A Survey of Lakeplain Prairie in Michigan

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Abstract

This report presents the results of a year-long project to inventory and characterize tallgrass prairie on Michigan's glacial lakeplain. The study was funded by the Coastal Management Program of the Land and Water Management Division and the Wildlife Division of the Michigan Department of Natural Resources. Data collected with support from the E.P.A. Great Lakes Program Office was utilized in a portion of this report. Lakeplain prairies are globally imperiled natural communities found in the Great Lakes states of Wisconsin, Illinois, Indiana, Michigan, and Ohio; and in southern Ontario, Canada. In Michigan, lakeplain 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 and Allegan counties in the southwest. Less than one percent of historical lakeplain prairie acreage remains in Michigan. As with elsewhere in the Great Lakes region, prairies were drained and converted for agricultural production beginning early in the nineteenth century. Although a number of these areas were later abandoned and partially reverted to the natural condition, more recent concentrations of urban development have all but eliminated these systems from Michigan's landscape. A total of 50 lakeplain prairie remnants were located in Michigan, ranging from 2-200 acres in size. The largest concentrations of prairie remnants are in southwest Wayne County, in and around the St. Clair River delta, and along the Saginaw Bay shoreline in Tuscola County.

Analysis of vegetation data taken in Michigan's prairie remnants indicated a clear moisture gradient and resulted in our subdivision of lakeplain prairies into wet, wet-mesic, and mesic subtypes. Rare plant and animal surveys in lakeplain prairie remnants resulted in many new occurrences and an increased understanding of the common insect fauna.

The conservation of lakeplain prairie remnants should include land acquisition, prairie restoration and management, and public education and involvement. Prairie remnants in Wayne County are of highest priority for land acquisition due to the extreme land-use pressures they currrently face. There are many opportunities to restore lakeplain prairie remnants through the re-establishment of natural hydrology and prescribed burning. Sites including restorable prairie remnants should be utilized when planning long-term watershed management strategies, and considered when locating potential wetland mitigation projects. Education of the public about lakeplain prairies, and other threatened components of Michigan's natural heritage, should raise awareness and stimulate involvement in land use planning ussues. It is critical for the conservation community in Michigan to take immediate action to conserve our lakeplain prairies before the few remaining opportunities are lost.

Introduction

Tallgrass prairies formed a significant part of the natural landscape in southern Lower Michigan when European-American settlers arrived in the late eighteenth century. Numerous accounts of early Michigan settlers describe a mosaic of prairie and "oak openings" that made up much of their natural surroundings (Chapman 1984). Early land surveyors made repeated reference to the extensive "open, wet prairie" as the political boundaries of Monroe and Wayne counties were being established. Unfortunately, given the relative ease of establishing homesteads in most open grasslands, nearly all of Michigan's prairies were converted for agriculture. Rich upland prairies were the first to fall to plow in the early 1800s. The conversion of wet prairies required extensive drainage systems, but also yielded productive agricultural land. That conversion took place in the mid-1800s.

The decline of these natural ecosystems has had a significant negative impact on a host of associated native plant and animal species. Ever-increasing land-use pressures in southern Michigan now threaten to eliminate the last viable examples of Michigan's prairies. It is therefore critical that we identify and protect prairie remnants. Scientific study of these remnants will help us to conserve - and perhaps partially restore - this unique component of our natural heritage.

Tallgrass Prairie on Michigan's Glacial Lakeplain

Tallgrass prairie in Michigan is considered to be at the northeastern extreme of Transeau's well known "Prairie Peninsula"(1935). This "peninsula" was described as an eastward extension of the prairie biome which stretched through Illinois to western Indiana, and included scattered prairie pockets in southern Lower Michigan and western Ohio. This prairie extension is considered to be the result of relatively dry post-glacial climate, known as the hypsithermal period, which allowed prairie and savanna associated species to colonize further to the east than they had been previously. More recent studies by Hayes (1964), Brewer (1969), and others has greatly increased our awareness of the historical extent of prairie in Michigan.

Michigan's native tallgrass prairies vary considerably in their species composition due to local differences in climate, soils, topographic position, and phytogeographic effects (Chapman 1984). In recent years researchers have focused on Michigan's prairies using historical accounts and known remnants (Hayes 1964; Thompson 1975; Chapman 1984). These studies, as well as recent field surveys of the Michigan Natural Features Inventory (MNFI) (Chapman & Crispin 1982), indicate that prairies occurring

on Michigan's glacial lakeplains may be floristically distinguishable from those occurring further inland. The intent of this project was to inventory and characterize Michigan's lakeplain prairie remnants.

Tallgrass prairie located on glacial lakeplain has been described for the Chicago region (Hansen 1981), northwest Ohio (Easterly 1979; Brewer 1994), and in southern Ontario (Rogers 1966; Reznicek & Maycock 1982; Bakowsky & Riley 1992). These latter studies have greatly expanded the range of the "prairie peninsula" to the northeast of Michigan and provide a more accurate description of the historical range of this prairie type.

More recent work in Michigan (Comer et al. 1993) provides the most detailed delineation thus far of the historical location and extent of lakeplain prairie. Using the transcribed field notes of the original land surveys of Michigan conducted by the General Land Office (1816-1856), a detailed digital map was produced for portions of Lower Michigan that historically included lakeplain prairie. From these maps, it was estimated that Michigan contained a total of 158,000 acres of lakeplain prairie in the early 1800s. These prairies were found in three regions of Lower Michigan lakeplain: the southeast region associated with Lake St. Clair, the Detroit River, and Lake Erie; the Saginaw Bay watershed, and the southwest region in Allegan and Berrien counties. Figure 1 indicates the relative abundance of lakeplain prairie historically associated with each county in Lower Michigan. Over 80% of historical lakeplain prairie acreage was found in the southeast region, especially in the counties of Monroe, Wayne, and St. Clair. The Saginaw Bay region included about 18%, primarily in Bay and Tuscola counties. Less than 1% of historical lakeplain prairie acreage was located in the southwest region of Lower Michigan.

Glacial Lakeplain and Natural Processes Maintaining Prairies

Michigan's glacial lakeplains were formed by sediments of pro-glacial lakes. These lakes formed at the margins of melting glaciers from the Wisconsin glaciation (Dorr & Eschman 1984) (Fig.2). In southeast Lower Michigan glacial lake deposits of clay are up to 100 meters thick over Paleozoic bedrock. The lacustrine deposits are thickest at their inland extremes and thinnest along the Lake St Clair and Lake Erie shorelines (Albert 1990). Poorly drained mineral soils characterize the clay plain. This clay plain extends inland up to 30 miles in southern Lenawee County, and continues around the southwest end of Lake Erie into northwestern Ohio. Within the clay lake plain there are several broad sand channels created when sand was deposited into the shallow pro-glacial lakes by glacial meltwater streams. These sand channels can be several miles wide, but the sand in them is typically only one to three meters thick. A series of sandy beach ridges, oriented towards the northeast, are found throughout this lakeplain in Lenawee, Monroe, Wayne, Oakland, and Macomb counties. The soils of the beach ridges are often excessively

drained, whereas those in adjacent swales are poorly or very poorly drained.. A glacial delta with both clay and sand deposits is located at the mouth of the St. Clair River.

On Saginaw Bay the flat clay plains extend up to 40 miles inland and are similar in character to those in the southeast region (Albert 1990). Similarly, they contain a thick mantle of clay overlain in places with a two to three meter thick layer of sand. The sand deposits were reworked by wind and wave

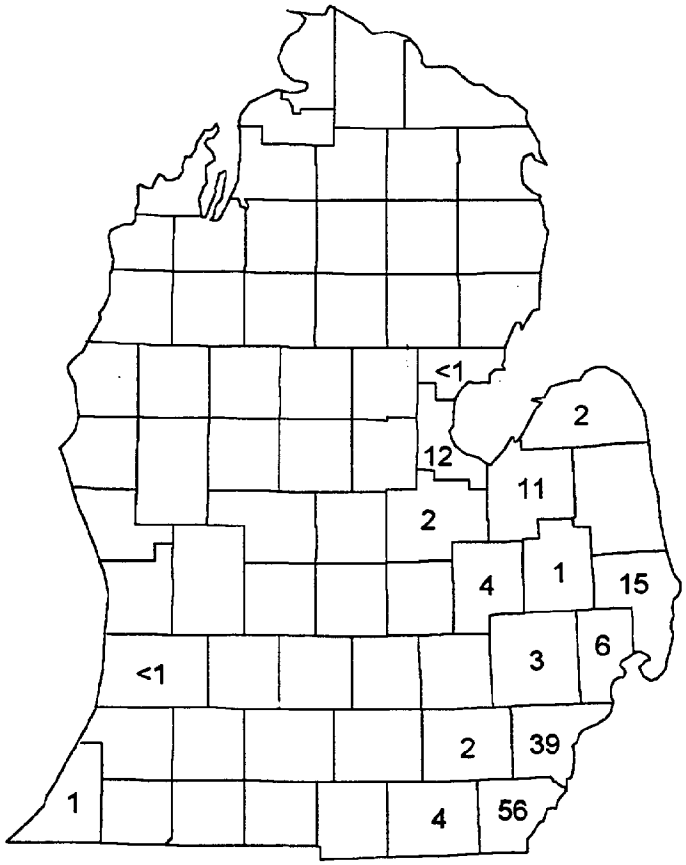


Figure 1: Distribution of lakeplain prairies in Michigan in the eighteenth century (Comer et al.1993). **(thousands of acres)**

action, creating smallsand dunes and spits and intervening depressions. A series of narrow beach ridges separated by poorly drained swales of varying width characteristize much of the Saginaw Bay shoreline.

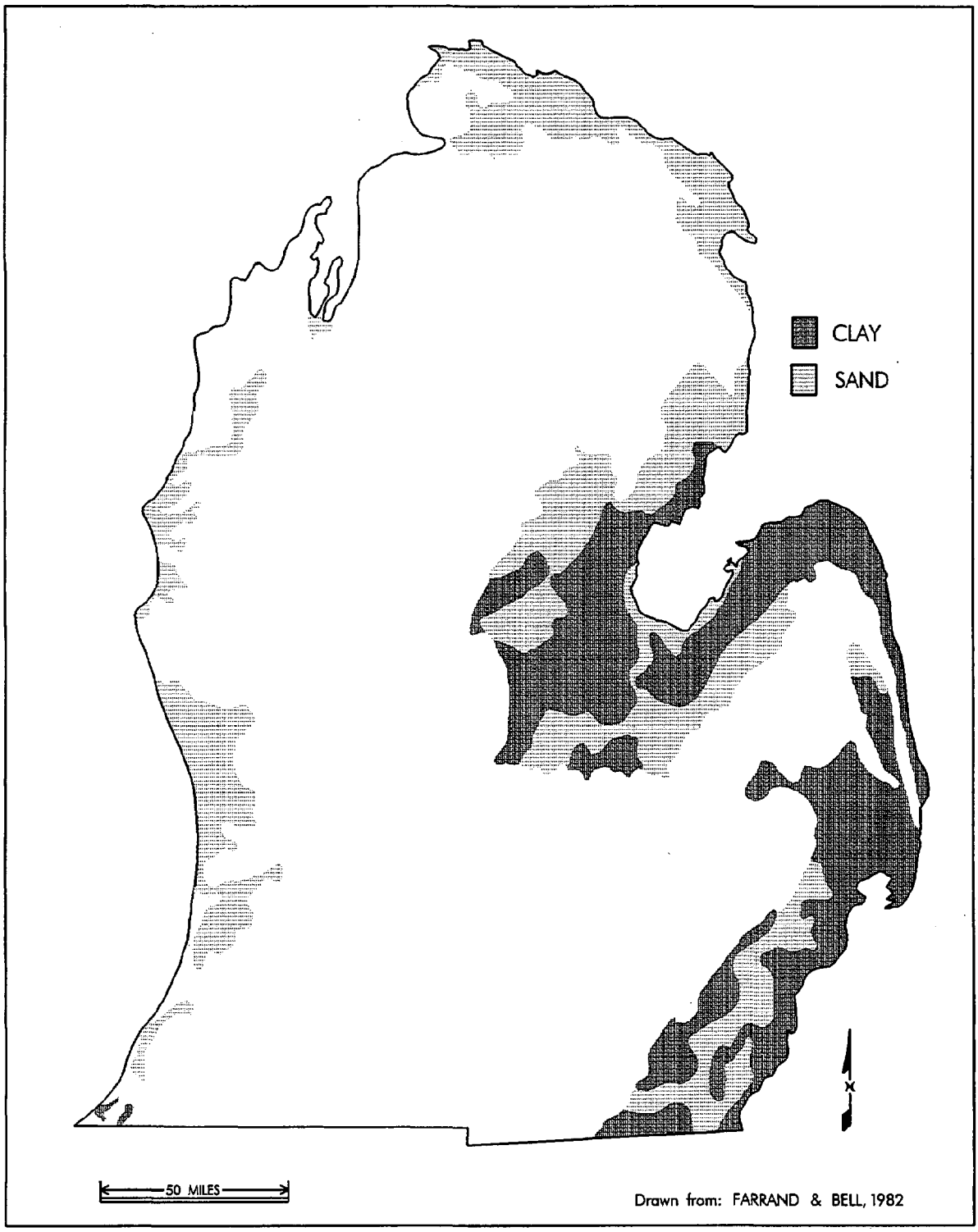


Figure 2: Distribution of clay and sand lakeplain in Lower Michigan.

The lakeplain of southwest Lower Michigan differs somewhat from those of the southeast region and Saginaw Bay, both in aereal extent and soil character (Albert 1990). The sand deposits tend to be much thicker on the lakeplain of Allegan County, with only a few small areas where clay bands or cemented sands are close to the surface. With this structure, very droughty soil conditions prevail. There are, however, low-lying areas with very fine, silt-rich sands. These areas are poorly drained on a seasonl basis. Further south in Berrien County, the sand deposits form a much thinner layer over the clay lake bed.

Factors favoring the development and maintenance of prairies on Michigan's lakeplain are many and complex. 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. Dominant 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 droughty 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 abiotic process in their establishment and maintenance. Such extreme variation in soil moisture regime is not conducive to the establishment of woody vegetation (Hayes 1964; Rogers 1966; Roberts et al. 1977). Figure 3 indicates the configuration of wet prairie, emergent marsh, and dry beach ridges as described by land surveyors along the Saginaw Bay shoreline in the 1820s and 1830s. In this case, not only were there dramatic seasonal fluctuations in water levels, there were also fluctuations associated with Great Lakes water level cycles. The wet prairies occupied the position on the landscape between emergent marsh and adjacent uplands. Along the Saginaw Bay shoreline, the boundary between prairie and marsh was not static; it moved inland and then back across the landscape, depending on the stage of the Great Lakes water level cycle.

The combination of the buildup of organic material and droughty conditions during the growing season would leave lakeplain prairies prone to wildfires, also limiting the encroachment of woody vegetation. However, it remains unclear whether lightning strikes and/or Native American activities would have played significant role in the maintenance of lakeplain prairie (Hayes 1964, Rogers 1966; Faber-Langendoen & Maycock 1987). It is clear, however, that Native Americans utilized dune ridges on the lakeplain for settlements and trails (Jones & Kapp 1972; Comer et al. 1993). As with 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 succeeded to closed-canopy oak forest since the 1800s.

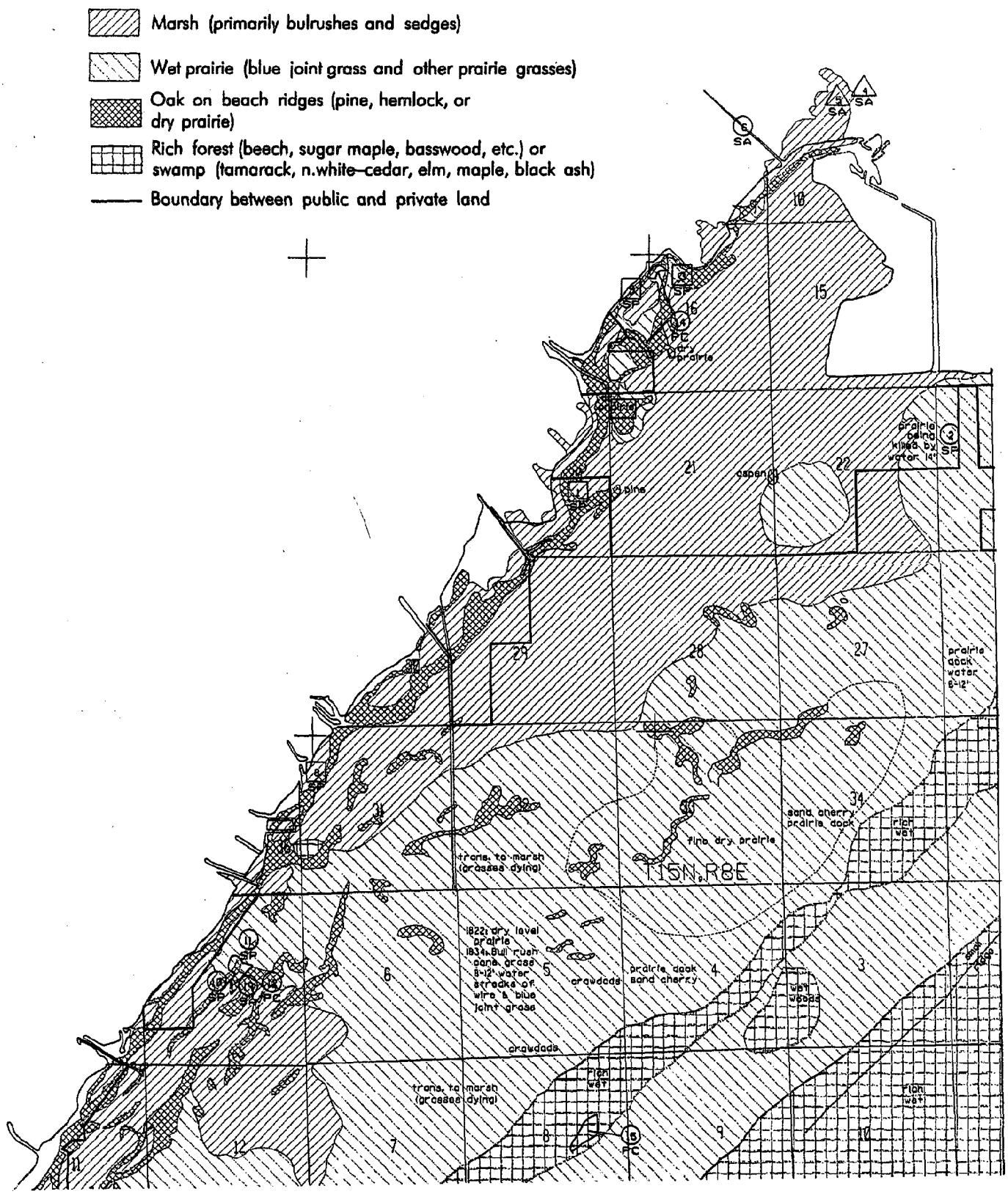


Figure 3: Mosaic of vegetation along the Saginaw Bay shoreline at Fish Point as described by land surveyors in 1822 and 1834 (Comer et al.1993).

Objectives

With a goal to inventory and characterize lakeplain prairies in Michigan, the specific objectives of this study were to:

- Identify all remaining examples of lakeplain prairie in Michigan.
- Collect data on hydrology, soils, and vegetation in lakeplain prairie remnants.
- Conduct rare plant searches for associated species in each remnant.
- Collect baseline data on associated insects, with an emphasis on rare and habitat restricted groups (*Orthoptera, Homoptera*, and *Hemiptera*).
- Document occurrences of king rail (*Rallus elegans*) and other rare animals.
- Analyze data from field visits along with selected historical data sets to refine a classification of lakeplain prairie types in Michigan.
- Provide site maps and recommendations for protection and management of lakeplain prairie remnants.

Format of Report

This report first documents the methods used to identify and characterize lakeplain prairie remnants. The results of the inventory will include a discussion of historic vs. current distributions of lakeplain prairies. This will be followed with a description of characteristic hydrology and vegetative zonation, and a classification of lakeplain prairie sub-types. Discussions of plant and animal surveys include methods utilized for their respective sections. Finally, current ownership and protected status of significant lakeplain prairies are discussed in providing recommendations for state-wide conservation priorities. Appendix I includes maps and specific recommendations for the protection and management of each prairie remnant. Appendix II includes figures from statistical analyses of prairie sites. Appendix III provides criteria for ranking prairie occurrences by natural quality. Appendix IV includes plant species lists, wetland coefficients, and natural quality indices for selected lakeplain prairies. Appendix V includes draft abstracts that provide additional information on selected rare plant species. Appendices VI through IX provide summary information related to animal surveys. Appendix X contains maps indicating unconfirmed sites which may contain additional lakeplain prairie remnants in Michigan.

Methods

Inventory and Field Sampling

The MNFI Biological Conservation Database (BCD) was consulted for known occurrences of lakeplain prairies and rare plant species known from prairie remnants (MNFI 1994). Maps depicting Michigan's landscape as it appeared during the original land surveys in the early 1800s (Comer et al. 1993) were also consulted to establish the historical range of prairies on Michigan's lakeplains. Aerial photography from 1978 (color IR) and 1987-88 (B/W IR) was interpreted for areas historically characterized as either "prairie" or "oak opening." From this initial interpretation, a compilation of sites was established and ranked for a "high," "medium," or "low" probability of containing prairie remnants.

Because most potential prairie remnants existed on private lands, county and township plat maps were consulted to compile a list of private landowners associated with each site. Each of approximately 500 private landowners associated with 120 sites ranked as "high" and "medium" was sent a letter in early spring of 1994 which informed them of our project and requested access to their property. From these initial mailings, 30% responded. Approximately 75% of the respondents gave us access to their land. Given the many sites with multiple ownerships, this response allowed us to visit portions of 70-80% of the sites targeted for inventory.

Spring site visits, conducted in June 1994, confirmed a number of new prairie occurrences. During these and later visits, plant lists were compiled for each site. Time spent compiling lists from each site varied, depending on the site's relative size and complexity. In a number of sites containing several clear vegetative zones, multiple plant lists were compiled that reflected each zone. Soils were characterized for each site and/or vegetative zone from corings taken with a 10 x 25cm bucket auger. Corings were taken to a depth that included 20cm of silt or clay, or where silt/clay was not encountered, to a depth of 1.5m. Soils were characterized by horizon for their texture, color, and presence of mottling. Depth to saturation was measured for the date of each sample. Sub-soil pH was measured in the field using a Cornell test kit.

Later site visits were conducted from July through October. Plant lists were augmented with each visit. Plant lists that had been compiled for previously known sites from the MNFI database were also augmented with each new visit. Our intention was to identify all sites in the spring so that all plant lists would be gathered throughout the growing season. Unfortunately, several prairie remnants were not discovered until later in the growing season. Plant lists for these sites may not have spring ephemeral species adequately represented.

In September 1994, quantitative sampling was conducted at two sites to characterize vegetative zonation in relation to landforms and soils. Similar sampling had been completed in 1993 at four additional prairie remnants for a related project (MNFI in prep). Some of the results from that project have been included in this report. At each site, transects of varying length were established perpendicular to the orientation beach ridges to sample a representative cross-section of each remnant. Percent cover was estimated for all plant species in a series of one square meter quadrates systematically located within each vegetative zone. Soils were cored and described for each vegetative sample point. At five prairies, an automatic level was used to measure elevations of each sample point along the transect. Previously established transects had wells installed to monitor water level fluctuations over the 1993-1994 growing seasons.

A master list of rare plant species likely to be encountered in lakeplain prairie remnants was developed prior to spring site visits. Each site was searched for these species throughout the growing season. At previously known sites, where known occurrences of rare plants existed, a search was conducted to update earlier records.

Data Analysis

Floristic Assessment Program

Plant lists for all lakeplain prairie remnants were input into the Michigan Floristic Assessment program developed by the Michigan Natural Heritage Program (Herman et al. in prep.). The program utilizes a flora list for the state of Michigan following in part the nomenclature given in Voss (1972, 1985) and Gleason and Cronquist (1991). It assigns wetland indicator coefficients, derived in part from Reed (1988) and floristic "coefficients of conservatism" to each vascular plant species (Wilhelm & Ladd 1988). Cumulative values for each site are then calculated to indicate overall wetland character and native floristic quality.

Classification of Lakeplain Prairie Sub-Types

Biotic and abiotic characteristics of each lakeplain prairie remnant were utilized to classify prairie remnants in relation to each other, and to similar prairies elsewhere in Michigan and southern Ontario. Statistical analyses were conducted using vegetative data from Michigan lakeplain prairie remnants.

Cluster Analysis

Vegetative relationships among the 40 lakeplain prairie remnants were first examined using a hierarchical agglomerative cluster analysis technique. Using overall species lists compiled for each site, vegetative similarities among prairies were calculated using a similarity coefficient that counts only positive species matches between any two sites. In essence, this coefficient represents the proportion of species shared by both locations out of the total number of species that occur at either or both locations. Based on the resulting matrix of similarity coefficients, the prairies were then grouped using Ward's method (a minimum variance clustering algorithm). In order to reduce problems arising from a sparse data matrix, only species occurring at five or more sites were included in the analysis (reducing the number of species to 219 out of a total of 631 species recorded for all sites).

TWINSPAN

Vegetative similarities and differences between lakeplain prairie remnants were also evaluated using TWINSPAN (Two-Way INdicator SPecies ANalysis), a polythetic divisive method for classification of samples based on the differential occurrence or abundance of one or more indicator species (Hill 1979b). A key attribute of the analysis is the identification of these differential or "indicator" species, i.e. species with clear ecological preferences, so that the presence of the species can be used to identify particular environmental conditions. The program first ordinates the samples and then uses this ordination to obtain a classification of the species according to their ecological preferences. The two classifications are then presented together in an ordered two-way table that expresses the species relations across a gradient defined by the ordering of the samples. The resulting ordered table is not simply an ordination, rather the together and similar arrangement displays the significant features of the data by grouping similar samples and/or species together.

The dual classification of sampling locations and species proceeds from several steps. TWINSPAN begins by ordinating the sampling locations based on all species using reciprocal averaging (Hill 1973). The program then identifies differential species that are preferential to one end or the other of this ordination; the samples are then ordinated again based on these differential species to obtain the "refined" ordination. Finally, the refined ordination of sampling locations is subdivided to identify similar groups of samples, and the most strongly preferential species or "indicator species" associated with each subdivision are identified.

The preliminary TWINSPAN analysis of 40 lakeplain prairie remnants was based on the presence/absence of species as determined from complete species lists for each site. As for the cluster

analysis, only species occurring at five or more sites were included in the analysis, reducing the number of species to 219 out of a total of 631 recorded species. One problem in attempting to group these prairies based on overall species lists, is that each prairie may contain a broad range of moisture conditions. Possible species' preferences to specific moisture conditions with each site are lost in a site-wide compilation. Accordingly, a subsequent TWINSPAN analysis examined locations with distinctive hydrologic/vegetative zones within several of the prairie remnants. As in the previous TWINSPAN analysis, vegetative similarities were based on the presence/absence of species at the sampling locations, and included only species occurring at five or more locations (reducing the number of species to 57 out of a total of 230).

DECORANA

The secondary TWINSPAN analysis of lakeplain prairie sub-sites resulted in a number of ambiguities, so possible further dimensionality of these sampling locations was explored using DEtrended COrrespondence ANalysis (DECORANA), a form of ordination based on reciprocal averaging (Hill 1979a). Reciprocal averaging is an iterative process that begins with a set of species scores and calculates sample scores as the mean score of the species that occur in it. The species scores are then recalculated so that the score of each species is the mean of the scores of the samples in which that species occurs. This process is repeated iteratively until scores stabilize. These are taken to represent the species' and samples' locations along the first axis or dimension. Subsequent axes are similarly derived through iteration following regression on the previous dimension(s) to preclude any linear relationship between these new scores and those on the previous dimension(s). In detrended correspondence analysis, the sample scores are also "detrended" to that they have no systematic relationship what-so-ever to sample scores on previous dimensions.

One major advantage of DECORANA is that both sample and species scores are derived in the same space, so that information about species' preferences can be directly used to interpret site (samples) scores and vice-versa.

Results and Discussion

Lakeplain Prairie Landscape

Analysis of presettlement landscape maps indicated that lakeplain prairies varied in size from fewer than ten acres to several thousand acres. These prairies typically occupied large flat expanses that were surrounded by several distinct plant communities, depending on location. For inland portions of the southeast region, especially in Wayne, Monroe, Washtenaw, and Lenawee counties, extensive wet prairies were found contiguous with oak-dominated savannas. The savannas were found either on dry, sandy beach ridges, or on rolling topography with moderate to poorly drained soils (Chapman 1984; Comer et al. 1993). The dry ridges were dominated by black oak (*Quercus velutina*) and white oak (*Quercus alba*), while those on less well drained soils included bur oak (*Quercus macrocarpa*) and swamp white oak (*Quercus bicolor*). Small, poorly drained depressions dominated by pin oak (*Quercus palustris*) were likely scattered among the prairies. Hardwoods such as black ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), and cottonwood (*Populus deltoides*) often formed swamps in lowlands adjacent to the prairies.

In the southwest region, relatively small prairies (2-700 acres) were located inland in Allegan and Berrien counties, commonly occurring in a mosaic of shrub swamps, emergent marshes, and/or white oak and white pine (*Pinus strobus*)-dominated forest and savanna. The small extant prairie at Grand Mere was located along shallow inland lake margins behind high dunes near the Lake Michigan shoreline.

Where lakeplain prairies were contiguous with the Great Lakes shoreline (along Saginaw Bay, Lake Erie, and Lake St. Clair {Fig. 1}), they typically formed a vegetative zone between coastal emergent marsh and inland forested swamp. Along the Saginaw Bay shoreline, oak-dominated beach ridges were a common part of the mosaic of coastal plant communities.

Figure 4 illustrates a typical cross-section of what can be found today along the Saginaw Bay shoreline in Tuscola County. This particular cross-section includes the Thomas Road prairie. In this case, a narrow, oak-dominated beach ridge is immediately adjacent to open water on Saginaw Bay. Behind the beach ridge, a mosaic of emergent marsh dominated by broad-leaved cat-tail (*Typha latifolia*) and shallow, open water grade into wet prairie and wet-mesic prairie. Muskrat lodges are commonly found in the shallow portions of the emergent marsh, whereas ant mounds and crayfish chimneys are more common in the adjacent prairie. Wet prairies along Saginaw Bay are typically dominated by blue-joint grass (*Calamagrostis canadensis*), sedges (*Carex stricta* and *Carex aquatilus*), prairie cordgrass (*Spartina pectinata*), red osier dogwood (*Cornus stolonifera*), and shrubby cinquefoil (*Potentilla fruticosa*). Wet-

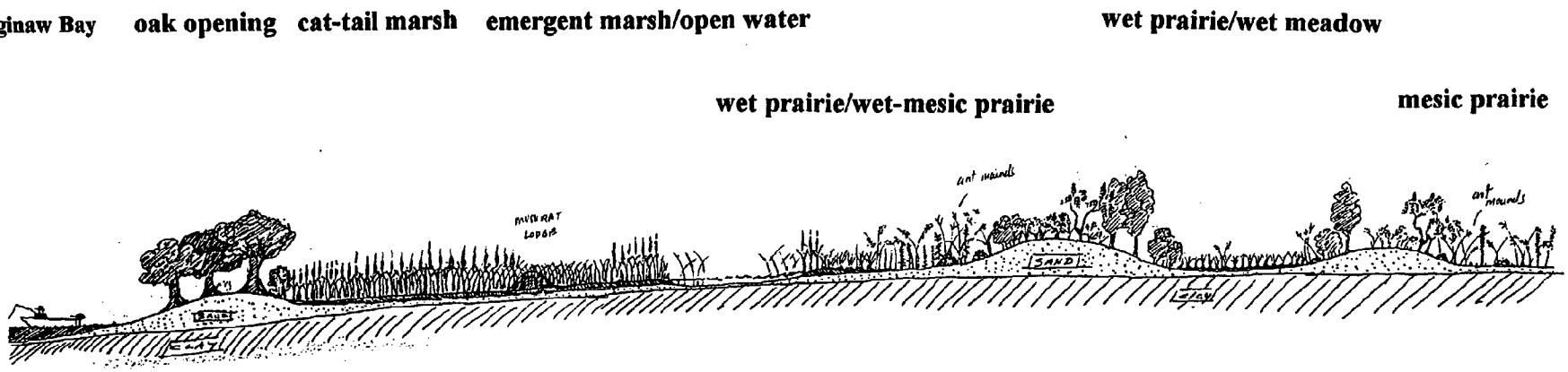


Figure 4: Cross-section of Great Lakes shoreline landscape at Thomas Road Prairie, Tuscola County.

mesic to dry-mesic conditions at the edge of wet swales, or on low beach ridges are typically dominated by tallgrass prairie species such as big bluestem grass (*Andropogon gerardii*), little bluestem grass (*Andropogon scoparius*), Indian grass (*Sorgastrum nutans*), and switch grass (*Panicum virgatum*). Other characteristic species include blazing star (*Liatris spicata*), tall coreopsis (*Coreopsos tripteris*), common mountain mint (*Pycnanthemum virginianum*), Ohio goldenrod (*Solidago ohioensis*), and Riddell's goldenrod (*Solidago riddellii*). Some swales between beach ridges are dominated by a mixture of sedges (*Carex spp.* and *Scirpus spp.*) and wet prairie grasses. Where oaks do not dominate the beach ridges, cottonwood (*Populus deltoides*) and smooth sumac (*Rhus glabra*) are common tree and shrub species.

Current Status of Lakeplain Prairie

As a natural community, tallgrass prairie on glacial lakeplain is globally imperiled (G2) (The Nature Conservancy 1994b). We estimate that less than one percent of range-wide lakeplain prairie acreage remains from what existed in the early 1800s. The most extensive remnants are found in southern Ontario, the Chicago region, and the Michigan counties of Wayne and St. Clair. Extensive tracts in southern Ontario are limited to Walpole Island and the Windsor Ojibway Prairies (Bakowsky & Riley 1992). In the Chicago region, several extensive prairies (totaling 2-3,000 acres) remain at Chiwaukee Prairie along the Illinois-Wisconsin border, the Markham Prairie outside of Chicago, and at the Hoosier Prairie within the Indiana Dunes National Lakeshore (Bowles pers. comm.). The Irwin Prairie is an extensive wet prairie/marsh complex in northwest Ohio, but it is likely that only a few acres of wet-mesic tallgrass prairie remains elsewhere in Lucas County (Cusick pers. comm.).

Prior to the start of the project, records from 27 lakeplain prairie remnants were known for Michigan, and recorded in the MNFI database. Prairie remnants were known from all three regions of the state (southeast counties, Saginaw Bay, southwest counties) where they historically occurred. A total of 23 new prairie occurrences were identified in 1994, primarily in the southeast counties of Wayne and St. Clair. Table 1 provides a comparison of current versus historical acreages for Michigan counties. Notwithstanding the new finds, the table reveals that lakeplain prairie has been virtually eliminated from the Michigan landscape. Of the estimated 158,000 acres present in the early 1800s, only 1,068 acres (0.7%) remain with some integrity. While the southeast counties historically contained 80% of state-wide prairie acreage, that region lost the greatest percentage of prairie acreage, when compared with Saginaw Bay and the southwest counties. Only 0.6% of historical prairie acreage (745 acreas today, out of 128,134 acres historically) remains in the southeast region. Similarly, the Saginaw Bay region retains about 0.8% of its historical acreage (227 acreas out of 28,610 acres historically). The southwest counties

of Allegan and Berrien, while they historically contained less than 1% of the state-wide total, appear to have retained the greatest proportion of their relative share, with 9% remaining (96 acres out of 1,027 acres historically). The regional differential in prairie loss is probably most closely related to the ease with which a given landscape could have been converted to productive agricultural lands. Prairies in the southeast counties, such as Wayne and Monroe, were close to rapidly growing population centers, and were drained to create some of the most productive agricultural land in the state. In recent years, additional prairie has

Table 1: Comparison of calculated presettlement vs. current acreages of lakeplain prairie in Michigan counties.

County	*Presettlement (acres)*	*% of County*	*Current (acres)*	*% of County*
Arenac	687	<1	0	0
Bay	12,132	4	104	<1
Genessee	570	<1	0	0
Huron	2,277	<1	44	<1
Saginaw	2,236	<1	0	0
Tuscola	10,708	2	79	<1
Saginaw Bay Region	**28,610**		**227**	
Lapeer	1,225	<1	0	0
Lenawee	4,484	1	0	0
Macomb	6,540	2	0	0
Monroe	56,158	16	24	<1
Oakland	2,955	<1	0	0
St. Clair	15,418	3	269	<1
Washtenaw	2,010	<1	0	0
Wayne	39,344	9	452	<1
Allegan	125	<1	94	<1
Berrien	902	<1	2	<1
Southeast Region	**128,134**		**745**	
Allegan	125	<1	94	<1
Berrien	902	<1	2	<1
Southwest Region	**1,027**		**96**	
State Total	**157,771**		**1,068**	

been lost to both residential and industrial expansion. Similarly, drainage of the lakeplain in the Saginaw Bay region provided for highly productive farm land. In Allegan County, however, relatively small prairies were located in a landscape of poor, sandy soils. Many farms that had been established in this area were later abandoned, and reverted to the state ownership.

Michigan's lakeplain prairie remnants are summarized in Table 2. Detailed site summaries are located in Appendix I. Where prairie remnants were found in distinct clusters, they are discussed both as individual sites and as parts of a significant cluster on the landscape. Individual prairie remnants range in size from less than one acre up to 200 acres. All have experienced severe degradation through agricultural drainage. In many cases, drains were inadequate for the productive agricultural use of the wettest portions of some prairies, leaving areas for prairie plants to persist. Some of these prairies were grazed and/or hayed. In other cases, secondary prairie established from remnant seed banks following either plowing or sand mining.

In the Saginaw Bay region, lakeplain prairie remnants are found only along the southern Saginaw Bay shoreline. Twelve prairie remnants totaling 197 acres are scattered along 30 miles of this shoreline (Fig. 5). Several remnants in this region are found within a complex of characteristic coastal plant communities, such as emergent marsh and upland oak-dominated beach ridges. A number of prairie remnants in the Saginaw Bay region are found on or adjacent to state land. The State Wildlife Areas of Wildfowl Bay, Fish Point, and Quanicassee, as well as the Tobico State Game Area include significant lakeplain prairie remnants. Work on protection and restoration of several prairie remnants in this area is on-going (MNFI in prep.).

A highly significant cluster of lakeplain prairie in Michigan is located in portions of the St. Clair River delta, with a cluster of 18 prairie remnants totaling 269 acres (Fig. 6). As with portions of the Saginaw Bay shoreline, several of these remnants are located on state land (Algonac State Park, St. John's Marsh and Recreation Area, and St. Clair Flats Wildlife Area) where conservation and management actions are on-going (MNFI in prep.). Several additional small remnants are contiguous to state lands. Walpole Island, with one of the largest lakeplain prairie occurrences in southern Ontario, is also part of the St. Clair River delta (Bakowsky & Riley 1992).

The largest lakeplain prairie remnant in Michigan, at Sibley Road in Brownstown Township, Wayne County, is actually part of a cluster of ten remnants totaling 370 acres (Fig. 7). This represents the most concentrated cluster of lakeplain prairie acreage in the state. Another cluster of five remnants totaling 82 acres is located in Wayne County to the west of the Sibley Road complex in Sumpter Township (Fig.7).

Table 2: Summary of size, location, and ownership of known lakeplain prairie remnants in Michigan.

Site Name	Prairie acreage	Assoc. acreage *	Prairie Region/ Subregion	County	Township-Range	Sect.	Ownership (type/ #)	
Killarny Beach	19	19	Saginaw Bay	Bay	T15N-R5E	19	state	1
Bangor Road	29	29	Saginaw Bay	Bay	T14N-R5E	4	private	1
Essexville Tank Farm	13	15	Saginaw Bay	Bay	T14N-R5E	15	private	2
Knight Road	30	100	Saginaw Bay	Bay	T14N-R6E	8	private, state	2
Coryeon Point	13	13	Saginaw Bay	Bay	T14N-R6E	14	state	1
Bradleyville Road	40	140	Saginaw Bay	Tuscola	T14N-R7E	11, 30	state, private	8
Bay Park	3	5	Saginaw Bay	Tuscola	T14N-R7E	1	private	4
Thomas Road	6	16	Saginaw Bay	Tuscola	T15N-R8E	10,14, 16	state	1
Berger Road	21	78	Saginaw Bay	Tuscola	T15N-R8E	13	state	1
Sebewaing Railroad	9	9	Saginaw Bay	Tuscola - Huron	T15N-R8E T15N-R9E	13 18	state, private, railroad	3
Sebewaing VFW	11	11	Saginaw Bay	Huron	T15N-R9E	7	state, private	6
Geiger Road	31	66	Saginaw Bay	Huron	T16N-R9E	15, 21, 22	state, private, conserv.org.	7
Weale Road	2	8	Saginaw Bay	Huron	T16N-R9E	14	state, private, railroad	5
Regional total	**227**	**509**						
Long Lane Airstrip	10	45	St. Clair Delta	St. Clair	T3N-R16E	22, 23	private	3
Algonac Borrow Pits	2	10	St. Clair Delta	St. Clair	T3N-R16E	27	state	1
Algonac South Drain	24	107	St. Clair Delta	St. Clair	T3N-R16E	27, 34	state	1
Algonac/Jankow Rd.	17	55	St. Clair Delta	St. Clair	T3N-R16E	34	state, private	3
Stone Road	4	4	St. Clair Delta	St. Clair	T2N-R16E	4	private	1
Field Road	10	30	St. Clair Delta	St. Clair	T2N-R16E T3N-R16E	4, 5, 33	private	1
Broadbridge and Marsh Roads	2	15	St. Clair Delta	St. Clair	T3N-R16E	15	private	1
Folkert Road	10	10	St. Clair Delta	St. Clair	T2N-R16E	5	private	3
Phelps Road	5	5	St. Clair Delta	St. Clair	T3N-R16E	31	private	2
St. John's Marsh	60	225	St. Clair Delta	St. Clair	T3N-R16E T2N-R16E	31 6	state	1
Middle Channel	5	10	St. Clair Delta	St. Clair	T2N-R16E	7, 19	private	1
Volkes Rd. SE	5	11	St. Clair Delta	St. Clair	T2N-R16E	19, 20	state	1
Volkes Rd. NW	25	30	St. Clair Delta	St. Clair	T2N-R16E	19, 20	private, state	2
Harsens Island School	15	15	St. Clair Delta	St. Clair	T2N-R16E	17	private	1
La Croix Road	25	25	St. Clair Delta	St. Clair	T2N-R16E	20	private	1?
Channel Road	20	20	St. Clair Delta	St. Clair	T2N-R16E	21	private	2?
Little Road	15	15	St. Clair Delta	St. Clair	T2N-R16E	16	private	1
Dickinson Island	15	15	St. Clair Delta	St. Clair	T2N-R15E	9, 12	state	1
Subregion total	**269**	**647**						

Table 2: continued

Site Name	Prairie acreage	Assoc. acreage *	Prairie Region/ Subregion	County	Township-Range	Sect.	Ownership (type/ #)	
Sibley Road	200	500	Greater Sibley	Wayne	T4S-R10E	7, 8	private, conserv.org. state, township	20 0
Beech-Daly Road	15	80	Greater Sibley	Wayne	T4S-R10E	18	private	2
Telegraph Road	24	24	Greater Sibley	Wayne	T4S-R10E	5	private	1
King Road	73	300	Greater Sibley	Wayne	T4S-R10E	17	private	3
West Road	23	23	Greater Sibley	Wayne	T4S-R10E	18, 19	private	2
Silver Creek	20	40	Greater Sibley	Wayne	T4S-R9E	11	private	2
Brest Road	15	15	Greater Sibley	Wayne	T3S-R10E	19	private	1
Subregion total	**370**	**482**						
Sumpter Township	40	100	SE Inland	Wayne	T4S-R8E	27	township, utility, private	3
Lincoln Middle School	5	5	SE Inland	Wayne	T4S-R8E	19	private	1
Sherwood Road	25	25	SE Inland	Wayne	T4S-R8E	29	private	5
Sumpter Borrow Pits	10	30	SE Inland	Wayne	T4S-R8E	31	private	1
Rawsonville Road	2	20	SE Inland	Wayne	T4S-R8E	30	private	1
Petersburg SGA (Minong Prairie)	9	60	SE Inland	Monroe	T7S-R6E	15, 20	state, private	15
Sterns Road	15	15	SE Inland	Monroe	T7S-R6E	25	township, private	2
Subregion total	**106**	**255**						
SE Region total	**745**	**1,384**						
Goose Lake	10	43	SW lakeplain	Allegan	T3NR14W	13	state	1
Beaver Meadow	11	11	SW lakeplain	Allegan	T3NR14W	15	state	1
Pipeline Prairie East	20	20	SW lakeplain	Allegan	T3NR13W	7	state	1
36th Street Prairie	28	28	SW lakeplain	Allegan	T3NR14W	12	state	1
130th Ave. Prairie	25	25	SW lakeplain	Allegan	T3NR13W	18	state	1
Grand Mere	2	2	SW lakeplain	Berrien	T5S-R19W	29	state	2
SW Region total	**96**	**129**						
State-wide total	**1,068**	**2,022**						

* Acreage values include prairie sites that qualify as MNFI element occurrences. Associated acreage values include prairie occurrence **plus** degraded areas immediately adjacent to prairie remnants that may be restorable.

Unfortunately, current land use pressures in Wayne County place all of these remnants under extreme threat. The highly fragmented pattern of land ownership further complicates conservation actions. One ten-acre parcel, owned by the Michigan Nature Association, represents the only currently protected portion of the Sibley Road complex. Two isolated prairies totaling 24 acres are all that remain in Monroe County. One small tract is partially protected and managed within the Petersburg State Game Area, while the other is an unprotected parcel partially owned by Whiteford Township.

In the southwest region of the state, a cluster of small lakeplain prairies totaling 94 acres is found within the Allegan State Game Area. Here, prairies are located within a complex of emergent marsh, seasonal ponds, and oak woodlands. Restoration and monitoring work is on-going at these sites

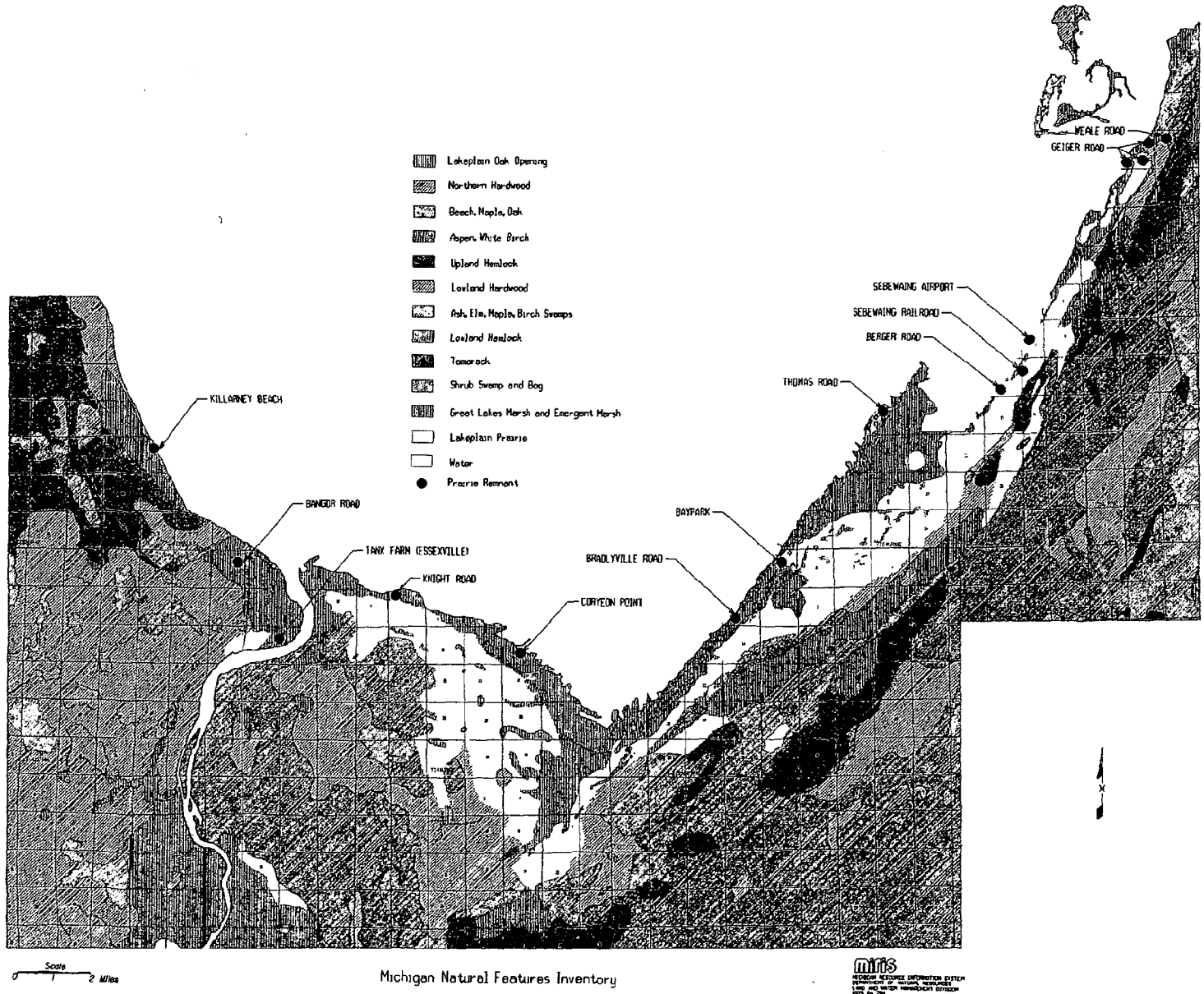
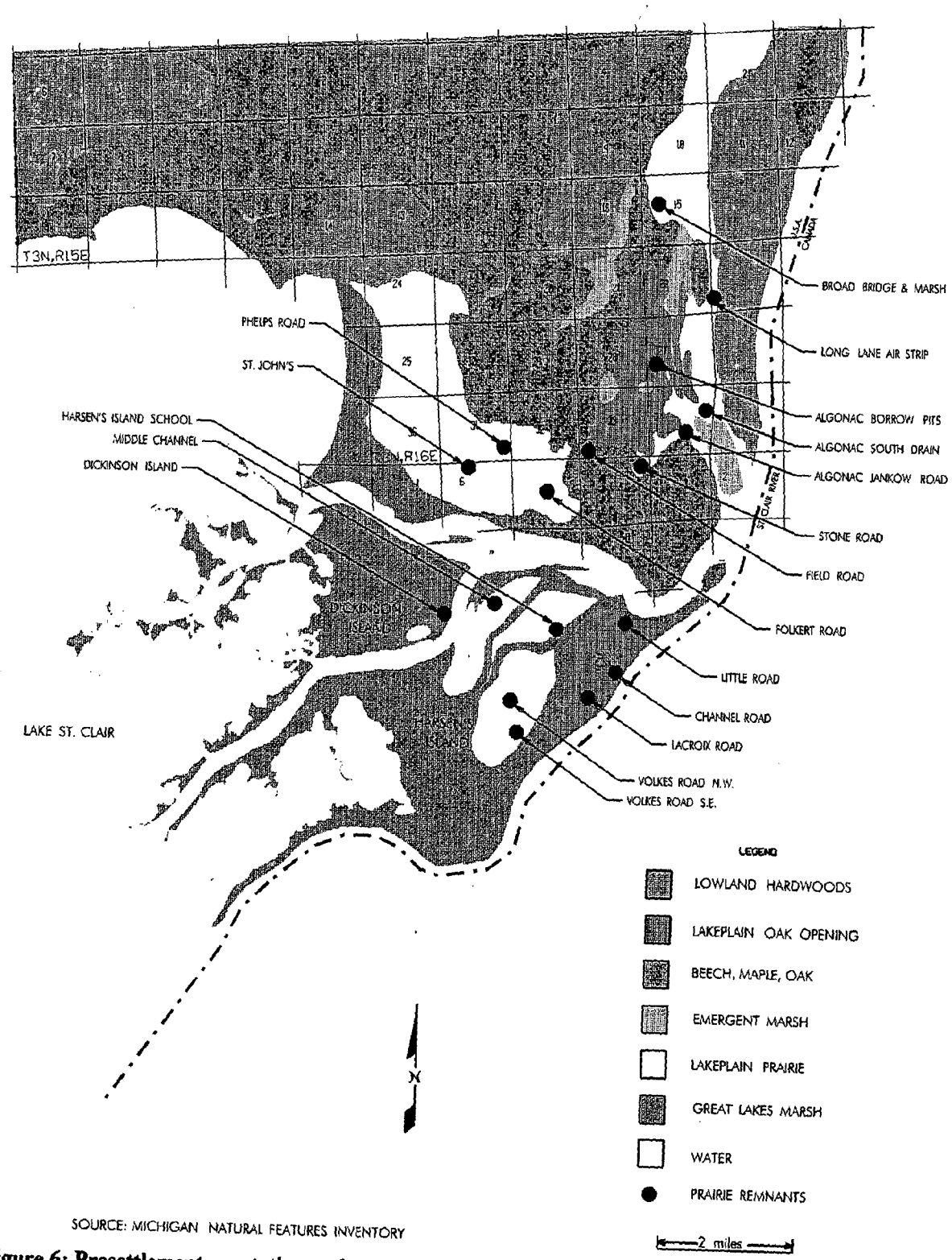


Figure 5: Presettlement vegetation and extant lakeplain prairies on Saginaw Bay.



SOURCE: MICHIGAN NATURAL FEATURES INVENTORY

Figure 6: Presettlement vegetation and extant lakeplain prairies on Michigan's St. Clair River delta.

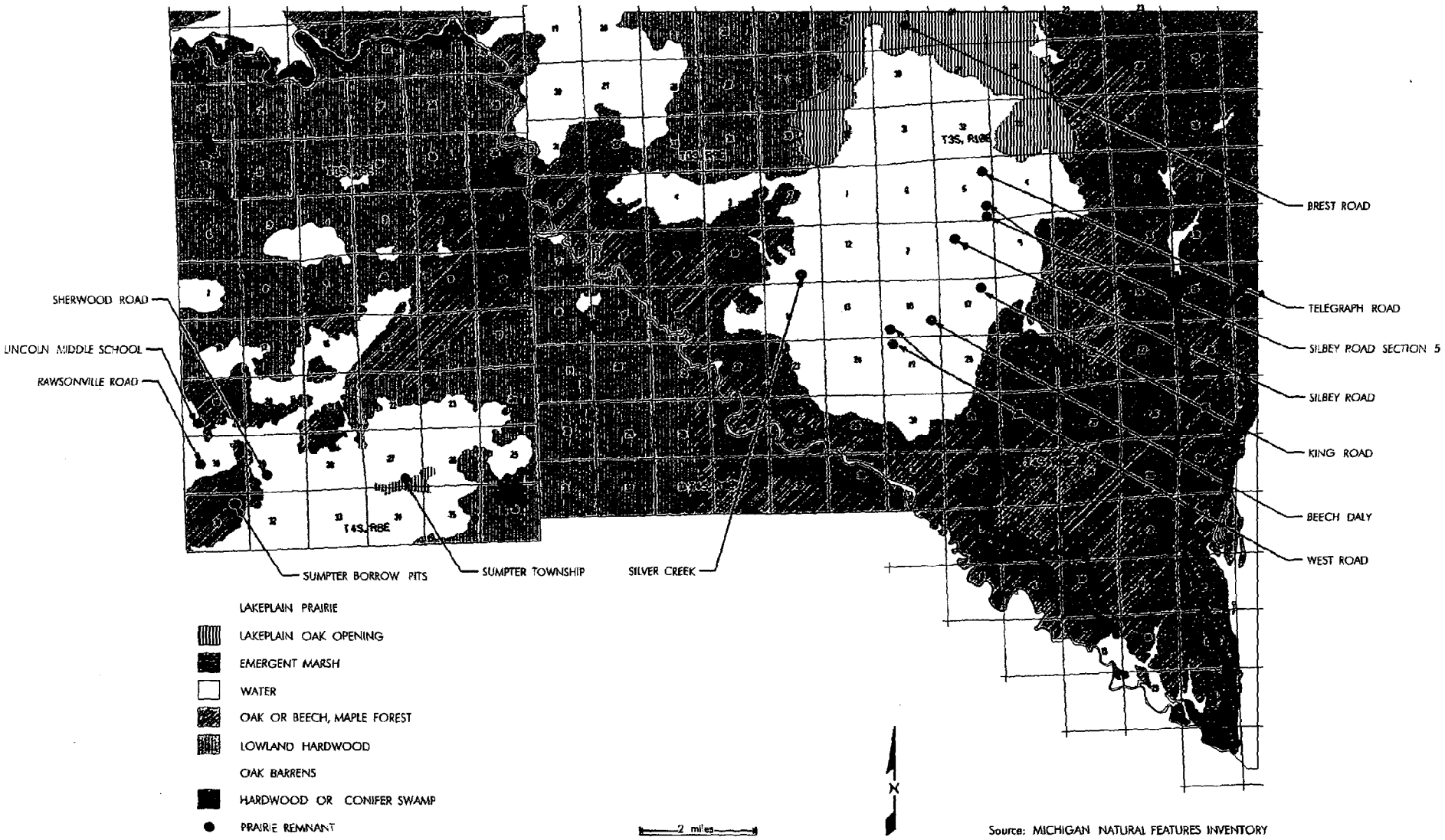


Figure 7: Presettlement vegetation and extant lakeplain prairies in southwest Wayne County.

(MNFI in prep.). The two-acre prairie at Grand Mere in Berrien County forms a narrow band along the border of a shallow lake, and is included within Grand Mere State Park.

Lakeplain Prairie Hydrology and Vegetative Zones

Lakeplain prairie remnants in Michigan exibit a wide range of soil moisture conditions and vegetative zonation. This is due in part to historical land uses that dramatically modified local system hydrology. It is also due to high natural variability found locally within a given area. Subtle differences in elevation can cause significantly different soil moisture conditions on sand and clay lakeplain. Quantitative data from transects established at lakeplain prairie remnants in Algonac State Park (St. Clair County) and Sumpter Township (Wayne County) provide good illustrations of the interaction between hydrology and vegetation that is characteristic of these ecosystems (Minc 1994).

The prairie at Algonac State Park is located in a broad (1/2 mile wide) swale that connects to the St. Clair River to the southeast. It is bordered on the west by a sandy oak-dominated ridge. The deepest portion of the swale includes a county drain. Prior to the installation of the drain, it is likely that prairie vegetation was restricted to the swale's border, with marsh dominating deeper portions. Drainage may have resulted in the expansion of prairie throughout a greater portion of the swale than was occupied historically.

A transect was established from the oak ridge across the prairie to the drainage ditch. Elevations were measured and eight wells were installed along the transect for monitoring water levels throughout the growing season (Fig. 8). A difference in elevation just over two meters was measured between the high and

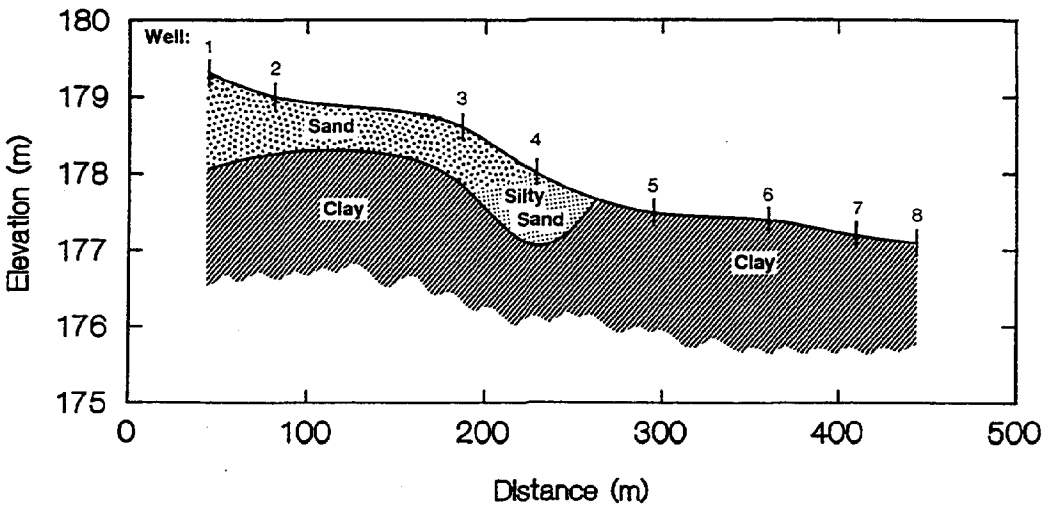


Figure 8: Well location and soil stratigraphy along a transect at Algonac State Park (from Minc 1994).

low ends of the transect. Soil profiles characterized during well installation indicated fine-medium sands overlaying lacustrine clay at the higher end of the transect. Lower portions of the transect graded from finer sands and silts to surficial clays. Water level data from 1993 indicated that in April water was at or near the surface at wells 3-8. By early June, water levels had dropped somewhat, but saturated conditions prevailed for the lower half of the transect. By the end of June, however, water levels had dropped to a half meter below the surface at the lowest end of the transect. This condition remained stable until November, when water levels began to rise. By December, saturated conditions again prevailed at the lowest end of the transect. Throughout the course of the growing season, water levels flucuated between one half and one meter in each of the eight wells (Appendix II). Cluster analyses of well data taken from 14 different dates indicated a division of the eight wells into two main groups: wells 1-3, on the sand ridge, and wells 4-8, at the lower end of the transect, with clay at ot near the surface (Appendix II). Well number 4 was identified as having hydrologic conditions intermediate between the more distinctive groupings of wells 1-3 and 5-8.

TWINSPAN analysis of quantitative vegetation data taken around each well divided the transect into two groups, clustering wells 1-3, 4-8 (Appendix II). A secondary division separated out well eight from wells 4-7. The primary division reflects the earlier clustering made with soils and water level data. The secondary division breaking out vegetation at well eight may correspond to the substantially wetter and prolonged saturated conditions at the lower end of the transect. Species strongly associated with the drier portions of the transect (wells 1-3) included red maple (*Acrer rubrum*), common cinquefoil (*Potentilla simplex*), and annual bedstraw (*Galium aparine*). The overstory of the sand ridge is dominated by black oak (*Quercus velutina*) and white oak (*Quercus alba*). The best indicator species associated with the wet and open conditions between wells four and seven was pale field sedge (*Carex granularis*). Other common species in this area were Dudley's rush (*Juncus dudleyi*), marsh blazing star (*Liatris spicata*), common mountain mint (*Pycnanthemum virginianum*), Ohio goldenrod (*Solidago ohioensis*), and Missouri ironweed (*Vernonia missurica*). These forbs are all characteristic species of lakeplain prairies. No prairie grasses were found to be abundant enough to be identified as indicator species in this zone, but they were present. The lower end of the transect included an open overstory with tree species such as pin oak (*Quercus palustris*) and red ash (*Fraxinus pennsylvanica*) which are associated with poorly drained conditions. Herbaceous and shrub species best represented at well eight included meadow sedge (*Carex stricta*), water knotweed (*Polygonum amphibium*), side-flowered aster (*Aster lateriflorus*), and the introduced glossy buckthorn (*Rhamnus frangula*). Relatively few species were widely occurring along the transect, indicating distinct vegetative zonation, from upland oak savanna, through wet-mesic prairie, to the edge of marsh/shrub swamp. In this example, a difference of just over two meters in elevation, coupled

with a water level fluctuation between one half and one meter, appears to maintain vegetative zones that include many characteristic species of lakeplain prairies.

Subtle differences in elevation and hydrology create a variety of vegetative zones *within* lakeplain prairies as well. A transect established in a prairie remnant in Sumpter Township (Wayne County) helps to illustrate the characteristic variation encountered. This very gently rolling landscape includes an occasional low beach ridge and varies in elevation by 1-2m. It is also crossed by a number of deep drainage ditches (Fig. 9). Like much of the sand lakeplain in Wayne County, soils here are characterized by 2-4m of sand over clay. Occasionally a thin lens of silt was encountered in the soil coring. Annual water level fluctuations appear to be about one meter, as determined through interpretation of soil characteristics which included mottling and the accumulation of organic material. The coupling of water level fluctuation with this gently rolling topography results in a patchwork where portions of the prairie flood nearly every spring while other portions remain dry at the surface. The mosaic of vegetation that results from these hydrologic differences is reflected in dominant as well as a number of rare species. Portions of this landscape which experience annual floods commonly included meadow sedge (*Carex stricta*), bulrush (*Scirpus pendulus*), and Dudley's rush (*Juncus dudleyi*), as well as state special concern species like two-flowered rush (*Juncus biflorus*) and Engelmann's spike-rush (*Eleocharis engelmannii*). Portions of this prairie that are slightly higher on the landscape included big bluestem grass (*Andropogon gerardii*), little bluestem grass (*Andropogon scoparius*), Missouri ironweed (*Vernonia missurica*), northern blazing star (*Liatris scariosa*), colic root (*Aletris farinosa*), and tall sunflower (*Helianthuis giganteus*). Rare species in this zone included state special concern, orange grass (*Hypericum gentianoides*); state threatened, three-awned grass (*Aristida longispica*); and state endangered, few-flowered nut-rush (*Scleria pauciflora*). Driest portions of the prairie included winged sumac (*Rhus copallina*), wild indigo (*Baptisia tinctoria*), round-headed bush-clover (*Lespedeza capitata*), and wild lupine (*Lupinus perennis*).

Classification of Lakeplain Prairie Sub-Types

Naturally complex zonation coupled with extensive fragmentation and degradation found among Michigan's lakeplain prairies makes classification of prairie sub-types extremely difficult. A classification of prairies in southern Ontario was completed using soils and vegetation data from 63 prairie remnants, 40 of which were relatively undisturbed (Faber-Langendoen & Maycock 1992). They described prairies on the southern Ontario sand and clay lakeplain in six categories along a moisture gradient consisting of; wet, wet-mesic on sandy loam, wet-mesic on sand, mesic, dry-mesic, and dry regimes. Dominant species in

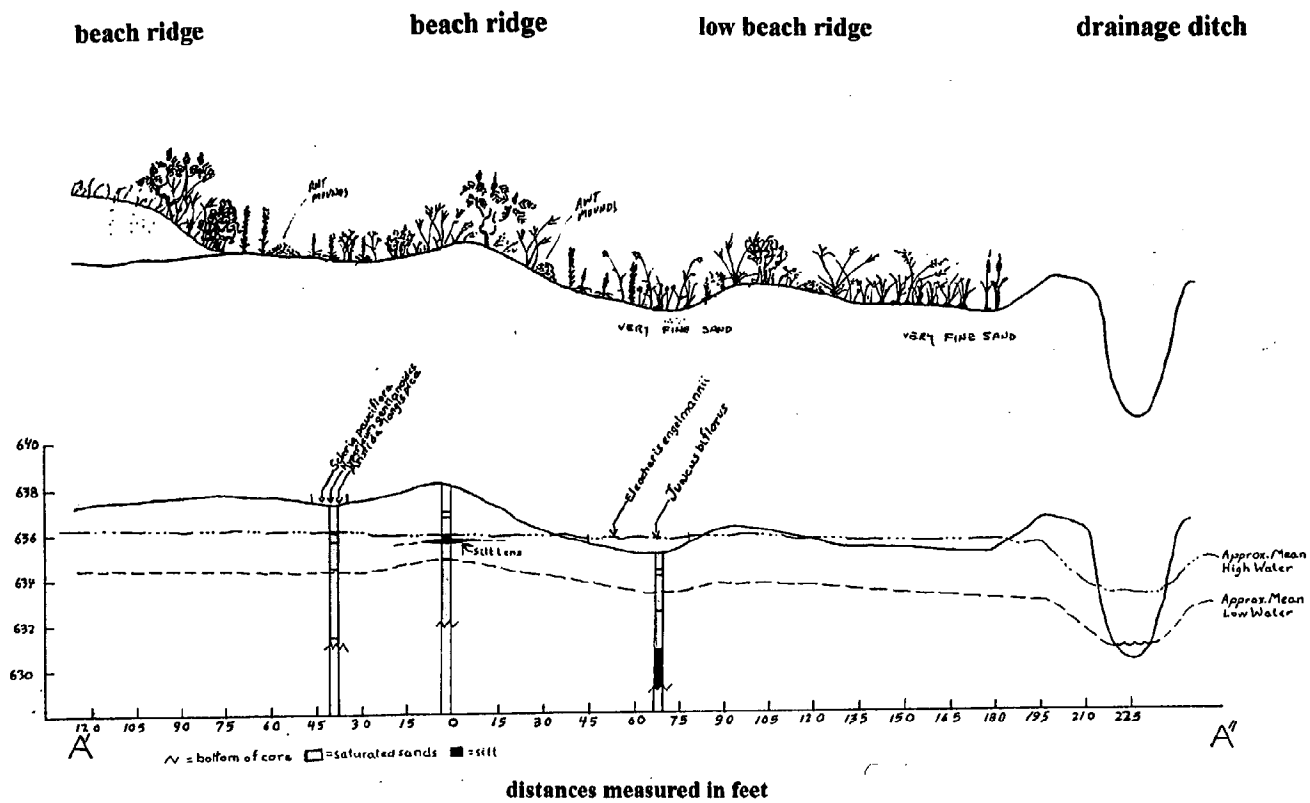


Figure 9: Elevational cross-sections of lakeplain prairie in Sumpter Township, Wayne County depicting water level flucuations, vegetative zones, and rare plant habitats.

their wet prairies include blue-joint grass (*Calamagrostis canadensis*), prairie cordgrass (*Spartina pectinata*), and meadow sedge (*Carex stricta*), while their wet-mesic prairie on sandy loam was dominated by switchgrass (*Panicum virgatum*), big bluestem grass (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), and common mountain mint (*Pycnanthemum virginianum*). Dominants in their wet-mesic prairie on sand include blue-joint grass (*Calamagrostis canadensis*), Canada goldenrod (*Solidago canadensis*), big bluestem grass (*Andropogon gerardii*), and prairie cordgrass (*Spartina pectinata*). They had more difficulty describing the mesic to dry end of the spectrum because they had fewer sampling sites in a less disturbed condition. Their mesic to dry prairies both included little bluestem grass (*Andropogon scoparius*) and big bluestem grass (*Andropogon gerardii*) as dominants.

In Michigan, all lakeplain prairie occurrences are small remnants that have experienced significant degradation through past land uses. We utilized the presence of plant species by prairie remnant, and by vegetative zone within selected prairies, to help clarify sub-types in the state. First, the Michigan Floristic Assessment program (Herman et al. in prep) was used to sort sites by the combined wetness coefficients for plants found at each site. Table 3 includes all prairie remnants where 20 or more plant species were noted, ordering them from the wettest to the driest (-5 = obligate wetland, 0 = facultative, +5 = obligate upland). The table also illustrates the relative number of native vs. introduced plant species, and a combined score for the relative "conservatism" of plant species found at each site. Cluster analyses, TWINSPAN, and DECORANA were used to further clarify relationships between prairie sites.

Cluster Analysis

The cluster analysis identified two relatively distinct groups of lakeplain prairie sites. For clarity, these groupings are also presented in Table 4. With several exceptions, these two groups appear to represent species differences between sites that are near the coast (Cluster 1) versus those that are farther inland (Cluster 2). Subdivisions of these two main clusters (identified by the horizontal lines in Table 4) are difficult to interpret. The subdivision of Cluster 1 may separate coastal sites that include a drier, upland component to their flora (above the line) from those sites that grade into marsh (below the line). The subdivision of Cluster 2 appears to reflect differences in species richness, with species-rich sites clustering together (above the line), and species-poor sites clustering together (below the line). In addition, all of the Allegan sites (all of which are relatively species-poor), form their own cluster.

Table 3 : Floristic assessment of lakeplain prairie sites ordered by combined wetness coefficients for plant species present.

Site Name	# of Species	Introduced Species	Combined Coefficient of Conservatism	Mean Coefficient of Conservatism	Combined Wetness Coefficient
Coryeon Point	31	0	26.58	4.77	-2.7
Berger Road	89	4	40.17	4.26	-2.3
Dickinson Island	79	3	33.98	3.82	-2.0
Geiger Road	110	7	50.34	4.80	-1.9
Weale Road	68	3	37.47	4.54	-1.8
Thomas Road	91	7	40.88	4.29	-1.7
Bradleyville Road	162	5	58.30	4.58	-1.5
Middle Channel	96	5	45.42	4.64	-1.5
Knight Road	62	4	29.97	3.81	-1.5
36th Street (Allegan)	54	0	44.23	6.02	-1.4
Sebewaing Railroad	87	6	40.33	4.48	-1.4
130th Avenue (Allegan)	43	0	38.89	5.93	-1.3
Essexville Tank Farm	68	8	33.35	4.04	-1.3
Volkes Road SE	58	3	30.46	4.00	-1.3
Harsens Island School	60	6	29.05	3.75	-1.3
St. John's Marsh	173	32	45.77	3.48	-1.2
Volkes Road NW	33	1	24.37	4.24	-1.2
Pipeline (Allegan)	68	4	44.26	5.37	-1.1
Sebewaing VFW	69	4	33.88	4.07	-1.1
Bangor Road	49	3	26.00	5.71	-1.1
West Road	61	3	37.13	4.75	-1.0
Sibley Road	190	7	69.65	5.05	-0.9
Grand Mere	85	5	35.25	3.82	-0.7
Bay Park	51	2	35.29	4.94	-0.7
Silver Creek Prairie	24	0	23.68	4.83	-0.7
Sumpter Township	211	18	60.86	4.19	-0.4
Sumpter Borrow Pits	60	5	29.18	3.77	-0.4
RawsonvilleRoad	72	6	27.32	3.22	-0.4
King Road	128	12	51.35	4.54	-0.3
Algonac/Jankow Road	95	8	37.55	3.85	-0.3
Killarny Beach	64	4	33.75	4.22	-0.3
Algonac South Drain	126	10	47.66	4.25	-0.2
Algonac Borrow Pits	90	8	41.00	4.32	-0.1
Brest Road	81	7	39.52	4.59	0.0
Long Lane Airstrip	39	3	23.86	3.82	0.3
Phelps Road Prairie	26	1	21.18	4.15	0.4
Field Road	48	3	28.34	4.10	0.5
Broadbridge & Marsh roads	49	4	24.14	3.45	0.6
Sherwood Road	58	11	25.34	3.33	1.1
Petersburg SGA	184	32	49.02	3.61	1.3
Sterns Road	70	11	27.85	3.33	1.8

Table 4: Primary division of lakeplain prairies in cluster analysis.

Cluster 1	Cluster 2
Sterns Road	Sumpter Borrow Pits
Long Lane Airstrip	Sherwood Road
Harsens Island School	Silver Creek
Grand Mere	West Road
Bay Park	Field Road
Volkes Road SE	Broadbridge and Marsh roads
Volkes Road NW	Rawsonville Road
Weale Road	Brest Road
Bangor Road	Algonac/Jankow Road
Middle Channel	Peterburg S.G.A.
Algonac South Drain	Sumpter Township
St. John's Marsh	Sibley Road
Bradleyville Road	Algonac Borrow Pits
Thomas Road	130th Street Allegan
Berger Road	36th Street Allegan
Dickinson Island	Allegan Pipeline
Geiger Road	Goose Lake Allegan
Tank Farm (Essexville)	Beaver Meadow (Allegan)
Killarny Beach	Coryeon Point
	Phelps Road
	Lincoln School

TWINSPAN

Overall, the primary TWINSPAN divisions duplicate those of the cluster analysis very closely, with TWINSPAN Group 0 corresponding to Cluster 1 and TWINSPAN Group 1 corresponding to Cluster 2 (Appendix II). Only three sites were reassigned: Sterns Road, Grand Mere, and Coryeon Point. The reassignment of these sites provides a somewhat better conformity between group assignment and distance from the coast. That is, TWINSPAN Group 0 includes all wet, coastal sites, while TWINSPAN Group 1 includes all inland sites. Within the group of inland sites, the Allegan sites again group together (TWINSPAN Group 11).

Indicator species for TWINSPAN Group 0 include *Spartina pectinata*, *Fraxinus pennsylvanica*, *Potentilla anserina*, *Calamagrostis canadensis*, and *Juncus balticus*, all species with known preferences for wet or inundated conditions. In contrast, indicator species for TWINSPAN Group 1 are *Coreopsis tripteris* and *Aletris farinosa*; species preferring moist but not saturated conditions.

were based on the presence/absence of species at the sampling locations, and included only species occurring at five or more locations (reducing the number of species to 57 out of a total of 230).

A table presenting the two-way ordering of species and sampling plots for this analysis appears in Appendix II. This table makes a primary division between the Berger Road sites (i.e. BERGER2 - BERGER7, plus KNIGHTWET and JANKOW1) assigned to TWINSPAN Group 0, and the Bradleyville, Sumpter Township, and Volkes Road sites (i.e. BRADLEY1 - BRADLEY3, SUMPTER1 - SUMPTER5, VOLKSE1, VOLKNW2, plus JANKOW2 - JANKOW3, HARSONSCH, KNIGHTRDG, and BERGER1). The indicator species for this first division are *Carex stricta* (occurring in all Group 0 sites) and *Solidago canadensis* (occurring in 12 out of 14 Group 1 sites). It is interesting that this primary division appears to identify groups of sampling locations that belong to the same prairie. However, the consistent presence of *Carex stricta* in Group 0 suggests that these sites are somewhat wetter (wet prairie); conversely, the strong presence of *Solidago canadensis* in Group 1 argues for drier conditions (wet-mesic prairie).

Group 0 is subsequently divided into sub-groups 00 (comprising BERGER2 and JANKOW1) and 01, with the species *Cladium mariscoides* and *Lycopus americanus* occurring only in the latter group (N=6). Similarly, Group 1 is divided into sub-group 10 (BRADLY1, BRADLY2, BRADLY3, HARSONSCH, JANKOW3, KNIGHTRIDGE, SUMPTER3, VOLKNW2, and VOLKSE1), and sub-group 11 (BERGER1, JANKOW2, SUMPTER1, SUMPTER2, and SUMPTER5). Indicator species for this division are *Cirsium discolor* and *Juncus canadensis*, both of which occur more frequently in sub-group 10. These secondary subdivisions are difficult to interpret for several reasons. While one could consider the separation of sub-groups 00 and 01 along a moisture gradient, with sub-group 01 at the wettest extreme, the relatively low numbers of species noted for the BERGER2 and JANKOW1 sites (23 and 15 species, respectively) may have skewed the result. Other factors, such as depth of soil saturation and soil organic matter at these two sites appear to be quite similar to the other sites from Group 0. The explanation for the subdivisions of Group 1 into sub-groups 10 and 11 is somewhat less problematic. The presence of both *Cirsium discolor* (an obligate upland species) and *Juncus canadensis* (an obligate wetland species) as indicators of the same sub-group (10) seems odd. But, it reflects the reality of these prairies, where very small, wet depressions are scattered throughout a moderately drained complex. Sub-group 11 includes the driest sites in our sub-sample of prairie zones. Their separation probably indicates a good cut-off between wet-mesic prairie and mesic (or even dry-mesic) prairie sites.

DECORANA

Given some of the ambiguities resulting from the TWINSPAN and cluster analyses, we concluded that further analysis using DECORANA would be useful. In this ordination, the first dimension reflected the primary dimension of variability, along an apparent moisture gradient. In contrast, the second axis provided little additional information (as indicated by a narrow range of values for samples on this dimension). Thus, the most relevant dimension for ordering the sampling locations is the first dimension. Sites with high values on Dimension 1 include the Sumpter Road sites, while the Berger Road sites have the lowest values. Drier-site species have high scores on Dimension 1, while wet-site species score low on this dimension (Table 5). Based on these species associations, it appears that the lakeplain prairies can be generally ordered along a moisture gradient.

Table 5: Species with extreme high and low values on the first DECORANA axis.

Species High on Dimension 1		Species Low on Dimension 1	
Species	**Score**	**Species**	**Score**
Lespedeza capitata	508	*Juncus effusus*	60
Coreopsis tripteris	417	*Calamagrostis canadensis*	55
Lactuca canadensis	409	*Carex aquatilus*	51
Andropogon scoparius	370	*Lycopus americanus*	50
Poa compressa	353	*Juncus balticus*	40
Populus deltoides	335	*Carex stricta*	-25
Fragaria virginiana	318	*Salix exigua*	-35
Spiranthes cernua	316	*Cladium mariscoides*	-64
Aster dumosus	300	*Typha angustifolia*	-85
Daucus carota	274	*Iris virginica*	-86
Scirpus pendulus	260	*Scirpus americanus*	-96
Solidago canadensis	256	*Campanula aparinoides*	-125
Rudbeckia hirta	252	*Gentianopsis crinita*	-125
Andropogon gerardii	250		

Using site clusters and indicator species from the above analyses, Michigan's lakeplain prairie remnants were placed into wet, wet-mesic, and mesic categories. Those prairie remnants that include distinct zones of multiple categories were described as such (Table 6). Given the low number and degraded condition of sites in the mesic category, labeling of these sites should be considered as tentative.

Michigan's lakeplain wet prairies are most commonly found on both sand and clay lakeplain close to the shoreline of Saginaw Bay and within the St. Clair River Delta. Soils of these prairies range from medium sands to silty clay loams that are poorly drained and moderately alkaline (pH 7-8). Water levels fluctuate on seasonal as well as multi-year cycles. Characteristic plant species include: blue-joint grass (*Calamagrostis canadensis*), prairie cordgrass (*Spartina pectinata*), rush (*Juncus balticus*), meadow sedge (*Carex stricta*), sedges (*Carex aquatilis*) and (*Carex pellita*), shrubby cinquefoil (*Potentilla fruticosa*), swamp milkweed (*Asclepias incarnata*), and twig-rush (*Cladium mariscoides*). Combined wetness coefficients for plant species found in these sites range from about -1.0 to -3.0. Although rich in plant species, they typically include fewer species than the wet-mesic sub-type. Michigan has a total of 14 known remnants that fall into the lakeplain wet prairie category.

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 Saginaw Bay shoreline. This sub-type more commonly occurs on sand lakeplain with soils of medium to fine-textured sand that are slightly acid to moderately alkaline (pH 6-8). They experience seasonal flooding and typically include small pockets that remain wet throughout the year. These are among the most floristically diverse plant communities in Michigan, with as many as 200 plant species found within a single prairie remnant. Characteristic plant species include big bluestem grass (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), little bluestem grass (*Andropogon scoparius*), marsh blazing star (*Liatris spicata*), tall coreopsis (*Coreopsis tripteris*), switch grass (*Panicum virgatum*), common mountain mint (*Pycnanthemum virginianum*), colic root (*Aletris farinosa*), Ohio goldenrod (*Solidago ohioensis*), Canada golderod (*Solidago canadensis*), and shrubby St. John's wort (*Hypericum kalmianum*). Combined wetness coefficients for plant species found in these sites range from about +0.5 to -1.0. Michigan has a total of 37 known remnants that fall into the lakeplain wet-mesic prairie category.

Lakeplain mesic prairie can be tentatively characterized as occurring on both sand and clay lakeplain and is not commonly found close to the Great Lakes shoreline. Soils range in texture from loam to medium sand and encompass a wide range in pH. These sites may never flood, but probably remain moist through much of the spring. Characteristic plant species include little bluestem grass (*Andropogon scoparius*), Indian grass (*Sorghastrum nutans*), colic root (*Aletris farinosa*), prairie dock (*Silphium terebinthinaceum*), round-headed bush-clover (*Lespedeza capitata*), tall coreopsis (*Coreopsis tripteris*), and wild indigo (*Baptisia tinctoria*). Combined wetness coefficients for plant species found in these sites range from about +0.5 to +2.0. Michigan has a total of six known remnants that fall into the lakeplain mesic prairie category.

Table 6: Michigan lakeplain prairie sub-types, occurrence ranks, and locations.

Site Name	Lakeplain Prairie Sub-type	Occurrence Rank	Prairie Region	County
Killarny Beach	lakeplain wet prairie	C	Saginaw Bay	Bay
Bangor Road	lakeplain wet prairie	C	Saginaw Bay	Bay
Essexville (Tank Farm)	lakeplain wet prairie	CD	Saginaw Bay	Bay
Knight Road	lakeplain wet prairie	CD	Saginaw Bay	Bay
Coryeon Point	lakeplain wet prairie	D	Saginaw Bay	Bay
Bradleyville Road	lakeplain wet-mesic prairie lakeplain wet prairie	CD AB	Saginaw Bay	Tuscola
Bay Park	lakeplain wet-mesic prairie	CD	Saginaw Bay	Tuscola
Thomas Road	lakeplain wet-mesic prairie	C	Saginaw Bay	Tuscola
Berger Road	lakeplain wet prairie lakeplain wet-mesic prairie	B C	Saginaw Bay	Tuscola
Sebewaing Railroad	lakeplain wet prairie	C	Saginaw Bay	Tuscola - Huron
Sebewaing Airport	lakeplain wet prairie	CD	Saginaw Bay	Huron
Geiger Road	lakeplain wet-mesic prairie lakeplain wet prairie	C B	Saginaw Bay	Huron
Weale Road	lakeplain wet-mesic prairie	D	Saginaw Bay	Huron
Long Lane Airstrip	lakeplain wet-mesic prairie	D	St. Clair Delta	St. Clair
Algonac Borrow Pits	lakeplain wet-mesic prairie	D	St. Clair Delta	St. Clair
Algonac South Drain	lakeplain wet-mesic prairie	C	St. Clair Delta	St. Clair
Algonac/Jankow Road	lakeplain wet-mesic prairie	C	St. Clair Delta	St. Clair
Stone Road	lakeplain mesic prairie	D	St. Clair Delta	St. Clair
Field Road	lakeplain wet-mesic prairie	CD	St. Clair Delta	St. Clair
Broadbridge and Marsh Roads	lakeplain wet-mesic prairie	D	St. Clair Delta	St. Clair
Folkert Road	lakeplain wet-mesic prairie	D	St. Clair Delta	St. Clair
Phelps Road	lakeplain wet-mesic prairie	D	St. Clair Delta	St. Clair
St. John's Marsh	lakeplain wet prairie	BC	St. Clair Delta	St. Clair
Middle Channel	lakeplain wet-mesic prairie	D	St. Clair Delta	St. Clair
Volkes Rd. SE	lakeplain wet-mesic prairie	D	St. Clair Delta	St. Clair

Table 6: continued

Site Name	Lakeplain Prairie Sub-type	Occurrence Rank	Prairie Region	County
Volkes Rd. NW	lakeplain wet-mesic prairie	C	St. Clair Delta	St. Clair
Harsen's Island School	lakeplain wet-mesic prairie	CD	St. Clair Delta	St. Clair
La Croix Road	lakeplain wet-mesic prairie	D ?	St. Clair Delta	St. Clair
Channel Road	lakeplain wet prairie	C ?	St. Clair Delta	St. Clair
Little Road	lakeplain wet-mesic prairie	D ?	St. Clair Delta	St. Clair
Dickinson Island	lakeplain wet prairie	CD	St. Clair Delta	St. Clair
Silver Creek	lakeplain wet-mesic prairie	C	Greater Sibley	Wayne
Brest Road	lakeplain wet-mesic prairie	C	Greater Sibley	Wayne
Telegraph Road	lakeplain wet-mesic prairie	CD	Greater Sibley	Wayne
Sibley Road	lakeplain wet-mesic prairie lakeplain wet prairie	AB C	Greater Sibley	Wayne
West Road	lakeplain wet-mesic prairie	CD	Greater Sibley	Wayne
King Road	lakeplain wet-mesic prairie	B	Greater Sibley	Wayne
Beech-Daly Road	lakeplain wet-mesic prairie	CD	Greater Sibley	Wayne
Lincoln Middle School	lakeplain wet-mesic prairie	D	SE Inland	Wayne
Sherwood Road	lakeplain mesic prairie	CD	SE Inland	Wayne
Sumpter Borrow Pits	lakeplain wet-mesic prairie	CD	SE Inland	Wayne
Rawsonville Road	lakeplain wet-mesic prairie	D	SE Inland	Wayne
Sumpter Town Prairie	lakeplain wet-mesic prairie lakeplain mesic prairie	C BC	SE Inland	Wayne
Petersburg SGA (Minong Prairie)	lakeplain mesic prairie lakeplain wet-mesic prairie	CD CD	SE Inland	Monroe
Sterns Road	lakeplain mesic prairie	CD	SE Inland	Monroe
Goose Lake	lakeplain wet-mesic prairie	C	SW	Allegan
Beaver Meadow	lakeplain wet-mesic prairie	D	SW	Allegan
Pipeline Prairie East	lakeplain wet-mesic prairie	BC	SW	Allegan
36th Street Prairie	lakeplain mesic prairie	C	SW	Allegan
130th Ave. Prairie	lakeplain wet-mesic prairie	C	SW	Allegan
Grand Mere	lakeplain wet-mesic prairie	D	SW	Berrien

Finally, Michigan's lakeplain prairies were placed within the context of other known lakeplain prairie occurrences in the Great Lakes region to develop a qualitative ranking of sites from A-D that reflects their natural quality and extant system function (Table 6). Criteria in developing these rankings include prairie size, adjacent natural communities, land use history, potential for restoring natural disturbance regimes, and species diversity (Appendix III). In general, Michigan's lakeplain prairies are

small, highly disturbed remnants that are in need of considerable effort in order to restore significant natural functions. Michigan contains no lakeplain prairies of similar size and intact vegetative structure to the Chiwaukee Prairie (Illinois-Wisconsin border), or Walpole Island (southern Ontario). The highest ranking sites (AB) in Michigan are along the Saginaw Bay shoreline at Bradleyville Road, and in Wayne County at Sibley Road. Those sites ranked B or BC include the wet prairies at Berger Road, Geiger Road (both in Wayne County), and St. John's Marsh (St. Clair delta); the wet-mesic prairies at King Road (Wayne County), and the Pipeline Prairie at Allegan State Game Area (Allegan County); and the mesic prairie at Sumpter Township (Wayne County). Ninteen of the remaining 57 Michigan prairie remnants were given C ranks, while 32 were ranked as CD or D.

Special Plant Surveys

Methods

Prior to field surveys, the MNFI database was consulted to compile information on the number and status of rare plant occurrences within the selected study areas. Particular attention was given to suites of species known within and in close proximity to prairie and associated natural community occurrences, such as the Sibley Road complex, or other areas where clusters of rare species indicated the potential presence of additional rarities. Prairie remnants identified for the lakeplain natural community inventory served as the sites that were concentrated upon for rare plant surveys. Areas such as these were highlighted for surveys to compile more comprehensive information on known rare plant occurrences as well as to seek new occurrences of other expected records based on recent discoveries.

During May, 1994, a reconnaissance trip was conducted by the project botanists and ecologists to gain an overview of lakeplain prairie habitats in southeastern Lower Michigan. Large remnants, such as the Greater Sibley complex, were examined to review species assemblages, community structure, and site indicators. A full range of lakeplain prairie habitat, from wet prairie to wet-mesic prairie remnants, was reviewed to discuss typical plant indicators, expected rarities, phenologies, soil conditions and other abiotic factors, and microhabitats where plant occurrences could best be sought or were most likely to be present. During this reconnaissance, examination of a portion of the Greater Sibley complex, in a site known as the King Road locality, resulted in the discovery of new rare plant occurrences. This provided an opportunity to review certain species in relation to microsite conditions and discuss recognition characters and other potential rarities. Reconnaissance concluded with a review of selected dry prairie habitats within the Petersburg State Game Area to review the xeric portion of the lakeplain prairie spectrum.

Following reconnaissance, field inventories were conducted from late May through early October. The majority of rare plant inventories were conducted during natural community inventories. When special plants--those species classified as endangered, threatened, or special concern--were identified, standard MNFI field forms were completed. Where appropriate, voucher specimens were collected for further study, confirmation, and ultimately herbarium submission. Field forms were processed following site inventories, resulting in the updating of numerous known occurrences and the recognition of many new special plant records. During the transcription and updating process, all occurrences were given an MNFI element occurrence rank (Appendix III) indicating the general quality, viability, and defensibility of

populations. Following the processing of field forms, these data were then submitted for mapping and entry in the MNFI Biological and Conservation Database (BCD).

Results and Discussion

A compilation of special plant species known in association with Michigan's lakeplain prairie remnants is presented in Table 7. For each species, the table provides the global rank assigned by The Nature Conservancy, the state rank assigned by MNFI, the state and federal status, and the prairie subregion(s), described previously in this report, in which occurrences have been identified. Field surveys resulted primarily in the identification of additional localities for species known previously within the described prairie subregions. In some cases, however, this resulted in the discovery of relatively large populations or the documentation of species known only from collections made several decades to nearly one century ago. Engelmann's spike-rush (*Eleocharis engelmannii*), for example, was known only from 15 records statewide, and only from one southeastern Michigan record documented in Wayne County in 1900 near the Detroit River. This species was found to be extant in new Wayne County localities in Sumpter Township. Few-flowered nut-rush (*Scleria pauciflora*), known previously from only three records in the state, two of which were turn-of-the-century collections (1904 and 1903), was discovered in southeastern Michigan, also in Sumpter Township.

Several new localities for Sullivant's milkweed (*Asclepias sullivantii)*, a western disjunct, were discovered in St. Clair and Monroe counties. Several occurrences previously documented in Michigan consist of populations occurring along roadsides and other rights-of-way. Among the new occurrences found during this study were populations existing in somewhat less vulnerable habitat away from rights-of-way in degraded lakeplain prairie. One of the largest populations of this species now known in the state was discovered in Monroe County. This population was found in an unusual area not within the boundary of historical lakeplain prairie as determined through analysis of historical data (Comer et al. 1993). A population of several hundred stems was identified during an inventory for eastern prairie fringed-orchid (*Platanthera lecucophaea*).

Examination of the assigned global ranks provided in Table 7 demonstrates that the vast majority of these species cannot be considered globally rare, as 86% have global ranks of G4 to G5 and are thus considered to be secure at the present time. (Explanations and criteria for both global and state ranks are provided in Appendix III). As discussed in more detail below, this is largely explained by the fact that most of the rare plants of the lakeplain occur in Michigan at the edge of their ranges. All of the taxa, however, are rare within Michigan, as shown by the state ranks. All of these species have a state rank of S3 or "higher" (the term higher meaning a greater rarity denoted by S1 or S2 ranking). Overall, the

Table 7: Rare vascular plant species associated with lakeplain prairie in Michigan.

SPECIES	RANK		STATUS		PRAIRIE SUBREGION				
	Global Rank	State Rank	State Status	Federal Status	Saginaw Bay	St. Clair Delta	Greater Sibley	SE Inland	SW Inland
Agalinis gattingeri	G3	S1	T			X			
Agalinis skinneriana	G3	S2	T	C2		X			
Angelica venenosa	G5	S3	SC				X	X	
Arabis missouriensis var. *deamii*	G5T3T4	S2	SC	C2				X	
Aristida longispica	G5	S2	T			X	X	X	X
Asclepias hirtella	G5	S1	T			X	X	X	X
Asclepias sullivantii	G5	S1	T		X		X	X	
Astragalus neglectus	G3G4	S2	SC	C2		X			
Baptistia leucophaea	G5Q	S1	E			X			
Boltonia asteroides	G5	S2	SC					X	
Cacalia plantaginea	G4G5	S2	T		X				
Carex festucacea	G5	S1S2	SC			X			
Conobea multifida	G?	S1	SC				X		
Cyperus flavescens	G5	S2S3	SC			X			
Cypripedium candidum	G4	S2	T	C3	X	X			
Echinodorus tenellus	G3	S1	E						X
Eleocharis engelmannii	G5	S2S3	SC					X	X
Eleocharis tricostata	G3	S2	T						X
Fimbristylis puberulenta	G5	SX	X			X			
Gentiana puberulenta	G4G5	S1	E						X
Helianthus mollis	G4G5	S1	T					X	
Hemicarpha micrantha	G4	S3	SC			X		X	X
Hypericum gentianoides	G5	S3	SC			X	X	X	X
Juncus biflorus	G5Q	S3	SC			X	X	X	X
Juncus brachycarpus	G4G5	S1S2	T				X	X	X
Juncus scirpoides	G5	S2	T						X
Juncus vaseyi	G3G5	S1S2	T				X	X	X
Lechea minor	G5	SH	SC				X?	X	
Lechea pulchella	G5	S1	T					X	
Lindernia anagallidea	G5	S2	SC					X	
Ludwigia alternifolia	G5	S2	T			X	X	X	X
Lycopodium appressum	G5	S2	T				X	X	
Panicum leibergii	G5	S2	T			X		X	
Platanthera ciliaris	G5	S2	T		X			X	
Platanthera leucophaea	G2	S1	E	LT	X	X		X	
Polygala cruciata	G5	S2S3	SC			X	X	X	X
Polygala incarnata	G5	SX	X					X	

Table 7: continued

SPECIES	RANK		STATUS		PRAIRIE SUBREGION				
	Global Rank	State Rank	State Status	Federal Status	Saginaw Bay	St. Clair Delta	Greater Sibley	SE Inland	SW Inland
Polygonatum biflorum var. *melleum*	G5TU	SX	X					X	
Pycnanthemum pilosum	G?	S3	SC					X	
Pycnanthemum verticillatum	G5	S1S2	SC		X				X
Ranunculus ambigens	G4G5	SH	T					X	
Ranunculus rhomboideus	G4	S2	T					X	
Rhexia virginica	G5	S3	SC					X	
Rotala ramosior	G5	S3	SC			X	X	X	X
Sabatia angularis	G5	S2	T						X
Scirpus clintonii	G4	S2	T				X		X
Scirpus hallii	G2	S1	E	C2					X
Scleria pauciflora	G5	S1	E			X		X	
Scleria triglomerata	G5	S2S3	SC			X	X	X	X
Silphium laciniatum	G5	S1S2	T					X	
Silphium perfoliatum	G5	S2	T					X	
Sisyrinchium atlanticum	G5	S1	T						X
Sporobolus heterolepis	G5	S2	T						X
Tradescantia virginiana	G5	S2	SC			X			
Triplasis purpurea	G4G5	S2	SC			X			
Valerianella chenopodiifolia	G5	S1	T					X	

majority of the species are an exceedingly rare component of Michigan's biota; approximately 90% are ranked S1 or S2 (this includes taxa ranked, for example, as S1S3). Species ranked SX or SH, referring to those taxa classified as extirpated or known only from historical records, respectively, comprise just under 10% of the list.

The rarest plant species of Michigan's lakeplain are the few that are presently considered globally imperiled, as indicated by those that are either currently listed under the Federal Endangered Species Act or are classified as Federal candidate species. One species, eastern prairie-fringed orchid (*Platanthera leucophaea*), is listed as Federal threatened. Species currently under consideration for federal listing include Skinner's gerardia (*Agalinis skinneriana*), Missouri rock-cress (*Arabis missouriensis* var. *deamii*), Cooper's milk-vetch (*Astragalus neglectus*), and Hall's bulrush (*Scirpus hallii*). Small white ladyslipper orchid (*Cypripedium candidum*), as denoted by its C3 status, is no longer under consideration for listing.

The rarest and most critically imperiled plant species of Michigan's lakeplain prairies is *Platanthera leucophaea*. This species is considered by Case (1987) to possibly be our region's most severely endangered orchid. Surveys by Case and others over the past decade have documented the decline

and increasing imperilment of this species, which has been impacted throughout its eastern North America range primarily by the destruction of moist prairie habitat (Case 1987; Sheviak and Bowles 1986; Bowles 1983). Ditching and draining, principally for agriculture, has severely affected *P. leucophaea*. As discussed by Case, this species is highly adapted to the cyclic changes of water levels in the Great Lakes. Its ability and need to migrate inland during high water years has enabled this species to perpetuate itself in a very dynamic environment. However, the loss of available lakeplain prairie habitat over the past several decades has removed important refugia for this species, and its numbers are greatly diminished. Although *P. leucophaea* has some ability to inhabit ditches, wet fallow fields, rights-of-way, and other degraded lakeplain habitats, the loss of intact prairie tracts make this species extremely vulnerable to extirpation. In lakeplain prairie remnants where it persists, *P. leucophaea* is also threatened by the relatively rapid encroachment of competitive woody vegetation, especially shrubs. Because many lakeplain prairie sites for this orchid no longer experience the natural disturbance regime necessary for the perpetuation of open habitat, it is likely that active management will be needed to maintain local populations and significant seed sources. Lastly, this striking and highly prized orchid is very susceptible to poaching and is persistently sought by photographers. For this reason, it must be noted that all references to specific localities for this globally imperiled species have been avoided in this report.

Additional information concerning selected rare plant species of Michigan's lakeplain prairies is provided in Appendix V, consisting of draft MNFI abstracts for endangered and threatened taxa. These abstracts provide synopses that present basic information on global and state distribution, taxonomy, recognition characters, and brief comments on status, threats, and management needs.

Overview of Floristic Relationships

As summarized in Table 7, numerous rare vascular plant species are known from and concentrated in Michigan's lakeplain prairies. Although rare within Michigan, several of these plant species are markedly disjunct from their primary ranges, where they are considerably more common. Many remaining prairie fragments support important species clusters, thus constituting significant refugia in the Great Lakes region. In general, much of the rare flora of the state (nearly 400 of approximately 1800 native species (Herman et al. in prep)) occurs in Michigan at the edge of its range.

Species such as three-awned grass (*Aristida longespica*), chestnut sedge (*Fimbristylis puberula*), gentian-leaved St. John's-wort (*Hypericaum gentianoides*), short-fruited rush (*Juncus brachycarpus*), two-flowered rush (*J. biflorus*), least pinweed (*Lechea minor*), yellow fringed-orchid (*Platanthera ciliaris*), tooth-cup (*Rotala ramosior*), few-flowered nut-rush (*Scleria pauciflora*), tall nut-rush (*S. triglomerata*),

cup-plant (*Silphium perfoliatum*), and corn salad (*Valerianella chenopodiifolia*), among others, are examples of predominantly southern taxa reaching the northern edge of their range in Lower Michigan. Relatively few rare species of the lakeplain demonstrate the northern element of Michigan's flora. However, Vasey's rush (*Juncus vaseyi*) and Clinton's bulrush (*Scirpus clintonii*) are good examples of boreal and northern Michigan species, respectively, that reach their southern range limit as disjuncts in Lower Michigan.

The rare flora of the Michigan's lakeplain prairies is also characterized by assemblages of disjuncts typical of western prairie communities as well as those found on pondshores and other intermittent wetland habitats along the Atlantic Coastal Plain. Disjuncts from western prairie communities include such species as Gattinger's gerardia (*Agalinis gattingeri*), tall green milkweed (*Asclepias hirtella*), Sullivant's milkweed (*A. sullivantii*), prairie Indian-plantain (*Cacalia plantaginea*), downy gentian (*Gentiana puberulenta*), downy sunflower (*Helianthus* mollis), compass plant (*Silphium laciniatum*), and prairie dropseed (*Sporobolus heterolepis*). Plants disjunct from their principal ranges along the Atlantic Coastal Plain comprise a significant component of the rare flora of Michigan's lakeplain prairies. This group is clearly the most diverse in composition. These well known species, many of which are considerably disjunct from their main distributions, are strongly concentrated in southwestern Lower Michigan, as discussed by Peattie (1922). Several coastal plain disjuncts, however, also occur in a sparser cluster in southeastern Lower Michigan, with a few species known to occur in rather scattered localities ranging into the western Upper Peninsula (Reznicek 1994).

Notable Coastal Plain rarities include dwarf burhead (*Echinodorus tenellus* (=*E. parvulus*)), three-ribbed spike-rush (*Eleocharis tricostata*), Engelmann's quillwort (*Isoëtes engelmannii*), scirpus-like rush (*Juncus scirpoides*), Leggett's pinweed (*Lechea pulchella*), appressed bog clubmoss (*Lycopodium appressum*), cross-leaved milkwort (*Polygala cruciata*), Maryland meadow-beauty (*Rhexia mariana*), meadow-beauty (*R. virginica*), netted nut-rush (*Scleria reticularis*), Atlantic blue-eyed-grass (*Sisyrinchium atlanticum*), and floating bladderwort (*Utricularia inflata (=U. radiata*) (Reznicek 1994). It should be noted that these species usually occur in association with several other, somewhat more widely distributed vascular plant taxa that are also known to be Coastal Plain disjuncts. Examples of these species, which are not listed as rare in Michigan, include Long's sedge (*Carex longii*), grass-leaved goldenrod (*Euthamia tenuifolia*), pennywort (*Hydrocotyle umbellata*), panic-grass (*Panicum spretum*), and hedge-hyssop (*Stachys hyssopifolia*) (Reznicek 1994).

Animal Surveys

Methods

Relatively little is known about the native fauna associated with lakeplain prairie communities, so surveys were designed to document occurrences of habitat-restricted insects and other rare animals. The Natural Heritage Biological and Conservation Database (BCD) was consulted for known occurrences of lakeplain prairies, insect host plants, and rare animal species associated with prairie remnants. Using additional information from spring 1994 natural community surveys for this project, 15 higher quality prairie remnants were surveyed for insects and 8 priority wetland complexes were surveyed for rails. Sightings of other listed animals also were recorded. Information on these species will be added to the BCD and become available for management planning and project review activities.

Insect Surveys

Several techniques were used to collect insects: selective hand-picking of insects feeding or resting on vegetation, diurnal sweepnetting of prairie vegetation, and nocturnal light-trapping. Of special interest were the Orthoptera (grasshoppers and crickets), Hemiptera (true bugs), and Homoptera (leafhoppers, spittlebugs, planthoppers, and treehoppers). These orders contain many herbivorous species which can be highly dependent upon specific host plants and their natural communities. Sampling dates and locations are shown in Appendix VI. Four sites (Bradleyville Road, Thomas Road, Algonac South Drain, and 36th Street Prairie) were sweepnetted monthly from June to September, and all except one (Bradleyville Road) was light-trapped monthly during that period. The remaining sites were sampled at least once during August and September.

Multiple sweepnet samples were taken from each lakeplain prairie area so that all zones of vegetation associated with the moisture gradient were included. Each sample consisted of 60 sweeps of a heavy canvas net while pacing slowly through the vegetation. Dominant plant cover and weather variables (temperature, wind speed, cloud cover) were noted. Collected material was transferred to an ethyl acetate-charged killing jar, and subsequently frozen. At a later date, insects were separated from vegetation and sample specimens from target groups were prepared following standard insect collection techniques.

Light-trapping consisted of a standard mercury-vapor light powered by a portable Honda generator. A 2 x 2 m metal conduit frame supporting a large white sheet was used as a collecting surface.

Collection periods generally started at sunset (about 2000 hr) and lasted for 4 - 6 hr. All surveys were conducted on nights on or near the new moon or on cloudy nights since bright moonlight lowers the responsiveness of many insects to light traps. Trapping sites were located within portions of the prairie with a high degree of floristic diversity. Collected insects were returned to the laboratory and processed following standardized techniques.

Prepared specimens were identified to genus or species using published references, or were sent to various experts for identification. Consultants for the project included D.F. Schweitzer (Eastern Regional Office of The Nature Conservancy, for the *Papaipema*); G.M. Fauske (North Dakota State University, for the remaining Lepidoptera and Orthoptera); K.G.A. Hamilton (Agriculture Canada, for the Cicadellidae in part); P.K. Lago (University of Mississippi, for the Scarabaeidae); D.A. Rider (North Dakota State University, for the Pentatomidae); E.G. Riley (Texas A&M University, for the Chrysomelidae); M.D. Schwartz (Agriculture Canada, for the Miridae); and S.W. Wilson (Central Missouri State University, for the Fulgoroidea).

Other Animal Surveys

Additional surveys were conducted for a variety of species associated historically with coastal wetlands. Special emphasis was given to the state endangered king rail (*Rallus elegans*) which has not been systematically surveyed for several years (Rabe 1986). Because Great Lakes' water levels were at a record high during that period, breeding habitat for the rails was extremely limited and fragmented. Periodic resampling is necessary to better evaluate the population trends and distribution of this rare species. If other listed species were sighted during the course of field surveys, their presence was noted.

Taped calls were used to locate birds during the breeding season because king rails are difficult to observe. Three types of calls (Kic-Kic, Chic-Chic-Churr, Grunt) were played at 100 m intervals while walking through appropriate habitat. Surveys were not conducted if wind speeds exceeded 10 mph. Each site was surveyed one time between 3-11 May during early morning (0700-0900 hr) or late evening (2000-2300 hr) periods whenever possible. These times have been shown to produce consistent and reliable census results (Meanley 1969; Rabe 1986). Surveys are limited by both weather and a short sampling period, therefore, not all known king rail sites in the state were visited. Special emphasis was given to wetland complexes associated with Saginaw Bay to support on-going management initiatives. Sampling locations for king rail surveys are shown in Appendix VII.

Results and Discussion

Table 8 lists rare animal species that were located in association with Michigan's lakeplain prairie remnants. The table includes a breakdown of element ranks, legal status, and prairie subregion where each species occurs. Field surveys resulted primarily in the identification of additional localities for species known previously from lakeplain prairie and associated wetlands. As indicated by their global ranks, most of these species are considered to be secure on a rangewide basis at the present time. None are listed under the Federal Endangered Species Act nor are they classified as federal candidate species. All are much rarer within Michigan, however, as shown by their state ranks.

Table 8: Rare animal species associated with lakeplain prairie in Michigan.

SPECIES	RANK		STATUS		PRAIRIE SUBREGION				
	Global Rank	State Rank	State Status	Federal Status	Saginaw Bay	St. Clair Delta	Greater Sibley	SE Inland	SW Inland
Elaphe vulpina gloydi	G5T3	S2	T		X	X			
Erynnis baptisiae	G5	S2S3	SC			X		X	
Ixobrychus exilis	G5	S2	T		X	X			
Papaipema maritima	G4	S1S3	SC					X	
Papaipema sciata	G4	S2S3	SC			X		X	
Papaipema silphii	G3G4	S1S2	T		X			X	
Prosapia ignipectus	G4	S2S3	SC		X	X			
Rallus elegans	G4Q	S1	E		X	X			
Spartiniphaga inops	GU	S1S3	SC						X

Insect Surveys

Insect survey results should be considered preliminary since several groups are still being processed by experts. Of those completed to date, a total of 201 species from four orders (Hemiptera, Homoptera, Lepidoptera, and Orthoptera) have been identified from the 15 lakeplain prairie study areas. Species lists for nine coastal and six inland sites are shown in Appendix VIII and IX, respectively. A total of 160 species were collected from the coastal prairies, while only 135 species were collected from the inland prairies. Most of this difference, however, can be attributed to differences in sampling intensity and

time of year. For example, light trapping was conducted at only one inland prairie, while three coastal lakeplain prairies were sampled. If results from this technique are separated from the rest, then 90 and 83 species were collected by other techniques from coastal and inland prairies, respectively. In addition, three coastal sites were sampled monthly from June through September, while only one inland site received similar sampling intensity.

Although preliminary, six genera with potential to contain host-specific homopterans have been collected from inland lakeplain prairies: *Philaenarcys*, *Chlorotettix*, *Flexamia*, *Graminella*, *Hecalus*, and *Laevicephalus*. Another six genera with potential to contain host-specific homopterans have been collected from coastal lakeplain prairies: *Chlorotettix*, *Flexamia*, *Graminella*, *Hecalus*, *Laevicephalus*, and *Lonatura*. These specimens currently are being identified to the species level by experts. Because these groups are not well studied, we anticipate that a number of disjuncts, range extensions, and possibly new and undescribed species will ultimately be reported. Other recent studies of higher quality natural communities have had similar results (K.G.A. Hamilton pers. comm.; Higman et al. 1994; Panzer and Gnaedinger 1986a, 1986b).

At this time, no listed species are known to be collected at inland lakeplain prairie sites. Two state-listed special concern insects were collected from coastal study areas. *Prosapia ignipectus* (red-legged spittlebug) was recorded in three sites, Algonac South Drain (two openings), Algonac-Jankow Road, and Thomas Road. This species appears to occur primarily in sandy regions of the northeastern U.S. south to southern Pennsylvania, and is locally common in southern Ontario (Hamilton 1982)

Only three verified collection localities were known from Michigan prior to 1994. One site was associated with alvar grassland in Presque Isle County; two sites were associated with prairie fen complexes in Berrien and Jackson counties. Little is known about the life history and ecology of most spittlebugs. Adult *P. ignipectus* typically are collected in July and August in Michigan. The nymphs are known to feed on the subterranean parts of little bluestem grass (*Andropogon scoparius*) and are difficult to find. Adults feed on little bluestem (Morse 1921) and other grasses (Hamilton 1982). It is unlikely that the species is restricted to a single plant species. In Michigan, it has been found only in relatively undisturbed habitats containing the larval host plant. One of the three locations at Algonac where it was collected includes dry sandy openings containing little bluestem within a degraded oak savanna system. The other two sites appear wetter, however, they still contain little bluestem. A single individual was collected from a sand ridge containing little bluestem adjacent to wetter zones of lakeplain prairie vegetation at Thomas Road. While fewer than five individuals were collected at most sites, 13 specimens were collected from the wetter portion of Algonac South Drain (around well 5, see Fig. 8).

Papaipema sciata (Culvers root borer, a moth) was collected only from light traps at Algonac South Drain. The species is know from seven localities in lower Michigan although many of these populations are small. This group of moths in general is very local in occurrence and rarely is found any great distance from larval food plants. *Papaipema sciata* is not restricted to prairies. It does occur quite frequently with *P. limpida* which shows a stronger affinity for prairie habitats. Both species have been recorded from lakeplain mesic prairie and prairie fen. *Papaipema sciata* has the potential to occur wherever large, unburned populations of its host plant, Culver's root (*Veronicastrum virginicum*) is found. All *Papaipema* moths are susceptible to fire at all stages of their life histories.

Overall, preliminary results indicate a fairly typical pattern of species occurrence for degraded and fragmented prairie remnants (Panzer 1988, Schweitzer pers. comm.). No one site appears to have more than a few of the more specialized prairie insects. Several sites have none. Additional light trapping is strongly recommended to further document occurrence and distribution of specialized prairie *Papaipema*. This group along with other specialist Lepidoptera are better indicators of intact prairies than the flora. Unlike perennial plants, fragmented Lepidoptera populations can be eradicated by single short term catastrophic events like severe drought or large unnaturally timed fire. A rich assemblage of prairie Lepidoptera indicates a high degree of historical continuity for the site. Good quality prairie remnants with intact fauna are considerably less common than remnants of good prairie flora.

Care should be taken when conducting prescribed burns since most of the prairie insect fauna is highly sensitive to unnaturally timed fires. Standard practices should include subdividing each remnant into smaller burn units, rotating burns so that adjacent areas are not burned in consecutive years, and allowing 3-5 years between burning of subunits to allow for recolonization from adjacent source populations. This is especially important for species that are not highly mobile and are closely associated with a host plant. Because insects tend to occur in localized patches and have seasonal activity patterns, additional survey work is recommended before management activities are implemented. Monitoring programs should be developed to evaluate insect response to lakeplain prairie restoration projects.

Other Animal Surveys

Of the eight wetland complexes surveyed for king rail, responding birds were documented at two. Although a large potion of suitable habitat was surveyed on the St. Clair Delta, only one breeding pair was identified at Harsen's Island in 1994. Surveys in 1986 with nearly identical coverage documented the presence of 17 birds, including 4 breeding pairs, in the complex (Rabe 1986). This area supported 61% of

the king rail population known to occur in the state that year. No one explanation readily explains the sharp decline. Much of the habitat still appears intact and relatively undisturbed. Because the birds tend to return to the same breeding territory year after year, a decline of this magnitude should not be attributed to the re-dispersal of individuals as Lake Huron water levels receded. Resurvey of the Delta should be a high priority in 1995. Additional information about is critical to develop management priorities for the king rail. Consideration should be given to the acquisition and protection of the prairie and adjacent wetlands at the Volkes Road Northwest site.

In addition to the St. Clair Delta, one breeding pair and one single bird were identified in Nayanquing Point during 1994 surveys. Six birds representing three breeding pairs were documented in that area in 1986. It appears that fewer birds now occur here, even though additional potential habitat was included in 1994 surveys. This area, and perhaps all of the bird's historical range in Michigan, should be resurveyed in 1995. Clearly the potential for statewide extinction is all too real. With declining populations throughout the Midwest, it may be that the king rail will persist only in the Atlantic and Gulf Coast marshes, and in the rice belts of Louisiana, Arkansas, and Texas where their densities historically have been greatest.

More intensive studies of the lakeplain prairie fauna will be needed to completely document species' occurrence and distribution because animal use of specific habitats can be seasonal. It is likely that other rare species use lakeplain prairies, and their requirements should be considered when planning restoration and management activities.

Lakeplain Prairie Conservation Recommendations

The results of the 1994 aerial and field surveys verify that only a small part of the once extensive tracts of lakeplain prairie remain. The importance of these remaining fragments of prairie for the conservation of biological diversity is recognized by the conservation community. Our primary options for conservation are include land acquisition and active land management.

Land Acquisition

The most urgent conservation action for lakeplain prairies in Michigan is to pursue the acquisition of remaining private parcels. Most of these are in areas subject to intense industrial or residential development pressure and likely will be lost within the next decade. The most important areas for acquisition are those in Wayne County, specifically, the large tracts at Sibley Road, King Road, and several sites near the Sumpter Township prairie.

Sibley Road is the largest prairie in the state, but primary land owners are unwilling to sell at this time. There has been approval of Natural Resources Trust Fund money for acquisition of this tract as a state game area, but unless major land owners sell, the state will probably abandon the game area project, rather than pursue the many small parcels within the prairie. King Road prairie, which is currently offered for sale, offers the best opportunity for acquisition in the Greater Sibley complex. There are numerous other small tracts that could be acquired, but many are isolated remnants that would be more difficult to manage than the larger Sibley Road and King Road sites. The state should continue to pursue tracts within the Greater Sibley Complex over the long term.

Sumpter Township, in southwestern Wayne County, has several prairie parcels. Most of these parcels are isolated from each other, restricting the development and management of a large scale prairie preserve. However, one 80-acre tract owned by the township contains restorable prairie. The township is currently planning development of a golf course at this site. Alternative golf course sites should be located within the township. Assistance by private conservation organizations would be especially helpful.

Along the shoreline there is also need for continued land acquisition adjacent to state-owned prairie tracts. Opportunities exist for prairie expansion along Saginaw Bay shoreline. Highest priorty sites are Bradleyville Road and Geiger Road, which are mostly included wthin the purchase boundaries of the Fish Point Wildlife Area. On the St. Clair delta, there are prairie remnants on parcels adjacent to state lands on Harsens Island and Dickinson Island. One parcel on Harsens Island was proposed for marina development, and most of the prairie was recently plowed and planted to soybeans. The state is considering acquisition

of this parcel, possibly to restore the prairie and develop into a locally-directed nature center. All of these tracts are within the purchase boundaries of the St. Clair Flats Wildlife Area. Several additional parcels are immediately adjacent to Algonac State Park, but fall outside of their purchase boundaries. At Petersburg State Game Area in Monroe County, there is privately owned prairie in the southeastern portion of Section 14, north of Ida Center Road, which partially falls within the game area's purchase boundaries.

Michigan's conservation community has not been as active in acquiring lakeplain prairies as they have been in neighboring Ohio, Illinois, and Wisconsin. In all three of these states, there has been aggressive pursuit of prairie remnants, even in rapidly developing urban and suburban areas. In Michigan, the fragmented nature of the prairies, compounded with local restrictions to burn management, have been viewed as excuses for avoiding involvement in prairie protection. Without a more active involvement of Michigan's conservation community, many of the existing project opportunities in rapidly urbanizing prairie areas of Wayne County will soon disappear.

Managing Publicly-owned Prairies

There are several prairie remnants in public ownership that are being managed. State game area and park managers have generally been quite supportive of prairie management, especially as experimental prescribed burns have been demonstrated to provide improved wildlife habitat for upland game birds and mammals. Burns at both Allegan State Game Area and Petersburg State Game Area have shown good responses of prairie grasses, improving both vegetation and seed productivity. Burns of both lakeplain wet and wet-mesic prairie at St. John's Marsh have improved the structure and increased the flowering of herbs and grasses. In general, the effect of burns on the fauna has not been evaluated. Documentation of the effect of burn management on the fauna, both game and non-game species, has not been adequately done to date.

Managers at Algonac State Park are excited about the response of prairie vegetation to burn management. The prairies offer recreational and educational opportunities to park users. More aggressive signing, development of viewing trails, and production of educational brochures are needed to increase awareness and support of prairie management from the public.

Not all of Michigan's publicly-owned prairies are being actively managed. For example, a golf course has been proposed for the Sumpter Township prairie. Educating citizens, public officials, and local planners on the importance of our remaining prairies should probably be one of the highest priorities of our conservation planners. Another prairie on a publicly-owned tract on Harsen's Island was sold to a

developer for conversion to a marina; the presence of the prairie was discovered only after much of the prairie had been plowed. The results of this study should help in avoiding situations like that in the future.

Prairie Restoration

Past land management within most of our remaining prairie remnants include drainage, plowing, and sand mining. Large county drains, often in combination with pumping, have lowered the water table, resulting in conversion of the prairies to either shrub swamp, forested swamp, or upland forest. Shallow "dead furrows", less than a half meter deep and 5 to 10 meters apart, allowed the prairies to be hayed, but did not as severely alter the hydrology; prairies often remain intact following creation of dead furrows. Restoration of the hydrology may be an important tool for enlarging our prairie remnants. Presently restoration is being explored at Bradleyville Road, but only on a small scale project. A major prairie restoration, which would involve large-scale hydrologic restoration, is in the planning stages near the Quaniccassee River on Saginaw Bay. Along Saginaw Bay, there are large areas of agricultural land that could be restored to prairie, but such restoration is likely to be limited to the wettest lands near the bay, where agriculture is only marginally profitable. Some of these lands adjacent to Fish Point and other coastal game areas, were offered when water levels were high in the late 1980s, but they were removed from the market when water levels dropped and farming subsequently became more profitable.

Many of the prairies of the St. Clair delta could also benefit from closing drains. Except for the DNR's drains on Harsens Island and St. John's Marsh which are used for wildlife management, however, it is unlikely that the public would support other closures, as these might adversely affect both agricultural and residential land use. Many of the inland prairies of Wayne and Monroe counties have also been adversely effected by drainage, but both agricultural and residential land-use pressures remain high. For some of our prairies, residential land use may actually result in further drainage projects.

Prescribed burning has been used for management of the lakeplain prairies at Algonac State Park, St. John's Marsh, and Petersburg State Game Area, with proposed burns at Thomas Road and Bradleyville Road prairies on Saginaw Bay, and Pipeline Prairie East at Allegan State Game Area. The Algonac and St. John's Marsh prairies responded with increased flowering of both prairie herbs and grasses, and with a reduction in shrubs and small trees. It is not yet clear whether the wetter lakeplain prairies require fire to persist. In contrast, the mesic to dry-mesic lakeplain prairies, such as those found at Sumpter Township and Petersburg State Game Area require burning to remove competition from shrubs and trees. Fire was probably much more prevalent in the past, allowing for the original establishment of prairie vegetation. Moister, cooler climatic conditions during the last 3000 to 4000 years may have reduced naturally

occurring lightning fires. During this period of moister weather, Native American land management with fire probably helped maintain the prairies.

Most of the mesic and dry-mesic prairies of Monroe and Wayne counties will require burn management for long-term persistence. Unfortunately, state and local burn restrictions may not allow prescribed-burn management in Wayne County. On state owned lands, reduced fire-control staffing within the Michigan's Department of Natural Resources has limited the number of prescribed-burns on lakeplain prairies in recent years. As the potential benefits of prescribed burns are realized, and experience with prairie burns increases, we hope that this trend will be reversed. It is imperative that we be able to utilize prescribed burning in the number of natural communities where this natural process is significant. Where the use of prescribed burning is simply unfeasible, alternative management regimes involving periodic shrub removal, mowing, and/or selective herbicide application should be considered.

Education

Due to seasonal variation in water levels and complex spatial patterning commonly found in lakeplain prairies, these sites are often not recognized as wetlands falling under state and federal regulation. Field personnel need to be educated on the complex nature of these systems so that they are recognized and receive adequate protection under existing statutes. Additionally, many lakeplain prairies are configured as a mosaic of small wetlands (< 5 acres) and dry upland ridges. These sites would be considered Critical Non-contiguous Wetlands, also falling under existing wetlands regulation, if landowners were notified of their existence. They fall under this category due to the unique habitat that they provide for rare species.

Education of the public about Michigan's natural heritage, especially the more threatened communities such as the lakeplain prairies, should perhaps be our most pressing goal. The extremely successful model of nearby Chicago should demonstrate the level of interest that the public has for prairies. In Chicago, Steve Packard (The Nature Conservancy-Illinois Chapter) has enough volunteers to maintain active stewardship and management of numerous Illinois prairies.

Summary and Conclusions

This report presents the results of a year-long project to inventory and characterize tallgrass prairie on Michigan's glacial lakeplain. Lakeplain prairies are globally imperiled natural communities found in the Great Lakes states of Wisconsin, Illinois, Indiana, Michigan, and Ohio; and in southern Ontario, Canada. In Michigan, lakeplain 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 and Allegan counties in the southwest. Historically they were most abundant in Wayne and Monroe counties, where 80% of the state's total was found. The Saginaw Bay region contained about 18% of the state total, primarily in Bay and Tuscola counties, while the southwestern counties of Berrien and Allegan contained less than one percent of historical lakeplain prairie acreage. Less than one percent of historical lakeplain prairie acreage remains in Michigan. As with elsewhere in the Great Lakes region, prairies were drained and converted for agricultural production beginning early in the nineteenth century. Although a number of these areas were later abandoned and partially reverted to the natural condition, more recent concentrations of urban development have all but eliminated these systems from Michigan's landscape. A total of 50 lakeplain prairie remnants were located in Michigan, ranging from 2-200 acres in size. The largest concentrations of prairie remnants are in southwest Wayne County, in and around the St. Clair River delta, and along the Saginaw Bay shoreline in Tuscola County.

Lakeplain prairies are located on sand and clay where subtle differences in elevation can result in significantly different vegetation. This is due to a characteristic annual fluctuation in water tables of one to three meters. Spring flooding coupled with summer drought combine to limit the establishment of woody vegetation. It is likely that wildfires also played a role in maintaining prairie conditions, but this relationship has not been clearly established. The highly fragmented nature of Michigan's prairie remnants complicates attempts at refining a classification of prairie subtypes. However, analysis of vegetation data taken in Michigan's prairie remnants indicated a clear moisture gradient and resulted in our subdivision of lakeplain prairies into wet, wet-mesic, and mesic subtypes. A dry-mesic subtype could probably be distinguished and described if more examples could be located for study. This breakdown, along with the dominant plant species characteristic of each type, closely resembles previous classification work completed in southern Ontario. In many cases, more than one prairie subtype is found in a mosaic on a given landscape. Along the great Lakes shoreline, lakeplain prairie typically is found just inland of coastal emergent marsh, and narrow bands of wet, wet-mesic, and mesic prairies are found near the base of low beach ridges. On inland portions of the lakeplain in Wayne and Monroe counties, lakeplain prairie is

commonly found in a patchy configuration, with small, wet spots interspersed among larger wet-mesic remnants. Beach ridges also form a part of this landscape mosaic.

Rare plant surveys in each of the lakeplain prairie remnants resulted in many new occurrences. Most rare plant species in Michigan's prairies are not globally rare, but many, such as Englemann's spike-rush (*Eleocharis engelmannii*) and few-flowered nut-rush (*Scleria pauciflora*), are very rare within the state. A total of 56 state-listed plant species are associated with Michigan's prairie remnants. Six of the rare plant species are listed either as candidates for federal listing, or are currently listed as federally threatened. Included among these six are the eastern prairie fringed orchid (*Platanthera leucophea*), Skinner's gerardii (*Agalinus skinneriana*), and Missouri rock-cress (*Arabis missouriensis* var. *deamii*). The rare flora of Michigan's lakeplain prairies include a number of species at the northern or southern edge of their ranges. There are also plant species assemblages that are disjuncts of typical western prairie communities and those found in intermittent wetland habitats along the Atlantic Coastal Plain.

Animal surveys resulted in several new occurrences. Two state-listed special concern insects were documented at three lakeplain prairie sites. Prior to this study, *Prosapia ignipectus* was known from only three localities in Michigan, and *Papaipema sciata* was known from seven localities. Although preliminary, a total of seven genera with potential to contain host-specific homopterans were collected. Because these groups are not well studied, it is possible that a number of disjuncts, range extensions, and possibly new and undescribed species will ultimately be reported. Avian surveys reconfirmed the presence of king rails at two sites, although numbers have declined since the last systematic survey of those areas in 1986. Because long-term information about rail abundance and distribution is lacking, additional survey work should be a priority. This knowledge is critical to guide the formulation of management priorities and strategies for the king rail. Because animal use of specific habitats can be seasonal, more intensive studies of the lakeplain prairie fauna will be needed to completely document species' occurrence and distribution.

The conservation of lakeplain prairie remnants should include land acquisition, prairie restoration and management, and public education and involvement. Prairie remnants in Wayne County are of highest priority for land acquisition due to the extreme land-use pressures they currently face. Additional land acquisitions are strongly recommended for private tracts adjacent to public lands along the Saginaw Bay shoreline, on the St. Clair River delta, and adjacent to the Petersburg State Game Area in Monroe County. Prairie restoration and management is on-going at a small scale on state land. There are many opportunities to restore lakeplain prairie remnants through the re-establishment of natural hydrology and prescribed burning. Sites including restorable prairie remnants should be utilized when planning long-term watershed management strategies, and considered when locating potential wetland mitigation projects.

Education of the public about lakeplain prairies, and other threatened components of Michigan's natural heritage, should raise awareness and stimulate involvement in land use planning ussues. It is critical for the conservation community in Michigan to take immediate action to conserve our lakeplain prairies before the few remaining opportunities are lost.

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APPENDIX I

Lakeplain Prairie Site Summaries

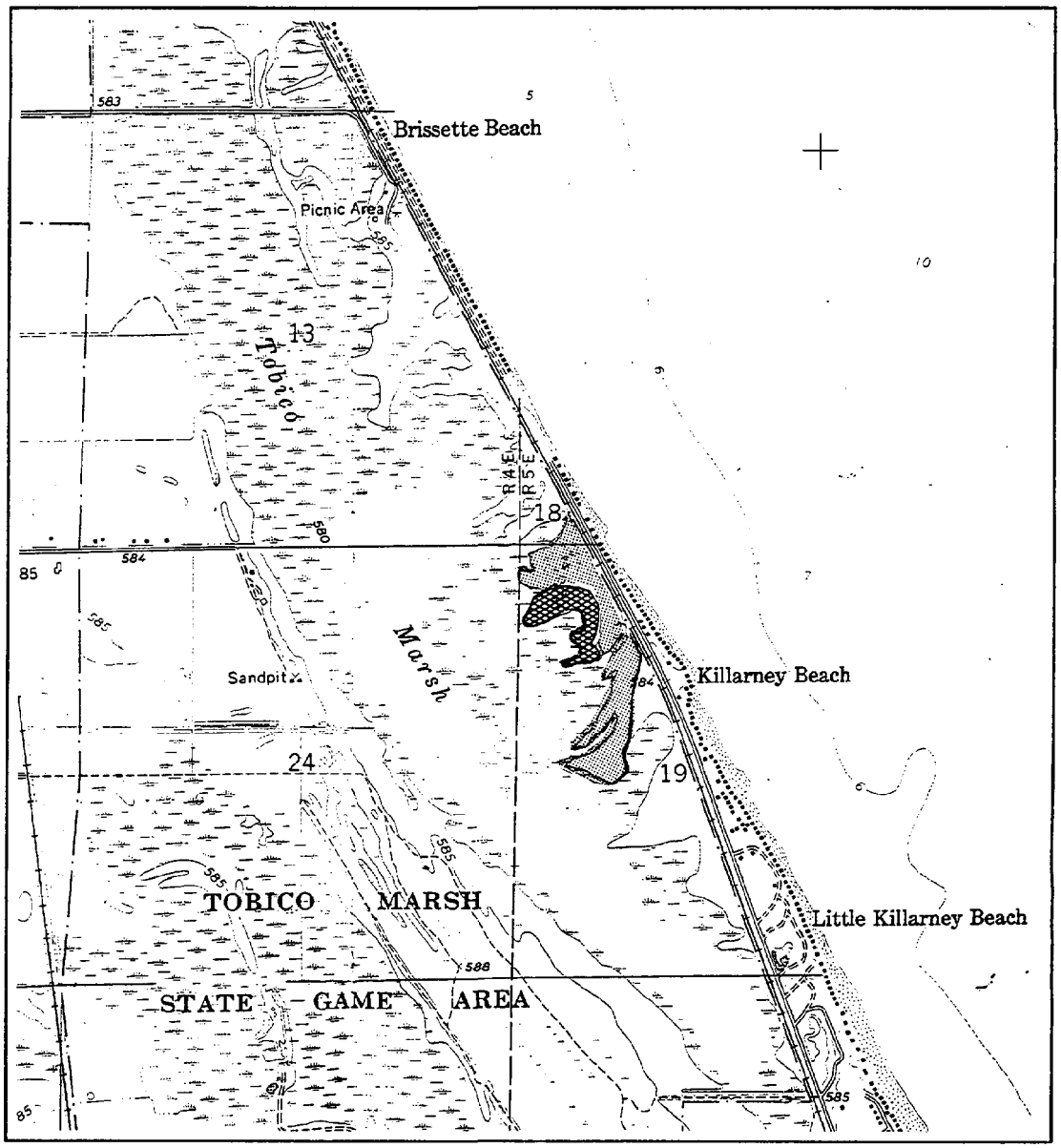
KILLARNY BEACH PRAIRIE, TOBIACO MARSH STATE GAME AREA

Killarny Beach is located on the shore of Saginaw Bay, approximately three miles northwest of the mouth of the Kawkawlin River, in the Tobico Marsh State Game Area. Seven acres of prairie and 20 acres of oak barrens are sandwiched between the railroad along the primary beach ridge and Tobico Marsh. The prairie occupies a hydrologic zone intermediate between the flooded marsh and dry beach ridge. This site does not correspond with any known presettlement prairie locations. The potential prairie habitat may have been significantly reduced by the controlled flooding of Tobico Marsh by the Wildlife Division. In addition some small scale sand mining has taken place on the upland portion of the site.

Lakeplain prairie occupies a narrow zone between the Tobico Marsh Flooding and beach ridge uplands. The marsh is dominated by cattail (*Typa sp.*) and grades into a meadow of blue-joint grass (*Calamagrostis canadensis*) before giving way to wet prairie. Continuing upland the lakeplain wet prairie gives way to an oak barren dominated by black oak (*Quercus velutina*) with a ground cover of Pennsylvania sedge (*Carex pensylvanica*). The blue-joint meadow includes pockets of red-osier dogwood (*Cornus stolonifera*) and cottonwood (*Populus deltoides*).

The lakeplain wet prairie is dominated by Kalm's St. John's wort (*Hypericum kalmianum*) and prairie cord grass (*Spartina pectinata*) with blue-joint grass; Indian grass (*Sorgastrum nutans*); rice button aster (*Aster dumosus*); a rush (*Juncus balticus*); grass leaved goldenrod (*Euthamia graminifolia*); and the sedges (*Carex aquatilis*) and (*C. buxbaumii*) also common. The prairie lies on Belleville loamy sands and Pipestone fine sands, most of the Belleville series has been inundated by the wildlife flooding. The site Floristic Quality Index equaled 33.75 which was 23rd out of 51 lakeplain prairie sites sampled. Sixty four species were noted during two site visits in the 1982 and 1984. The plant list is a composite of upland and wetland portions of the site so a meaningful, average Wetness Coefficient is not available. The site was not visited during 1994. No listed species were observed on the site, however the yellow fringed orchid (*Platanthera ciliaris*) was collected in the general vicinity in 1896.

The site is contained with in the Tobico Marsh Wildlife Refuge, within the Tobico Marsh State Game Area. The lands between the railroad and the lake shore consist of small, privately owned lots with houses and seasonal cottages. No additional acquisition is recommended for the site. Protection of the physical site is achieved through it's inclusion in the game area. The prairie would benefit from a small decrease of the water level in the flooding and from periodic controlled burns of the prairie and savanna elements.



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SITE: Killarny Beach, Tobico Marsh State Game Area

LOCATION: Saginaw Bay Region, Bay Co., T15N-R5E Sec. 19.

USGS QUADRANGLE: Kawkawlin 4308368

COMMUNITY TYPE(S): lakeplain wet prairie, oak barrens.

ELEMENT RANK: C FQI: 33.75 WET CO. -0.3 $\bar{X}$ COEF. CONS. 4.22

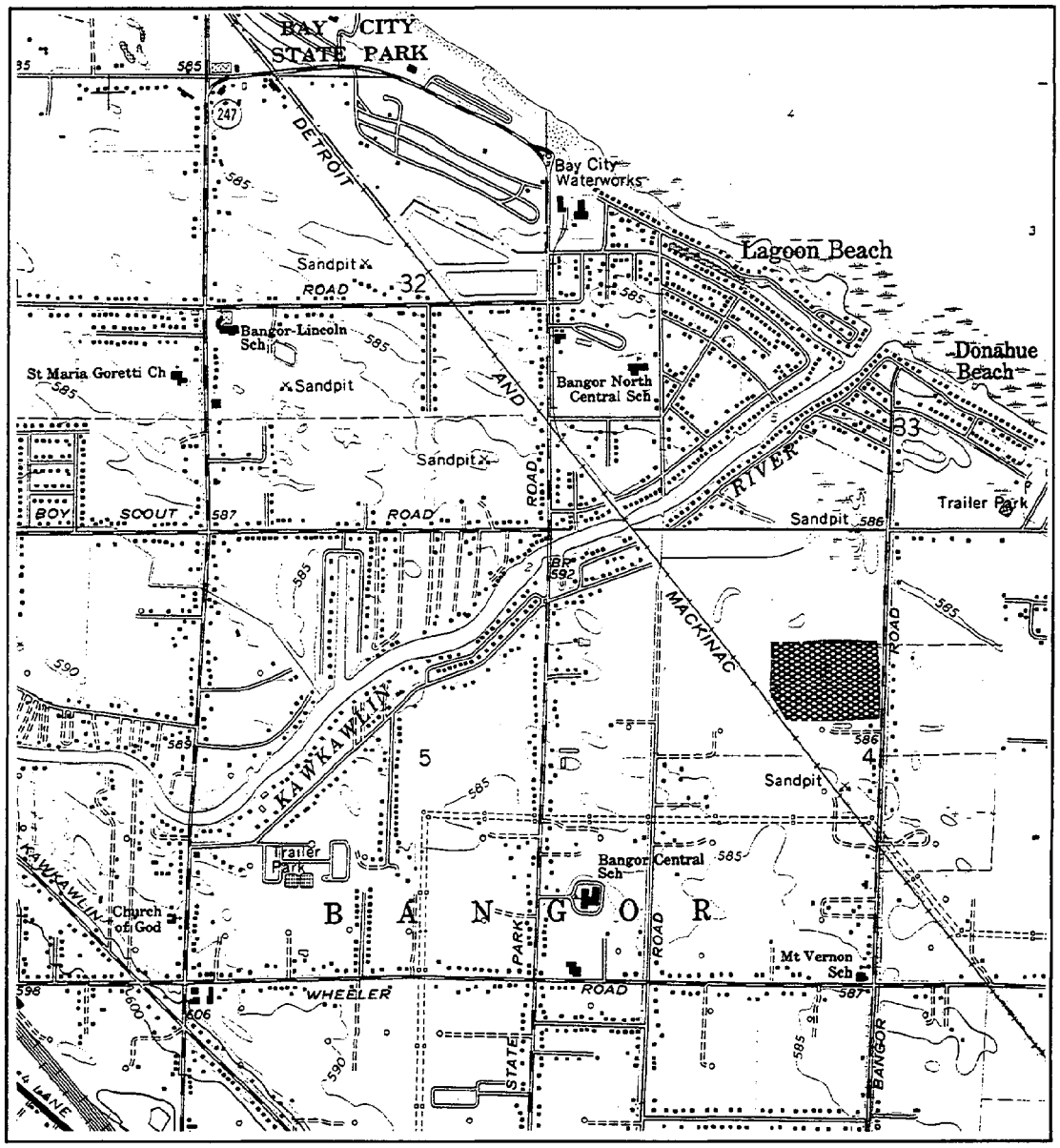
FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

BANGOR ROAD PRAIRIE

Bangor Road wet prairie is located approximately 0.75 mile south of Saginaw Bay and one half mile southwest of the Kawkawlin River, between Bangor Road and the Detroit and Mackinac Railroad tracks. The site contains approximately 30 acres of prairie bounded on the east by Bangor Road on the west and south by the railroad and on the north by shrubby, disturbed ground. The 30 acres of prairie on this site are a remnant of a prairie-marsh complex that, prior to European settlement covered 2,500 acres. Approximately 500 acres of the complex was prairie. The marsh was bordered by lakeplain prairie. Drainage of the area, accompanied by agriculture and urban development has eliminated the marsh. The reduced water table has allowed prairie vegetation to migrate into the former marsh..

The lakeplain wet prairie occupies a level, sandy, glacial lakebed. Much of the site is shrubbing in with gray stemmed dogwood (*Cornus foemina*), Kalm's St. John's wort (*Hypericum kalmianum*) and shrubby cinquefoil (*Potentilla fruticosa*). The prairie grasses, Indian grass (*Sorgastrum nutans*), blue-joint (*Calamagrostis canadensis*), and prairie cord grass (*Spartina pectinata*) are common but do not dominate. The herbaceous ground cover is dominated by silverweed (*Potentilla anserina*), marsh blazing star (*Liatris spicata*), strawberry (*Fragaria virginiana*), heath aster (*Virgulus ericoides*), sneezeweed (*Helenium autumnale*), and pale spiked lobelia (*Lobelia spicata*). The prairie occurs on sandy loam of the Belleville series. The site Floristic Quality Index equaled 26.00 which was 36th of 51 lakeplain prairie sites sampled. Forty nine species were noted during a single visit in the autumn of 1994. No listed species were observed on the site. The site has Wetness Coefficient of -1.1 (*Fac+*).

The site is privately owned by the Elek and Burke Development Company. This single ownership encompasses the entire prairie and an additional 76 acres. Because the site is privately owned and no listed species occur on the site it is vulnerable to development. The proximity of the site to the lake shore and a moderated sized urban area increase the likelihood of the site being developed. Protection is available via the Goemare-Anderson Wetlands protection act but the site may be vulnerable to encroachment by small wetland fill permits along the sites margins. Acquisition of this site should be pursued. The site is equally vulnerable to succession by a mature, lowland forest as it is to be lost to development. This site requires active management in the form of periodic brushing, or preferably, controlled burns, to maintain a healthy lakeplain prairie.



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SITE: Bangor Road

LOCATION: Saginaw Bay Region, Bay Co. T14N-R5E Sec. 4

USGS QUADRANGLE: Kawkawlin 4308368

COMMUNITY TYPE(S): lakeplain wet prairie

ELEMENT RANK: C FQI: 26.00 WET CO.: -1.1 $\bar{X}$ COEF. CONS.: 5.71

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

ESSEXVILLE (TANK FARM) PRAIRIE

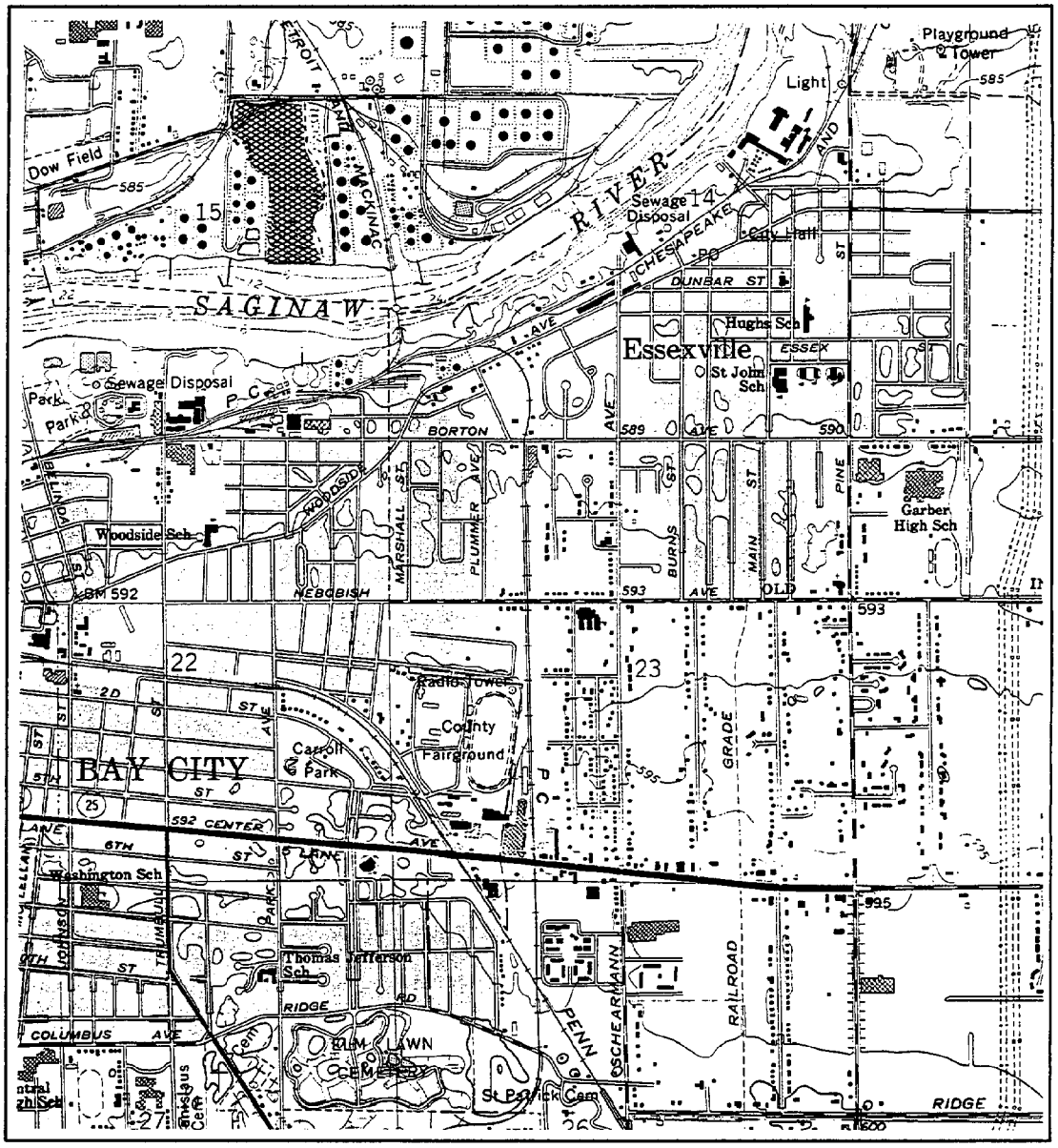
The Essexville (Tank Farm) prairie is located on the west bank of the Saginaw River approximately three miles inland from the river mouth. The site is actually on the north bank of an east-west bend in the river, 300 meters west of the Detroit and Mackinac Railroad bridge. The site occupies 13 acres surrounded to the north, west and east by heavy industrial development and to the south by a diked marsh along the Saginaw River. This site is a remnant of a prairie that covered over 500 acres prior to European settlement. Historically, the prairie marsh complex extended north along the Saginaw River and west to the mouth of the Kawkawlin River. The Bangor Prairie site occurs near the northwest edge of this historical prairie-marsh complex.

The site is a small remnant of a prairie that until the 1970's still covered over 50 acres. Because the value of the site was not recognized early enough it became home to a Dow Chemical Plant, a Shell Oil and Gas Co. tank farm and a municipal sewage treatment plain.

The lakeplain wet prairie remnant is dominated by the prairie grasses; big bluestem (*Andropogon gerardii*) and blue-joint (*Calamagrostis canadensis*). Gray stemmed dogwood (*Cornus foemina*) has formed dense growths in portions of the site. Other common lakeplain prairie plants include; Indian grass (*Sorgastrum nutans*), the sedges (*Carex aquatilis*) and (*C. crawyei*), marsh blazing star (*Liatris spicata*), strawberry (*Fragaria virginiana*), mountain mint (*Pycnanthemum virginiana*), grass leaved goldenrod (*Euthamia graminifolia*) and Riddell's goldenrod (*Solidago riddellii*) are also common. The prairie lies on loam of the Tappan Series with a pH of 7.5. The Floristic Quality Index for the site is 33.35, 22nd of 51 lakeplain prairie sites surveyed. Sixty eight plant species have been recorded from the site during three visits in the 1980's. The Wetness Coefficient for the site is -1.3 (Fac+).

A population of the state threatened tall green milkweed (*Asclepias hirtella*) also occurs on the site and an 1898 collection of the state Threatened tuberous Indian plantain (*Cacalia plantaginea*) was made in the general vicinity.

The site is privately owned and lies primarily on lands of William Bartlett, Straits Wood Products but extents on to lands of Dow Chemical Co., Shell Oil and Gas Co., and the municipal government. Acquisition would be difficult on the site and the potential for hazardous waste problems is very real. The best management protection option would be to negotiate a formal management agreement with the owners and seek a conservation easement to prevent the complete loss of the site.



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SITE: Essexville (Tank Farm Prairie)

LOCATION: Saginaw Bay Region, Bay County, T14N-R5E, Sec. 15

USGS QUADRANGLE: Essexville 4308357

COMMUNITY TYPE(S): lakeplain wet prairie

ELEMENT RANK: CD FQI: 33.35 WET CO.: -1.3 $\bar{X}$ COEF. CONS.: 4.04

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

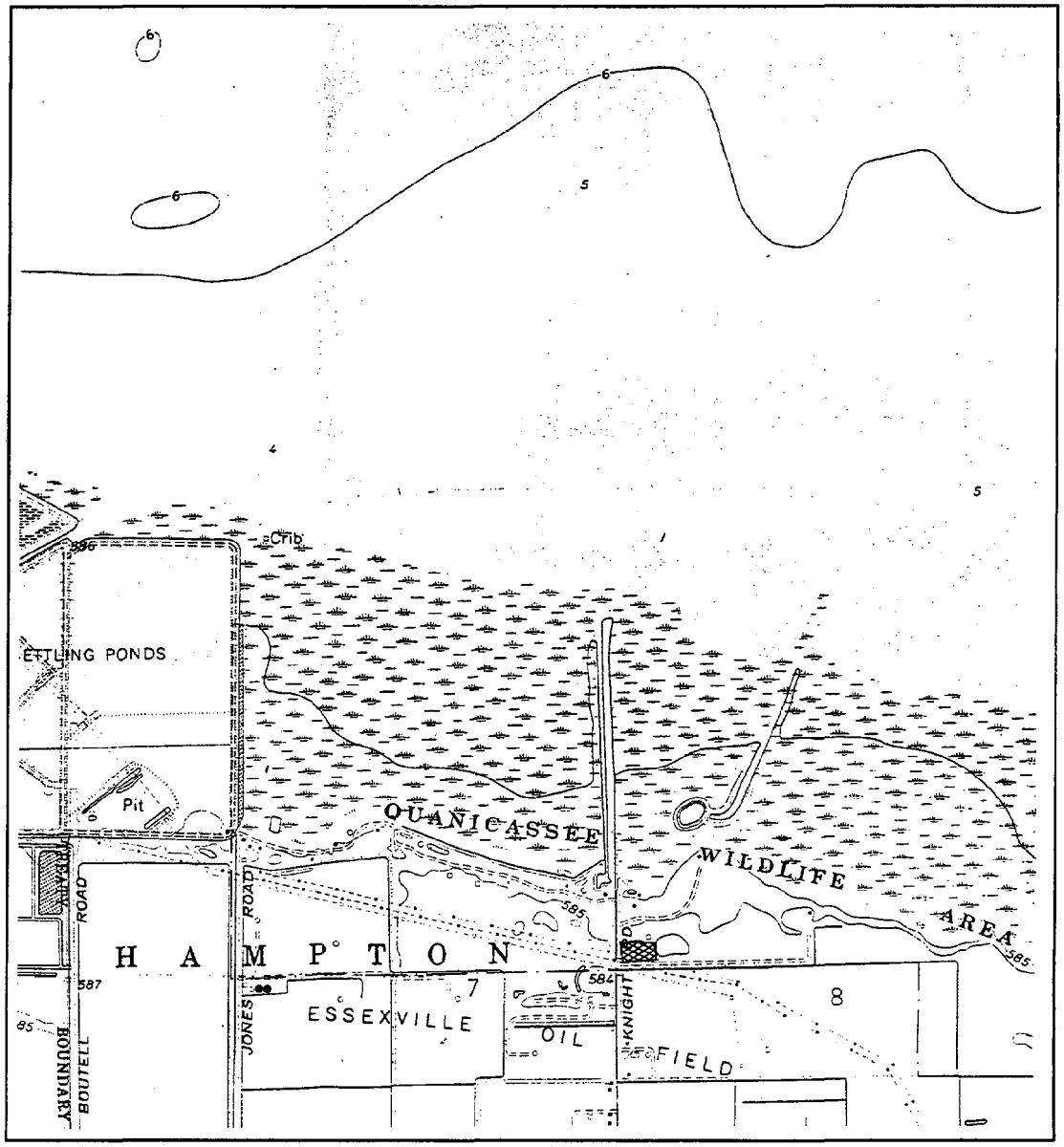
KNIGHT ROAD PRAIRIE: QUANICASSEE WILDLIFE AREA

The Knight Road lakeplain wet-mesic prairie is located approximately 100 meters inland of the Saginaw Bay shoreline, in section eight of Hampton Township, Bay County. This two acre remnant is bordered by old field, oak forest and roadways. Portions of the site have been damaged by oil and gas drilling. The most severe alterations have resulted from road construction and associated ditching. This site lies within the boundaries of a lakeplain prairie, Great Lakes marsh, lakeplain oak opening complex that, prior to European settlement, stretched from the mouth of the Saginaw River along the coast to the Wildfowl Bay Islands and inland up to five miles.

The oak forest adjacent to the site is currently closed canopy, but with burning may revert to an oak opening. This land is adjacent to residential sites which may complicate controlled burning program.

The lakeplain prairie lies behind the primary beach ridge on loamy sands of the Essexville Series. The prairie is being shaded out by a thick growth of red-osier dogwood (*Cornus stolonifera*) which is the dominant species on the site. The open prairie section are dominated by big bluestem (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), prairie cord grass (*Spartina pectinata*), and a sedge (*Carex aquatilis*). Other common prairie plaints include blue-joint (*Calamagrostis canadensis*), twig rush (*Cladium mariscoides*), meadow sedge (*Carex stricta*), a spike rush (*Eleocharis obtusum*), grass leaved goldenrod (*Euthamia graminifolia*), common mountain mint (*Pycnanthemum virginianum*), Indian hemp (*Apocynum cannabinum*), heath aster (*Virgulus ericoides*), New England aster (*V. novae-angliae*), strawberry (*Fragaria virginiana*), tall sunflower (*Helianthus giganteus*), switch grass (*Panicum virgatum*) and Riddell's goldenrod (*Solidago riddellii*). Sixty two species have been observed on the site during two visits. The site's Floristic Quality Index is 29.97, ranking it 29th out of 53 lakeplain prairie sites surveyed. The site's Wetness Coefficient is -1.5 (Fac+). No listed species have been observed on the site.

The prairie is adjacent to the Quanicassee Wildlife Area but occurs on private lands of Barbara and Sidney Huges within the dedicated boundaries of the Wildlife Area. Lands to the south are open but degraded and belong, in part to Consumers Power Company. Acquisition of a conservation easement or fee title acquisiton of the prairie and adjacent lands is recommended. This site is in need of shrub removal and would benefit from a schedule of controlled burns.



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SITE: Knight Road

LOCATION: Saginaw Bay Region, Bay County, T14N-R6E, Section 8

USGS QUADRANGLE: Bay City NE 4308367

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK: CD FQI: 29.97 WET CO.: -1.5 $\overline{X}$ COEF. CONS.: 3.81

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

CORYEON POINT PRAIRIE, QUANICASSEE WILDLIFE AREA

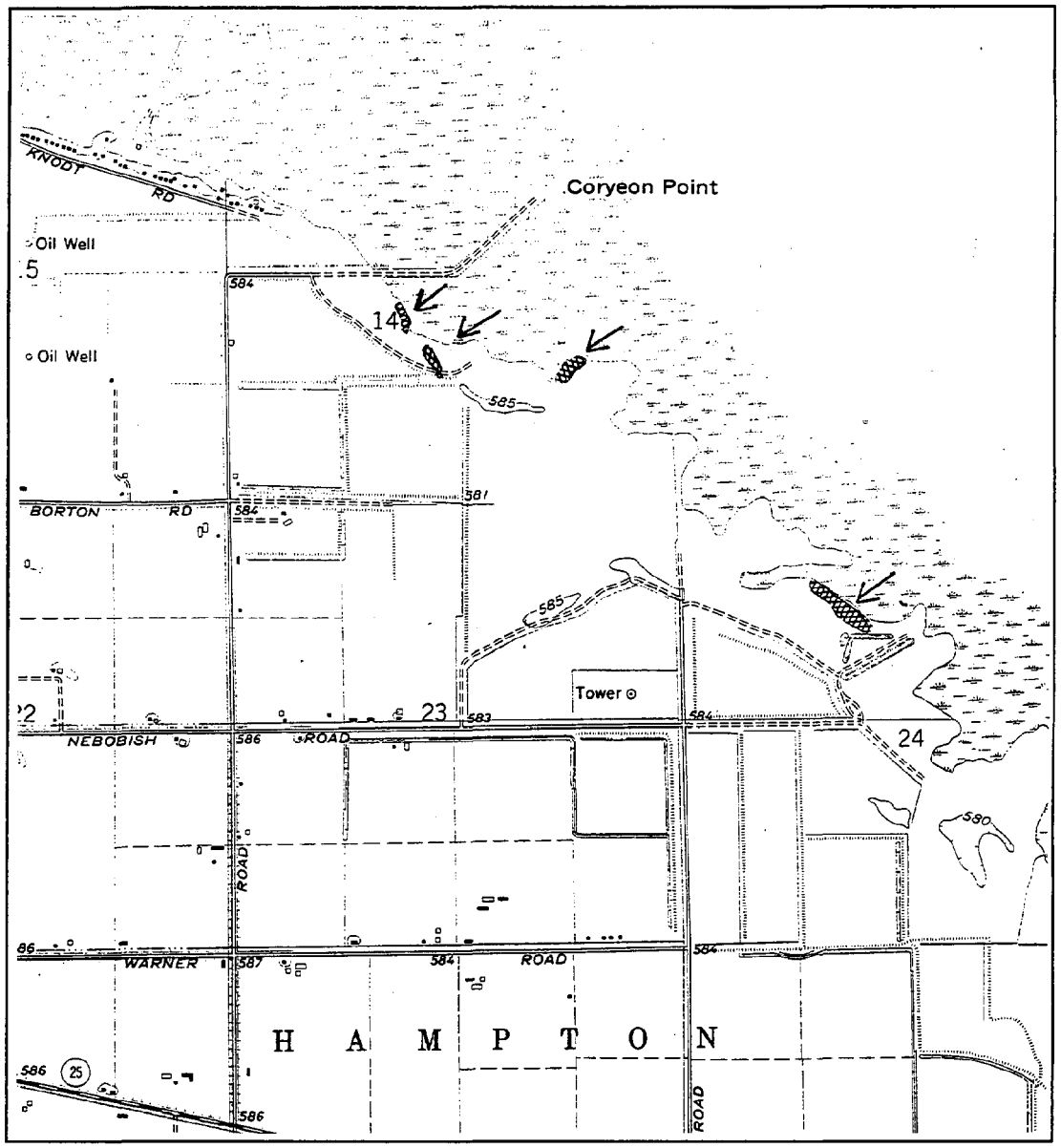
Coryeon Point is located on the shore of Saginaw Bay, approximately 2.75 miles northwest of the mouth of the Quanicassee River, in the Quanicassee Wildlife Area. Lakeplain wet prairie occurs in five small portions of the site totaling approximately 13 acres. This site supported a Great Lakes marsh prior to European settlement. The marsh was part of a prairie, marsh, oak barrens complex that stretched from the mouth of the Saginaw River, north and east to the Wildfowl Bay Islands and extend from the coast inland from one half to six miles. The prairie is sandwiched between Great Lakes Marsh and the primary beach ridge. Extensive diking and ditching, to prevent local flooding by lake waters, was conducted in 1987. This project has drastically altered the natural hydrology of the site. The prairie remnants appear to be declining and may not persist under current site conditions.

Lakeplain wet prairie occurs in narrow bands along the base of the primary beach ridge. The associated marsh is extensive and is dominated by narrow leaved cattail (*Typha latifolia*), soft stemmed bullrush (*Scirpus validus*) and reed canary grass (*Phalaris arundinecea*). The sandy beach ridge supports swamp white oak (*Quercus bicolor*), black oak (*Q. velutina*), and Gray stemmed dogwood (*Cornus foemina*).

The small prairie fragments are dominated by prairie cord grass (*Spartina pectinata*), blue-joint (*Calamagrostis canadensis*). The sites are being encroached on narrow leaved cattail, soft stemmed bullrush, sandbar willow (*Salix exigua*), purple loosestrife (*Lysimachia salicaria*) and other aquatic and weedy plants. Common herbs on the site include mountain mint (*Pycnanthemum virginianum*), silverweed (*Potentilla anserina*), eastern lined aster (*Aster lanceolatus*), thimbleweed, (*Anemone canadensis*), marsh bells (*Campanula aparinoides*), and Canada goldenrod (*Solidago canadensis*). The prairie rests on Essexville loamy sand with an A-horizon pH of 7-8. Thirty one plant species are noted from the site, apparently all from a single visit in 1980. Although the site has been subsequently visited no additional flora lists were constructed. The sites Floristic Quality Index is 26.58 which is 37th of 51 lakeplain prairie sites surveyed. The Wetness Coefficient is -2.7 (FacW).

Cooper's milk vetch (*Astragalus neglectus*) a state special concern species has been collected on the sandy oak ridges of the site This species has not been noted on the site since August of 1979.

All of the extant prairie is contained within the Quanicassee Wildlife Area. Private agricultural land lies inland of the flood control dikes. It is unlikely that this fragment will persist, however burning of the extant portions may be sufficient to allow the community to persist.



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SITE: Coryeon Point

LOCATION: Saginaw Bay Region, Bay Co. T14N-R6E Sec. 14

USGS QUADRANGLE: Quanicassee 4308356

COMMUNITY TYPE(S): lakeplain wet prairie

ELEMENT RANK: D...FQI: 26.58 WET CO.: -2.7 $\bar{X}$ COEF. CONS.: 4.77

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

BRADLEYVILLE ROAD, PRAIRIE: FISH POINT WILDLIFE AREA

Bradleyville Road prairie is located along the shore of Saginaw Bay in Tuscola County. Segments of this prairie complex lay along nearly 2.5 miles of coast from the end of Bradford Road in the southwest to beyond the end of King Road in the northeast. The site includes approximately 40 acres of wet prairie and wet-mesic prairie and up to an additional 100 acres of degraded prairie, shrub swamp and lowland hardwood forest which may be restorable. The best prairie pockets in this complex occur in low swales which run parallel to the coast between low, sandy beach ridges. The swales between 150 meters and 450 meters from the present coast line hold the highest quality prairie remnants. Portions of the inland edge of the prairie complex have been converted to agriculture since Lake Huron levels have dropped from their historical high levels in the mid 1980s.

Lakeplain prairie remnants occupy both the bottoms of the swales and the upland - wetland transitional zone located at the base of the beach ridges. The intervening beach ridges are dominated by black oak (*Quercus velutina*) and bur oak (*Q. macrocarpa*) with an understory of mixed hardwoods and a ground cover of false lily of the valley (*Maianthemum canadensis*), sweet cicely (*Osmorhiza claytoniana*), and Pennsylvania sedge (*Carex pensylvanica*). Portions of the swales are dominated by red-osier dogwood (*Cornus stolonifera*), and silky dogwood (*Cornus amomum*). Other portions of the swales are dominated by black ash (*Fraxinus nigra*) and prickly ash (*Zanthoxylum americanum*).

The AB ranked lakeplain wet-mesic prairie is locally dominated by big bluestem (*Andropogon gerardii*), Indian grass (*Sorgastrum nutans*), prairie cord grass (*Spartina pectinata*), and occasionally in upland areas little bluestem (*Andropogon scoparius*). Common prairie forbs include New England aster (*Virgulus nova-angliae*), heath aster (*V. ericoides*), pasture thistle (*Cirsium discolor*), marsh blazing star (*Liatris spicata*), strawberry (*Fragaria virginiana*), silverweed (*Potentilla anserina*), Canada goldenrod (*Solidago canadensis*), Ohio goldenrod (*S. ohioensis*), Riddell's goldenrod (*S. riddellii*), grass leaved goldenrod (*Euthamia graminifolia*), and sneezeweed (*Helenium autumnale*). The lakeplain wet prairie is dominated by blue-joint (Calamagrostis cananadensis) and prairie cord grass. One hundred and sixty two plant species have been recorded from the site during seven surveys. The site Floristic Quality Index equals 59.22 which is third out of 51 lakeplain prairie sites surveyed. This is the highest Floristic Quality Index rating observed outside of Wayne County. The Wetness Coefficient for the entire site was -1.5 (FacW), although wetter and dryer areas exist within the complex.

Notable plant occurrences on this site include a population of, state threatened, prairie Indian-plantain (*Cacalia plantaginea*) consisting of approximately 90 individuals, and an occurrence of the state threatened tall green milkweed (*Asclepias hirtella*).

The majority of this site lies within the Fish Point Wildlife Area. However the eastern edge extends onto seven, identified private ownership's and an unknown number of small camp lots. Acquisition of these lands should be pursued in order to fully protect the highest quality lakeplain prairie site along the entire Great Lakes shoreline. The most significant parcels are a 109.6 acre tract owned by Ralph D. Bayer et. al. and a nine acre tract owned by "W. J. et al." (Rockford Map Publishers, 1994). Both of these parcels lie in section 14 of Wisner Township (T14N-R6E) and are adjacent to the highest quality portions of the lakeplain prairie complex.

Management of the site should include bush removal, preferably via controlled burns and restoration of natural hydrologic conditions by closing drains feeder drains on the property. The closure of drains should be done slowly and vegetative responses closely monitored to ensure that does not revert to marsh instead of prairie vegetation. Some minor drains surface drains were blocked in the spring of 1994 (MNFI in prep.). Vegetative response to this small manipulation will provide the first indication of the soundness of this approach. If large scale restoration of lakeplain prairie ever becomes feasible an expansion of this site, within an area bounded by Kirk Road on the East, State Route 25 on the southeast and Gager Drive on the west, may provide the most promising opportunity.

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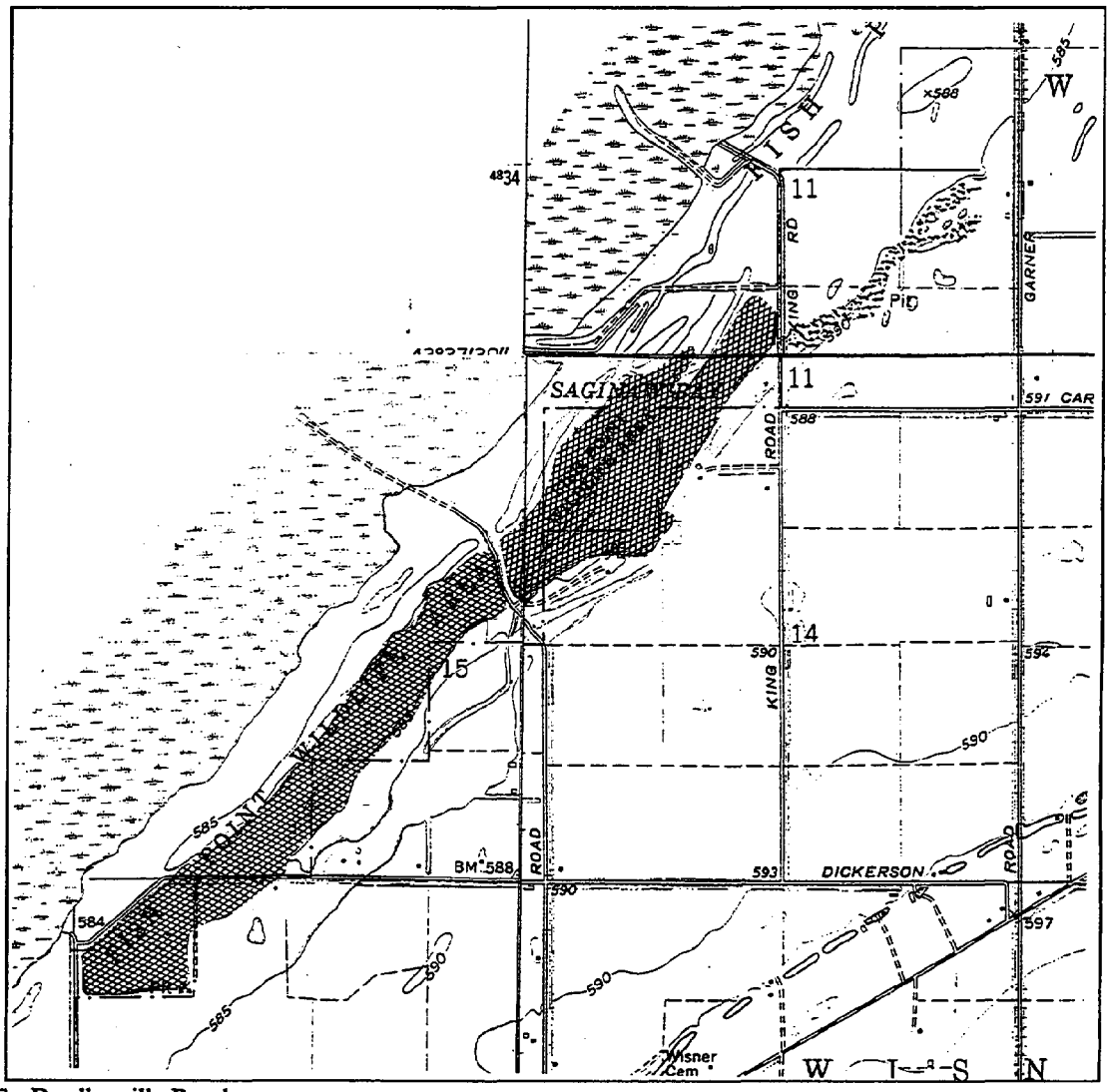


SITE: Bradleyville Road
LOCATION: Saginaw Bay Region, Tuscola Co., T14N-R7E Sec. 11, 14 + 15
USGS QUADRANGLE: Quanicassee 4308356; Fish Point 4308365, Fairgrove 4308355
COMMUNITY TYPE(S): lakeplain wet prairie, lakeplain wet-mesic prairie
ELEMENT RANK: AB FQI: 58.30 WET CO.: -1.5 $\bar{X}$ COEF. CONS.: 4.58
FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

BAY PARK PRAIRIE; FISH POINT WILDLIFE AREA

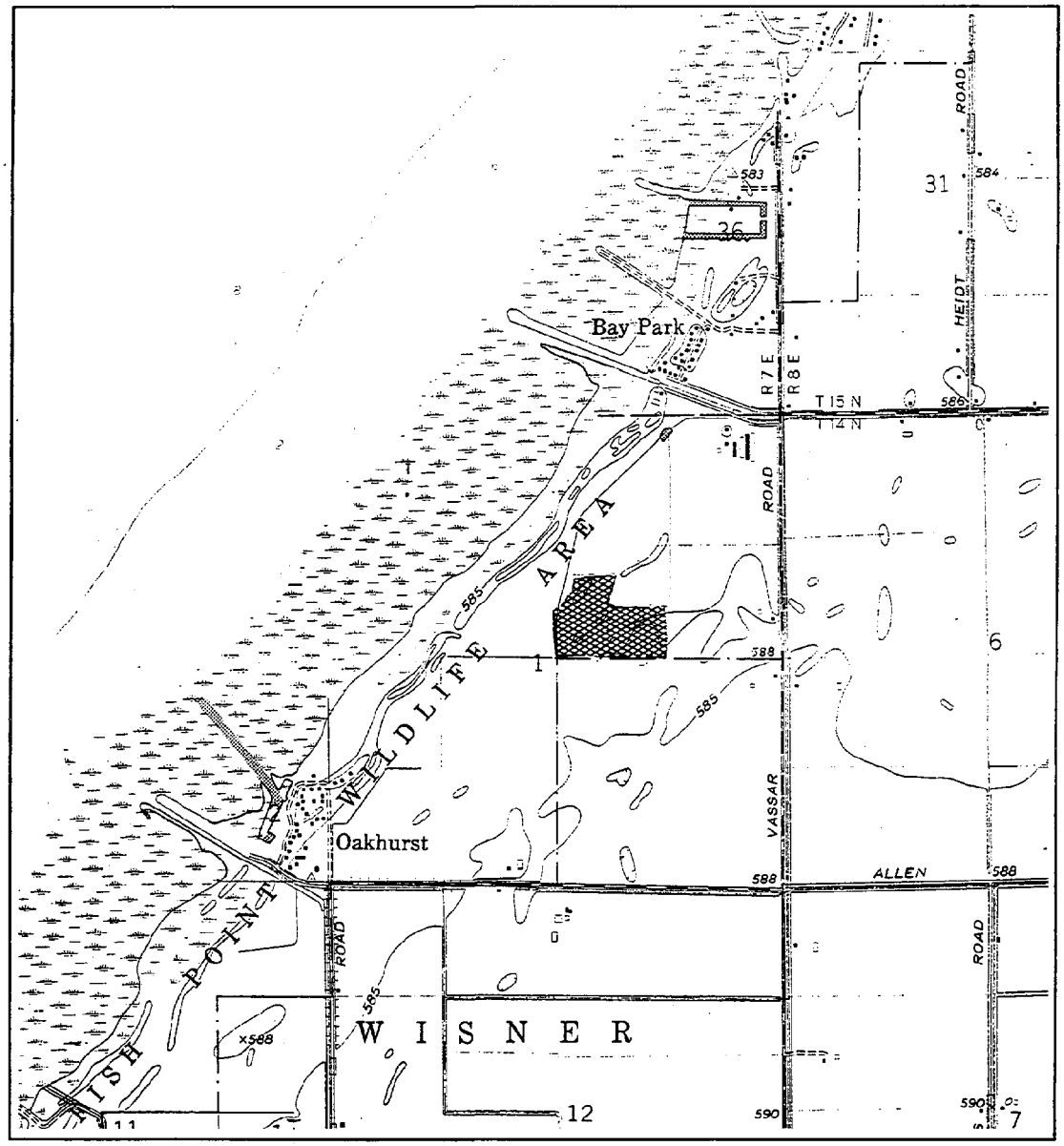
Bay Park lakeplain wet-mesic prairie is located approximately 0.5 miles inland of the Saginaw Bay shore, 200 meters south of the western end of Bay Park Road. The site is on private lands within the dedicated boundaries of the Fish Point Wildlife Area. Three to five acres of prairie are sandwiched between plowed fields and oak forest. Additional small prairie pockets, visible on 1978 aerial photography have been plowed.

The beach ridges east and west of the prairie supports black oak (*Quercus velutina*), white oak (*Q. alba*), burr oak (*Q. macrocarpa*), round leaved service berry (*Amelanchier sanguinea*),and red ash (*Fraxinus pensylvanica*). The land to the north and south has been plowed.

The prairie occurs on Soils of the Tappan loam series with a pH of 7.6 to 8.0. It is dominated by Indian grass (*Sorgastrum nutans*), little bluestem (*Andropogon scoparius*) and a sedge (*Carex aquatilis*). Other common prairie plants include shrubby cinquefoil (*Potentilla fruticosa*), red-osier dogwood (*Cornus stolonifera*), prairie dock (*Silphium terebinthinacium*), mountain mint (*Pycnanthemum virginianum*), tall goldenrod (*Solidago altissima*), and northern bedstraw (*Galium boreale*). The site has a Floristic Quality Index of 35.29 which is 21st out of 51 lakeplain prairie sites surveyed. Fifty one species were recorded from the site during a single visit in 1982. The Wetness Coefficient for the site is -0.7 (Fac+).

The site supports a state threatened plant species prairie Indian-plantain (*Cacalia plantaginea*). The state threatened silphium borer moth (*Papaipema silphii*) has also been found on the site.

The prairie lies on lands owned by Lucille and Clarence Lindenberg within the dedicated boundaries of the Fish Point Wildlife Area. Acquisition of the property should be pursued. Additional property within the dedicated wildlife area boundary, including portions of lands owned by Carl Eurich, Douglas and Betty Nixon, and Daniel E. and Eva J. Herman should also be pursued. These parcels plus an additional 40 acres occupying the northwest quarter of the southeast quarter of Section 1 would provide an adequate buffer for the extant prairie.



Scale 1:24,000

SITE: Bay Park

LOCATION: Saginaw Bay Region, Tuscola Co. T14N-R7E Sec. 1

USGS QUADRANGLE: Fish Point 4308365

COMMUNITY TYPE(S): lakeplain wet prairie

ELEMENT RANK: C FQI: 35.29 WET CO.: -0.7 $\bar{X}$ COEF. CONS.: 4.94

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

THOMAS ROAD PRAIRIE: FISH POINT WILDLIFE AREA

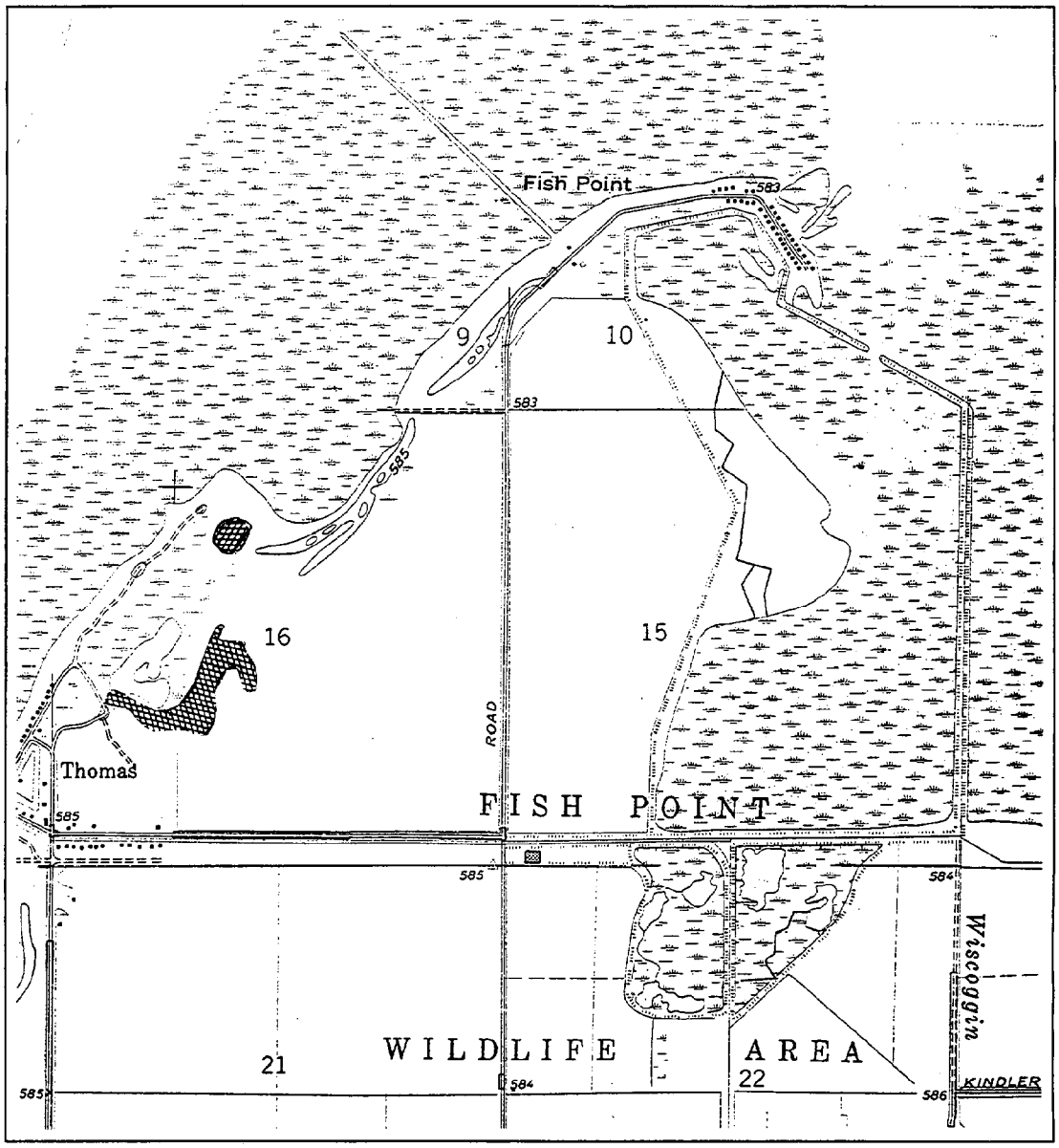
The Thomas Road lakeplain wet-mesic prairie is located in Tuscola County, along the shore of Saginaw Bay, at the northern terminus of Thomas Road on the Fish Point peninsula. The site includes approximately six acres of natural prairie and 25 acres of prairie on lands with artificially manipulated water tables. The prairie is bordered by emergent marsh and dry sandy ridges. This site is a remnant of a lakeplain prairie, Great Lakes marsh, and lakeplain oak opening complex that, prior to European settlement extended from the mouth of Saginaw River in Bay County, north and east along Saginaw Bay to the Wildfowl Bay Islands in Huron County.

Lakeplain prairie extends from the edge of standing water to the tops of low sand ridges, supporting both wetland and upland prairie species. The emergent marsh is dominated narrow leaved cattail (*Typha angustifolia*), sedges including: (*Carex lacustris*), (*C. lasiocarpa*), (*C. stricta*), and (*C. hystericina*); spikerushes including (*Eleocharis elliptica*), (*E. erythropoda*), and (*E. obtusa*), bullrushes including hard stemmed bullrush (*Scirpus acutus*), and three square bullrush (*Scirpus americanus*). The marsh prairie boarder is dominated by blue-joint (*Calamagrostis canadensis*) and a sedge (*Carex stricta*). The upland ridges support young bur oak (*Quercus macrocarpa*), trembling aspen (*Populus tremuloides*), and sand cherry (*Prunus pumila*). These beech ridges are more open, with a larger prairie component to the flora, than in other sites along Saginaw Bay.

The lakeplain prairie is dominated by big bluestem (*Andropogon gerardii*), Indian grass (*Sorgastrum nutans*), little bluestem (*Andropogon scoparius*), and switch grass (*Panicum virgatum*). Common prairie herbs and shrubs include shrubby cinquefoil (*Potentilla fruticosa*), silverweed (*P. anserina*), purple gerardia (*Agalinis purpurea*), Indian paintbrush (*Castilleja coccinea*), twig rush (*Cladium mariscoides*), bastard toadflax (*Comandra umbellata*), gray dogwood (*Cornus foemina*), strawberry (*Fragaria virginiana*), tall sunflower (*Helianthus giganteus*), marsh blazing star (*Liatris spicata*), wild bergamont (*Monarda fistulosa*), mash wild Timothy grass (*Muhlenbergia glomerata*), common mountain mint (*Pycnanthemum virginianum*), tall goldenrod (*Solidago altisima*), Ohio goldenrod (*S. ohioensis*) and false asphodel (*Toefieldia glutinosa*). The sites Floristic Quality Index is 40.88, ranking it 14th out of fifty one lakeplain prairie sites surveyed. Ninety one species have been recorded during four site visits. The Wetness Coefficient for the site is -1.7 (FacW), this value includes species from both the marsh and upland portions of the site.

No special plant species have been recorded within the wet-mesic prairie although the red legged spittle bug (Prosapia ignipectus), a state special concern insect is known from the site. Three state threatened plant species; prairie Indian plantain (*Cacalia plantaginea*), Sullivant's milkweed (*Asclepias sullivantii*), and tall green milkweed (*Asclepias hirtella*) were collected on the peninsula near the end of the ninteenth century.

The prairie is completly contained within the Fish Point Wildlife Area. Because the system is contained within lands managed by the Wildlife Division there is good potential to manage portions of the property for the expansion of the lakeplain prairie. Management should include monitoring of the natural water level fluctuations and monitoring plant commuity dynamics in areas with managed hydrology to determine if artificial hydrologic management could be made to favor prairie species.



Scale 1:24,000

SITE: Thomas Road Prairie

LOCATION: Saginaw Bay Region, Tuscola Co. T15N-R8E

USGS QUADRANGLE: Fish Point 4308365

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK: C FQI: 40.88 WET CO.: -1.7 $\overline{X}$ COEF. CONS.: 4.29

FQI= Floristic Quality Index ; WET COEF. = Average Wetland Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

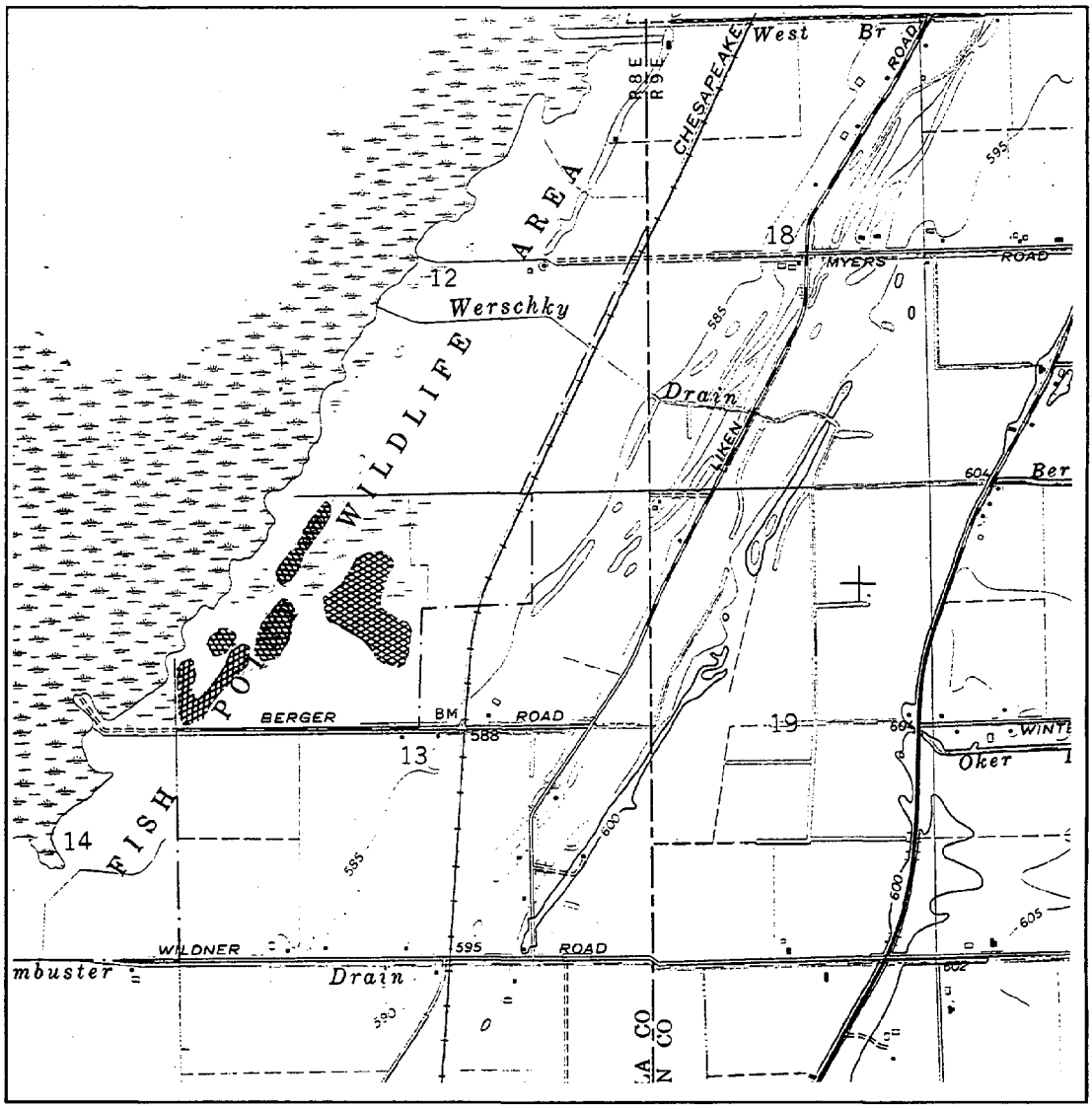
BERGER ROAD: FISH POINT WILDLIFE AREA

The Berger Road prairie includes both wet and wet-mesic portions and is located in Tuscola County, along the shore of Saginaw Bay, approximately 2.25 miles south of the mouth of the Sebewaing River. The prairie occupies shallow swales below low beach ridges and in some places covers portions of the beach ridges as well. The best remnants of this complex are AB- ranked lakeplain wet prairie covering 20-30 acres, the lakeplain C-ranked wet-mesic prairie has been degraded or is a secondary prairie recolonizing disturbed lands. The wet mesic portion accounts for 5-15 acres. This remnant is part of an extensive lakeplain prairie, Great Lakes Marsh, and lakeplain oak opening complex that, prior to European settlement, reached from the mouth of the Saginaw River in Bay County, north and east to the Wildfowl Bay Islands in Huron County. Portions of the Berger Road site have been plowed but are reverting to native vegetation. Active management will be required to direct the natural succession of the site towards a prairie community instead of a mixed hardwood forest community.

The highest quality prairie remnants occur in the fist and second swales inland from the shore. These prairie pockets are intermixed with Great Lakes marsh, wetland shrub and upland shrub communities. The marshes are dominated by hard stemmed bull rush (*Scirpus acutus*), narrow leaved cattail (*Typha angustifolia*), reed canary grass (*Phalaris arundinecea*) and occasional pockets of feather grass (*Phragmites australis*). The wetland shrub communities are dominated by silky dogwood (*Cornus amomum*) and black ash (*Fraxinus nigra*), while the upland shrub zones are dominated by staghorn sumac (*Rhus typhina*) and gray stemmed dogwood (*Cornus foemina*). The quality of the prairie generally declines inland until agricultural land is encountered. This degraded zone contains many prairie elements and may be the most likely site for a successful restoration project.

The lakeplain wet prairie is dominated by blue-joint (*Calamagrostis canadensis*), meadow sedge (*Carex stricta*), and prairie cord grass (*Spartina pectinata*). Other common components of the wet prairie include twig rush (*Cladium mariscoides*), three square bulrush (*Scirpus americanus*), hard stemmed bullrush (*S. acutus*), fringed gentian (*Gentianopsis crinita*), silverweed (*Potentilla anserina*), winged loosestrife (*Lythrum alatum*), Ohio goldenrod (*Solidago ohioensis*), marsh fern (*Thelypteris palustris*), common arrow grass (*Triglochin maritima*), purple gerardia (*Agalinis purpurea*), marsh blazing star (*Liatris spicata*), Kalm's St. John's wort (*Hypericum kalmianum*), grass leaved goldenrod (*Euthamia graminifolia*), and New England aster (*Virgulus nova-angliae*). The wet-mesic prairie was dominated by big bluestem (*Andropogon gerardii*), Indian grass (*Sorgastrum nutans*), and beach grass (*Ammophila breviligulata*). Other common plants of the wet-mesic zone include wormwood (*Artemisia campestris*), strawberry (*Fragaria virginiana*), black eyed Susan (*Rudbeckia hirta*), Riddell's goldenrod (*Solidago riddellii*), common mountain mint (*Pycnanthemum virginianum*), shrubby cinquefoil (*Potentilla fruticosa*), tall sunflower (*Helianthus giganteus*), sneezeweed (*Helenium autumnale*), pale spiked lobelia (*Lobelia spicata*), butterfly weed (*Asclepias tuberosa*), and ninebark (*Physocarpus opulifolius*). The site is situated on Essexville loamy fine sands and Tappan loams. Soil pH ranges from 4.6 on the tops of sandy ridges to 7.3 in wet swales. The swales may include a histic epipedon up to 20 cm deep. The sites Floristic Quality Index is 40.17, ranking it 15th out of 51 lakeplain prairie sites surveyed. Eighty nine plant species have been recorded from the site during four visits. The sites average Wetness Coefficient is -2.3 (FacW-).

The prairie currently covers approximately 15 acres but up to 80 acres of adjacent land represents one of the best opportunities for prairie restoration in the state. The core prairie is not as high quality as is the Bradleyville Road Prairie, but the adjacent lands may be restorable with less effort than those lands abutting the Bradleyville Prairies. All of the extant prairie and most of the restorable land is within the Fish Point Wildlife Area, but a few parcels in the north east may also be restrorable. Refer to the Sebewaing Railroad Prairie site for a discussion of these parcels. Primary management should include brush removal, preferably via controlled burns and monitoring of local ground water levels.



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SITE: Berger Road
LOCATION: Saginaw Bay Region, Tuscola Co. T15N-R8E Sec. 13.
USGS QUADRANGLE: Sebewaing 4308364
COMMUNITY TYPE(S): lakeplain wet prairie; lakeplain wet-mesic prairie.
ELEMENT RANK B wet; C wet-mesic FQI: 40.17 WET CO.: -2.3 $\overline{X}$ COEF. CONS.: 4.26
FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

SEBEWAING RAILROAD PRAIRIE: FISH POINT WILDLIFE AREA

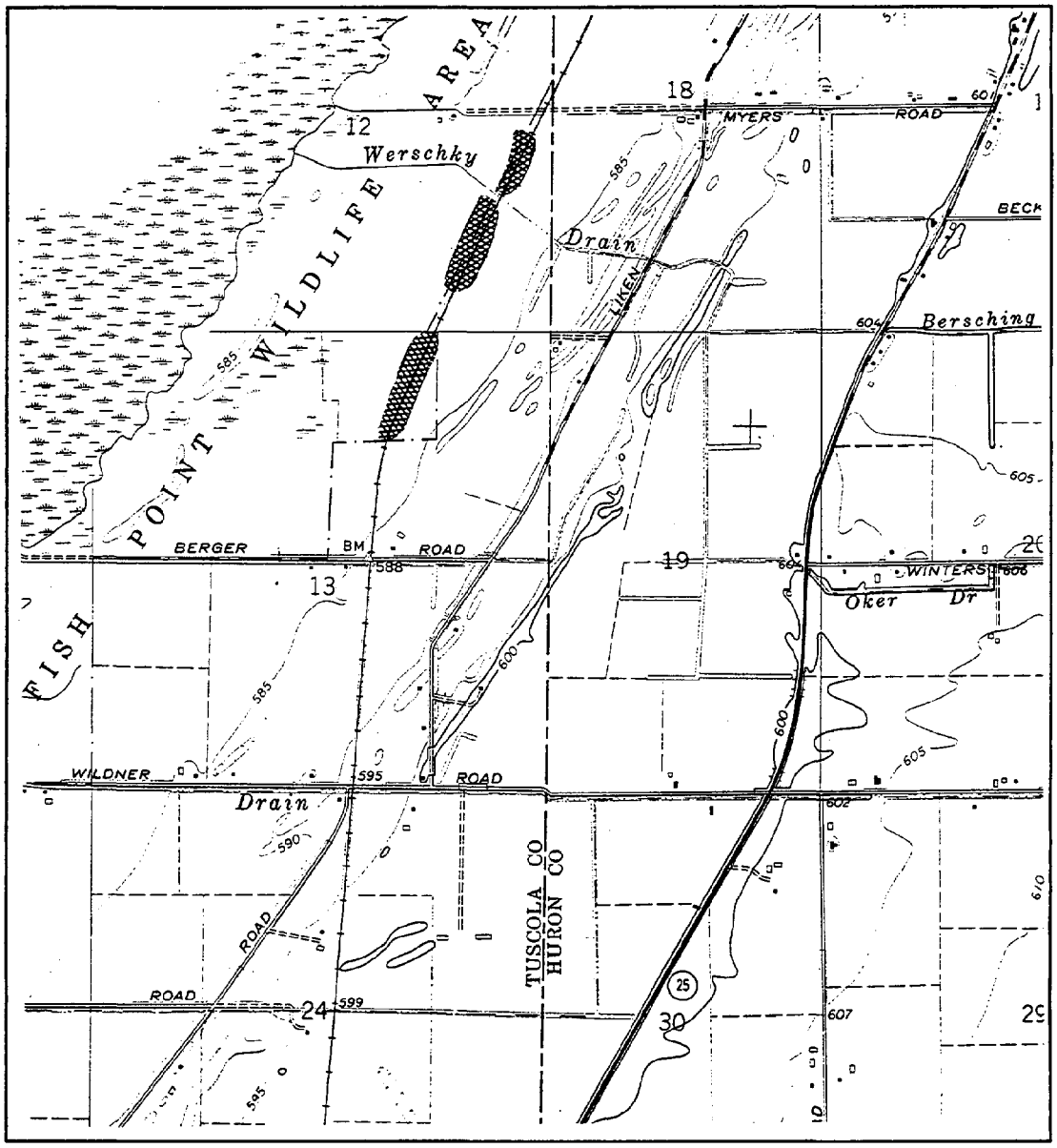
The Sebewaing Railroad lakeplain wet prairie is located approximately 0.5 miles inland of Saginaw Bay and just under two miles south of the Sebewaing River. The prairie lies along the eastern boundary of the Fish Point Wildlife Area and is accessed via Berger Road. The site boarders the Tuscola-Huron County line. The prairie on this site is secondary, having recovered after being plowed for an undetermined length of time. This prairie is a 10 acre remnant of an extensive prairie that, prior to European settlement, extended along Saginaw Bay from the mouth of the Saginaw River in Bay County to the Wildfowl Bay Islands in Huron County and between one half and five miles inland.

This lakeplain prairie is contained within the right of way of the Chesapeake and Ohio Railroad. Improvements to the road bed in 1984 severely damaged this site. An additional problem has been the heavy application of herbicides. Ironically the former method of right-of-way brush control, burning, probably maintained the prairie up until the 1960s.

The wet prairie is dominated by Indian grass (*Sorghastrum nutans*), blue-joint grass (*Calamagrostis canadensis*), and a sedge (*Carex aquatilis*). Other common prairie species include brown eyed Susan (*Rudbeckia hirta*), strawberry (*Fragaria virginiana*), wild bergemot (*Monarda fistulosa*), big bluestem (*Andropogon gerardii*), little bluestem (*Andropogon scoparius*), bastard toadflax (*Comandra umbellata*), fringed closed gentian (*Gentiana andrewsii*), prairie dock (*Silphium terebinthinaceum*), marsh blazing star (*Liatris spicata*) twig rush (*Cladium mariscoides*), shrubby St. John's wort (*Hypericum kalmianum*), and shrubby cinquefoil (*Potentilla fruticosa*). The prairie is situated on loamy soils of the Tappan Series with a pH in the A horizon of 7.8 to 8.0. The site's Floristic Quality Index equals 40.33 ranking it 16th out of 53 lakeplain prairie sites sampled. Eighty nine plant species have been noted on the site during two visits. The Wetness Coefficient for the site is -1.4 (Fac+).

The state threatened tall green milkweed (*Asclepias hirtella*) is found on this site.

Portions of the Sebewaing Road prairie lie within the Fish Point Wildlife Area. The majority ownership is with the Chessie System Co. in form of a railroad right-of-way. The prairie also extends onto lands of the Krauss - Schwartz Company and of Victor Engelhardt. This site is closely associated with the Berger Road ste and the Sebewaing VFW site. Acquisition of the Krauss-Schwartz property would create a single management unit encompassing all three sites and large intervening areas with restoration potential. Mr. Krauss rejected inquiries conducted by The Nature Conservancy in the early 1980s. Acquisition is recommended for all properties lying north of Berger Road, West of the Chesapeake and Ohio Railroad and south of Sebewaing Road. If this land could be acquired it would create one of three lakeplain prairie sites with a good potential for long term viability and the ability to endure fluctuations in Great Lakes water levels. The other two sites are Bradleyville Road to the south and Gieger Road to the north.



Scale 1:24,000

SITE: Sebewaing Railroad

LOCATION: Saginaw Bay Region, Tuscola + Huron Co., T15N-R8E Sec 13, T15N-R9E Sec. 18

USGS QUADRANGLE: Sebewaing 4308364

COMMUNITY TYPE(S): lakeplain wet prairie

ELEMENT RANK: C FQI: 40.33 WET CO.: -1.4 $\overline{X}$ COEF. CONS.: 4.48

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

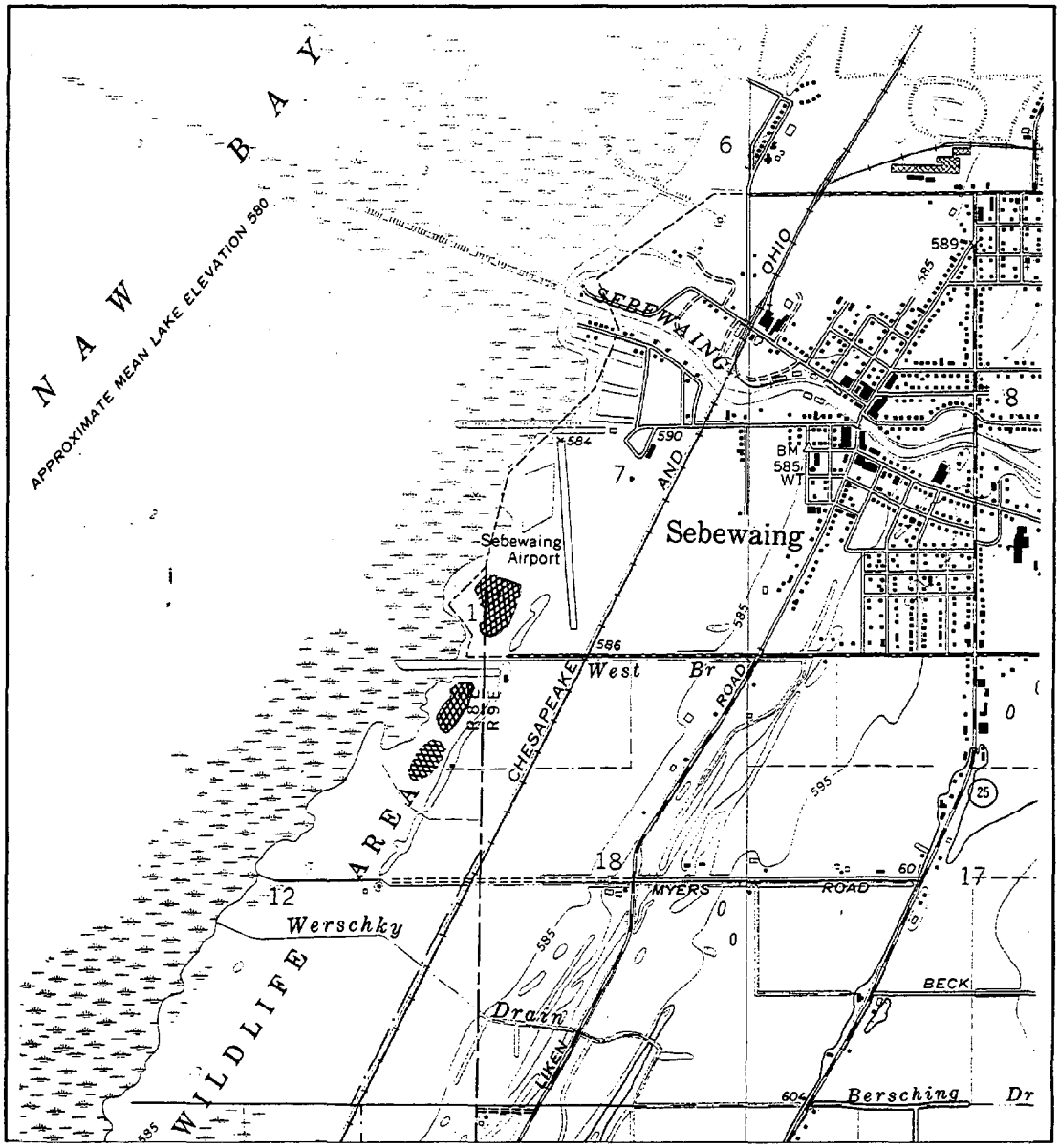
SEBEWAING VFW AND AIRPORT PRAIRIE: FISH POINT WILDLIFE AREA

The Sebewaing VFW and Airport site includes lakeplain wet prairie and lakeplain oak opening and is located along the shore of Saginaw Bay, approximately 0.8 miles south of the mouth of the Sebewaing River. The wet prairie and oak opening each cover approximately five acres. Most of the surrounding land is currently in active to agricultural use. Portions of wet prairie are within a grass runway of the Sebewaing Airport, although the best remnant stretches south along the lake shore. The extant prairie is a small remnant of an extensive lakeplain prairie, Great Lakes marsh, and lakeplain oak opening complex, that prior to European settlement, stretched from the mouth of the Saginaw River in Bay county north and east to the Wildfowl Bay Islands in Huron County.

The remaining lakeplain prairie lies immediately adjacent to Great Lakes marsh and in a swale, inland of the primary beach ridge. The marsh is dominated by narrow leaved cattail (*Typha angustifolia*) and hard stemmed bullrush (*Scirpus acutus*). Shrubby areas between the prairie and oak openings are dominated by silky dogwood (*Cornus amomum*), diamond willow (*Salix eriocephala*), and blue leaf willow (*S. myricoides*). The oak opening is dominated by open grown bur oak (*Quercus macrocarpa*) and swamp white oak (*Q. bicolor*).

The C-ranked lakeplain wet prairie is dominated by bluejoint grass (*Calamagrosits canadensis*) and a sedge (*Carex aquatilis*). Common prairie species include prairie cord grass (*Spartina pectinata*), swamp milkweed (*Asclepias incarnata*), bastard toadflax (*Commandra umbelata*), sneezeweed (*Helenium autumnale*), common rock rose (*Helianthemum canadense*), shrubby cinquefoil (*Potentilla fruticosa*), pale spiked lobelia (*Lobelia spicata*), silverweed (*Potentilla anserina*), and Ohio goldenrod (*Solidago ohioensis*). The prairie occupies loamy sands in the Essexville Series and sands in the Pipestone Series. The soil pH ranges from 4.5 on top of the beach ridges to 8.0 in the wet swales. The site has a Floristic Quality Index of 33.88 ranking it 24th out of 52 lakeplain prairie sites surveyed. Sixty nine species have been observed during two site visits. The site, including both prairie and oak opening elements has a Wetness Coefficient of -1.1 (Fac+).

The site straddles the northern edge of the designated boundaries of Fish Point Wildlife Area. All of the property is privately owned. The principle owner is the Krauss—Schwartz Company that holds 184 acres in T15NR8E, Section 12. Six other landowners own portions of the site. The most significant of these is the Sebewaing Municipal Airport Authority. Management of the oak opening and wet prairie fragments on the airport property would be consistent with the maintenance of the airport. Formal management agreements and conservation easements should be pursued on this parcel. Inquires into the acquisition of the Krauss—Schwartz property by The Nature Conservancy of Michigan, in the early 1980s, were rejected by Mr. Krauss. Acquisition of all open lands west of the Chesapeake and Ohio Railroad, North of Berger Road and South of the Sebewaing Municipal Airport is recommended for the protection of this site.



Scale 1:24,000

SITE: Sebewaing Airport

LOCATION: Saginaw Bay Region, Huron Co., T15N-R9E Sec.7

USGS QUADRANGLE: Sebewaing 4308364

COMMUNITY TYPE(S): lakeplain wet prairie; lakeplain oak opening

ELEMENT RANK: CD FQI: 33.88 WET CO.: -1.1 $\overline{X}$ COEF. CONS.: 4.07

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

GIEGER ROAD LAKEPLAIN PRAIRIE: WILDFOWL BAY WILDLIFE AREA

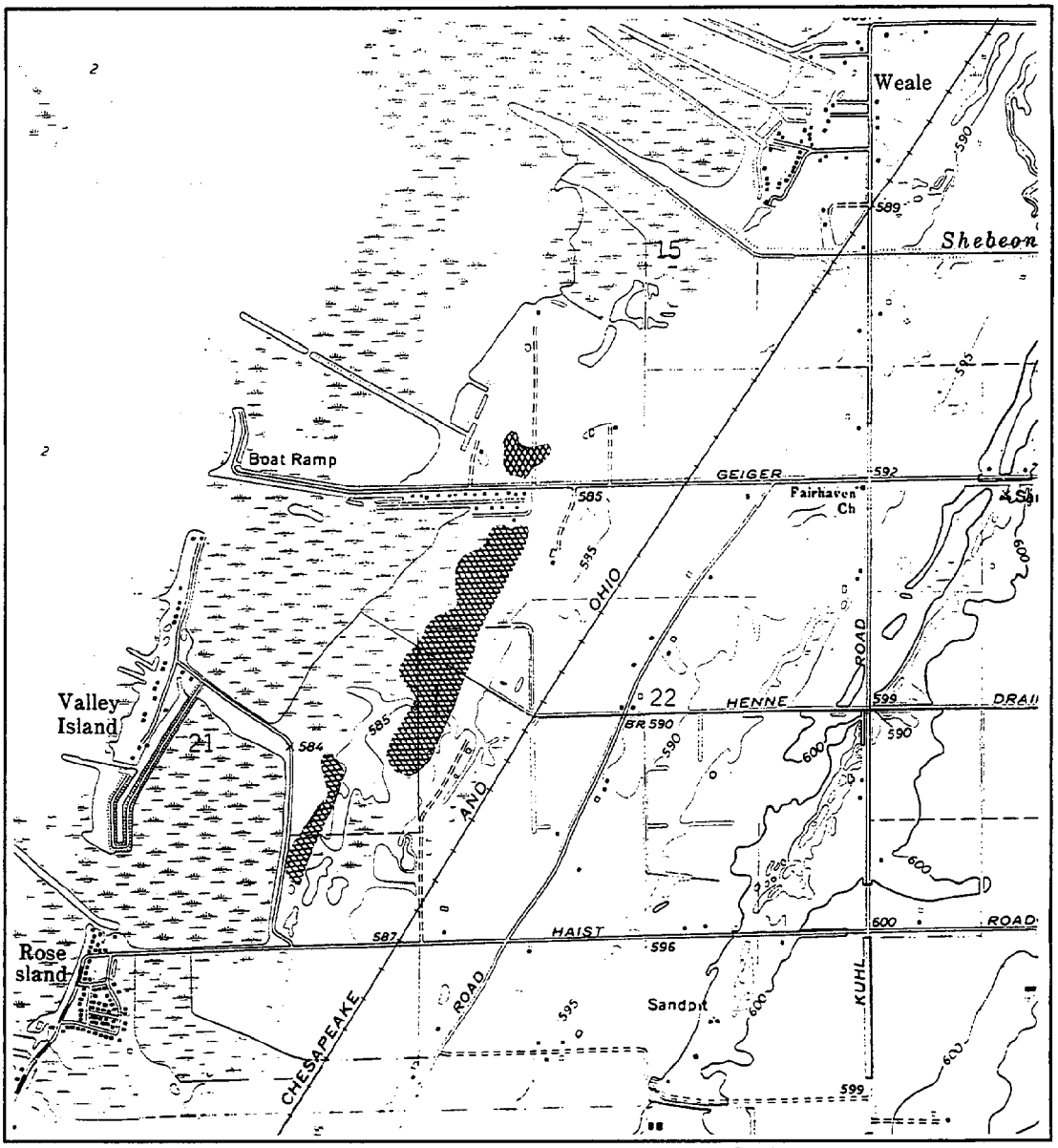
The Gieger Road prairie includes lakeplain wet-mesic prairie and lakeplain wet prairie, and is located in Huron County along the shores of Saginaw Bay in the lee of Valley Island. The site may be accessed via either Gieger Road on the south or Haist Road on the north. The prairie is located just inland of an extensive marsh in the bays behind Valley Island. The best prairie lies adjacent to the shore but degraded prairies are found behind the primary beach ridges. Much of the inland area appears to have been farmed at some time but is reverting to prairie vegetation. The Gieger Road lakeplain prairie is a 10-15 acre fragment of an large lakeplain prairie, Great Lakes Marsh, and lakeplain oak opening complex that, prior to European settlement, reached from the mouth of the Saginaw River in Bay County to the Wildfowl Bay Islands in Huron County and extended inland from one half to five miles.

The adjacent marsh is dominated by narrow leaved cattail (*Typha angustifolia*) hard stemmed bullrush (*Scirpus acutus*) and soft stemmed bullrush (*S. validis*). Inland and upland of the prairie is a mature forest supporting bur oak (*Quercus macrocarpa*), swamp white oak (*Q. bicolor*), black oak (*Quercus velutina*), and northern white cedar (*Thuja occidentalis*), with an understory of prickly ash (*Zanthoxylum americanum*). There are also areas of abandoned agricultural land that contain assemblages of prairie vegetation and, that if are properly managed, may be restored to prairie.

The B-ranked wet prairie is dominated by sedges (*Carex spp.*), twig rush (*Cladium mariscoides*), prairie cord grass (*Spartina pectinata*), Ohio goldenrod (*Solidago ohioensis*), the exotic, Kentucky blue grass (*Poa pratensis*). Other common plant include shrubby cinquefoil (*Potentilla fruticosa*), marsh blazing star (*Liatris spicata*), blue-joint (*Calamagrostis canadensis*)and Canada rush (*Juncus canadensis*). The C-ranked lakeplain wet-mesic prairie is dominated by shrubby cinquefoil, blue-joint and Indian grass (*Sorgastrum nutans*). Other common species include, common mountain mint (*Pycnanthemum virginianum*), clasping dogbane (*Apocynum sibericum*), bastard toadflax (*Commandra umbellata*), spiked lobelia (*Lobelia spicata*), and strawberry (*Fragaria virginiana*). The site's Floristic Quality Index is 50.34, ranking it sixth of 53 lakeplain prairie sites surveyed. The prairie is located on loam of the Tappan Series and loamy sands of the Essexville Series. The wet-mesic prairie has a pH of 7.7 while the wet prairie has a pH of 8.1. One hundred ten plant species have been noted during six visits to the site. The site's Wetness Coefficient equals -1.9 (FacW), this represents a composite of the lakeplain wet prairie and the lakeplain wet-mesic prairie.

Gieger Road supports two state threatened plants, a BC ranked population of the prairie Indian plantain (*Cacalia plantaginea*) consisting of approximately 60 clumps and an AB ranked population of tall green milkweed (*Asclepias hirtella*) which may contain hundreds of stems.

The Gieger Road Prairies site is in multiple ownership. The southwestern portion is owned by the Michigan DNR and is part of the Wildfowl Bay Wildlife Area. The northwestern portion is owned by the Michigan Nature Association. East of these properties the site is in private ownership, owned by Anna Horun, Efim Syter, F. Kuchta and north of Gieger Road, Art & Angeline Klass, and Norm & Florence Kuhl. Most of this land lies within the dedicated boundaries of the Wildfowl Bay Wildlife Area and acquisition should be pursued. This is one of the most promising sites along Saginaw Bay for the preservation of lakeplain prairie.



Scale 1:24,000

SITE: Gieger Road

LOCATION: Saginaw Bay Region, Huron Co. T16N-R9E Sec. 15, 21, + 22.

USGS QUADRANGLE: Bay Port West 4308374

COMMUNITY TYPE(S):lakeplain wet prairie, lakeplain wet-mesic prairie.

ELEMENT RANK: B wet, C wet-mesic FQI: 52.03 WET CO.: -2.1 $\overline{X}$ COEF. CONS.: 5.13

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

WEALE ROAD PRAIRIE: WILDFOWL BAY WILDLIFE AREA

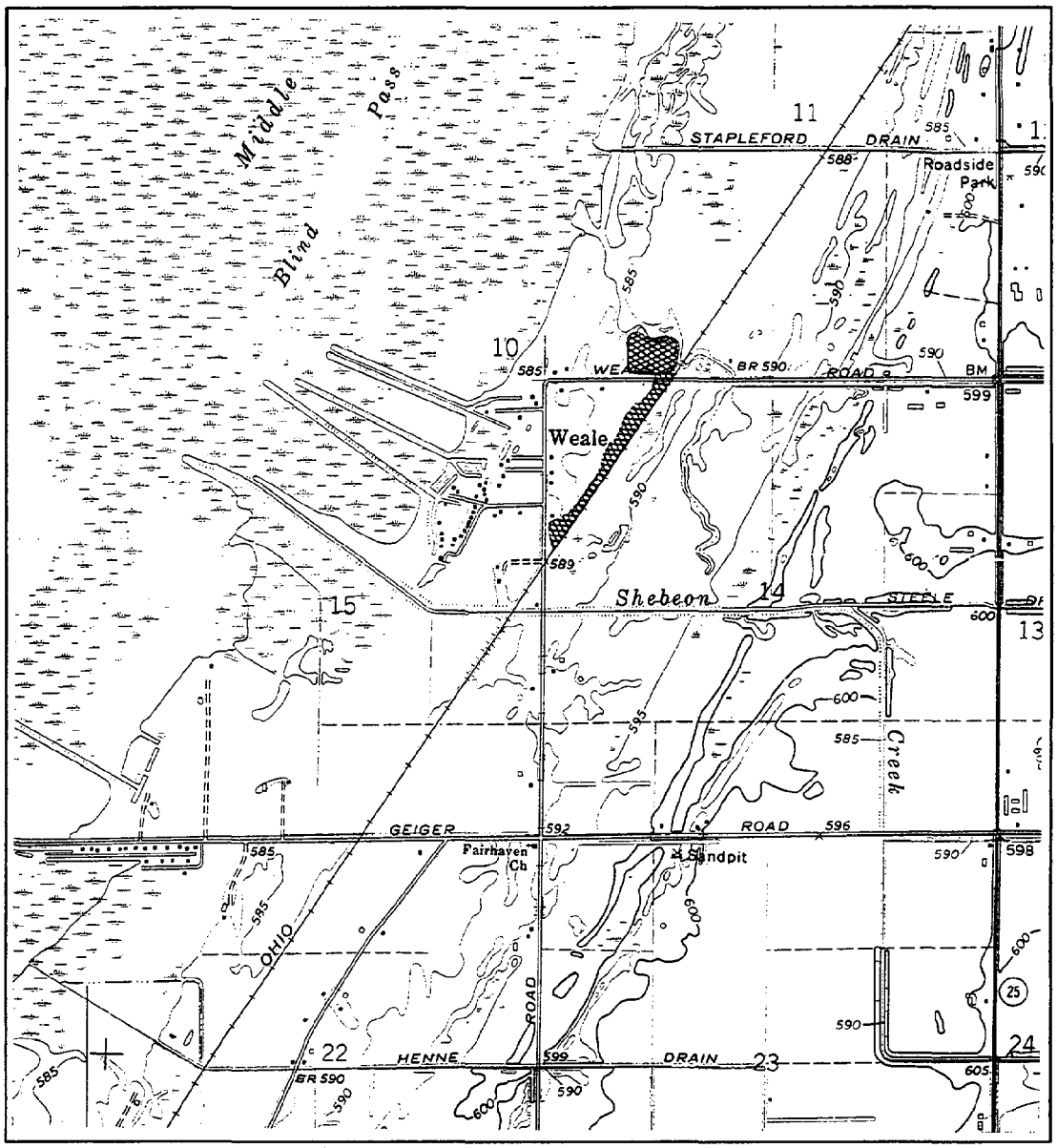
Weale Road lakeplain wet prairie occurs approximately 0.5 miles inland from the shores of Saginaw Bay. The site lies just north of Shebeon Creek and runs north along the Chesapeake and Ohio Railroad to Weale Road. This prairie has been highly degraded by herbiciding and other track maintenance. Only two or three acres of prairie are extant on the site but up to 25 acres may be restorable with proper management. At both the northern and southern segment of the site the prairie extents west off the railroad right-of-way and onto small private holdings. There may be additional prairie north of Weale Road. This remnant appears at the northeastern end of a lakeplain prairie, Great Lakes marsh, lakeplain oak opening complex that, prior to European settlement, extend from here south along the Saginaw Bay shoreline to the mouth of the Saginaw River and reached inland between one half mile and five miles.

The prairie runs along the west side of the railroad tracks, primarily within the railroad right-of way. At both the north and south end the prairie extends westward onto private lands. Abandoned agricultural land along the right-of-way also supports some prairie vegetation and, with proper management, may be restored to prairie.

The lakeplain wet prairie is dominated by big bluestem (*Andropogon gerardii*) and prairie cord grass (*Spartina pectinata*). Other common prairie plants include blue-joint (*Calamagrostis canadensis*), New England aster (*Aster nova-angliea*), red-osier dogwood (*Cornus stolonifera*), shrubby St. John's wort (*Hypericum kalmii*), marsh blazing star (*Liatris spicata*), silverweed (*Potentilla anserina*), shrubby cinquefoil (*P. fruticosa*), and purple gerardia (*Agalinis purpurea*). The prairie is situated on loamy soils of the Tappan series. The site's Floristic Quality Index is 37.47 ranking it 19th out of 53 lakeplain prairie sites surveyed. Sixty eight plant species have been identified at the site during three visits. The site's Wetness Coefficient equals -1.8 (FacW).

A single, dead, Blanding's turtle (*Emydoidea blandingii*) was found on the railroad tracks adjacent to the prairie. Also of note is the occurrence of a fossil bed of a free standing coral, Cylindrophyllum, which has been exposed by ditching along the railroad.

The site is adjacent to lands of the Wildfowl Bay Wildlife Area but only a tiny portion of the prairie extends onto state owned lands. The majority of the prairie is within the ownership of the Chesapeake and Ohio Railroad (H&E RR ?). Portions of the prairie west of the right-of-way extend onto lands of J. & E. Katenko, Richard H. & Bonnie Abbott, and other small ownership. The site lies within the designated boundaries of the Wildfowl Bay Wildlife Area. Acquisition of the site is recommended.



Scale 1:24,000

SITE: Weale Road

LOCATION: Saginaw Bay Region, Huron Co. T16N-R9E Sec. 14

USGS QUADRANGLE: Bay Port West 4308374

COMMUNITY TYPE(S): lakeplain wet prairie

ELEMENT RANK D FQI: 37.47 WET CO.: -1.8 $\bar{X}$ COEF. CONS.: 4.54

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

LONG LANE AIRSTRIP PRAIRIE

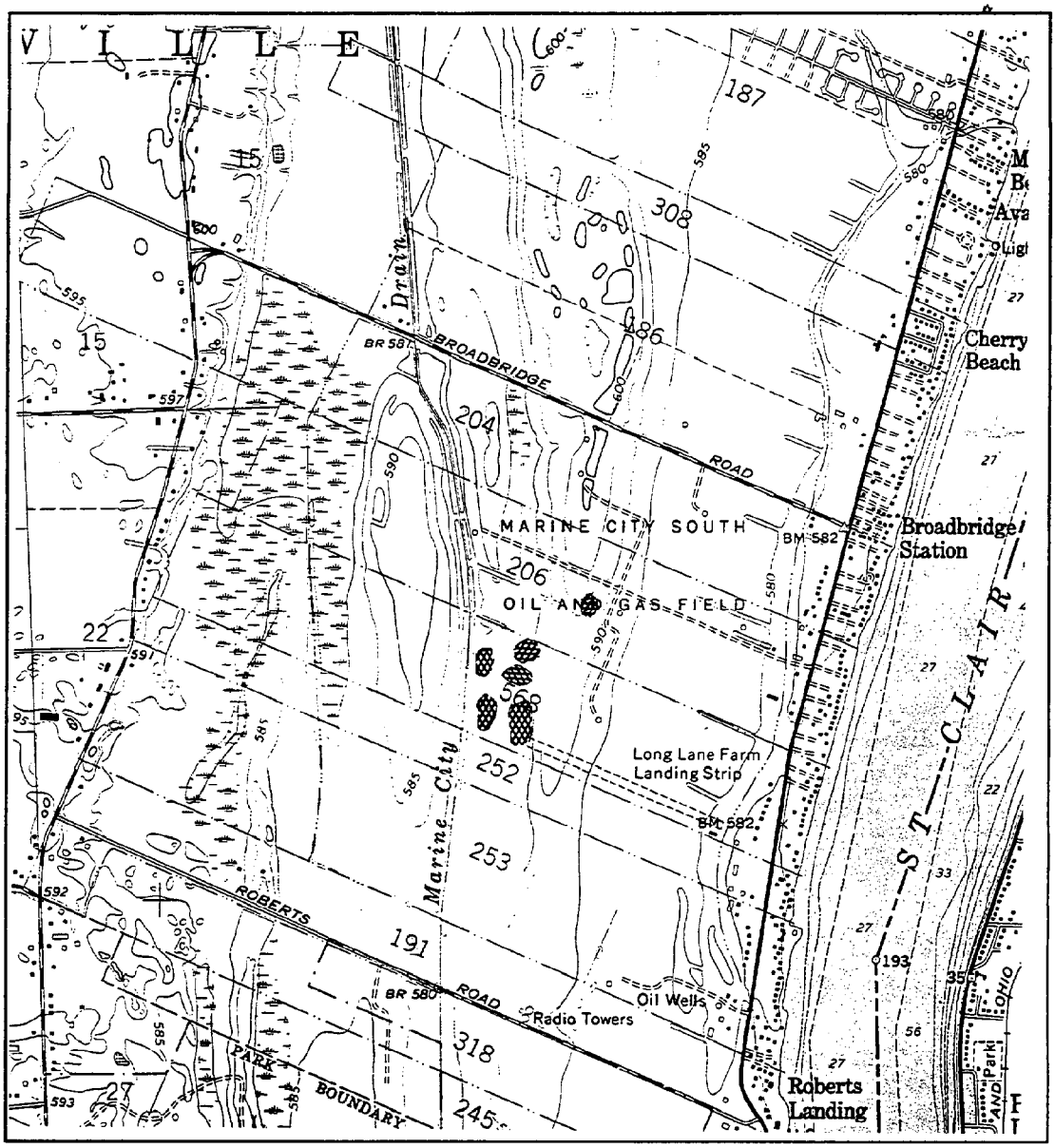
The Lone Lane Airstrip prairie is located in St. Clair County, just under a mile west of the St. Clair River, along the Marine City Drain between Broadbridge Road and Robert's Road. This area is in abandoned agricultural fields but is reverting to a prairie flora. There are 10 to 15 acres of prairie vegetation on the site. Proper management could increase that total to as many as 45 acres. This prairie is a remnant of a lakeplain prairie, emergent marsh and lakeplain oak opening complex which, prior to European settlement, covered approximately 4,750 acres along the current Marine City Drain.

The lakeplain prairie lies along the west side of a low ridge. The ridge runs north to south approximately 300 to 600 meters east of Marsh Drain. The highest quality prairie occurs at the toe of the ridge where water seeps out of the ground. The soils on the site are sandy loam with a clay subsoil in the Wasepi Series and clays in the Paulding Series. The seepage area includes section of both Wasepi and Paulding soils. The sandy layer of the Wasepi loam typically ranges from 18 to 40 inches deep but is highly variable of very short horizontal distances.

The D-ranked wet-mesic prairie is dominated by blue-joint (*Calamagrostis canadensis*). Other common prairie plaints include grass leaved goldenrod (*Euthamia graminifolia*), ironweed (*Veronia missorica*), heath aster (*Virgulus ericoides*), Riddell's goldenrod (*Solidago riddellii*), tall sunflower (*Helianthus giganteus*), common mountain mint (*Pycnanthemum virginiana*), and marsh blazing star (*Liatris spicata*). The sites Floristic Quality Index is 23.86 ranking it 41st out of 53 lakeplain prairie sites surveyed. Thirty nine species were noted during a single visit. The sites Wetness Coefficient is 0.3 (Fac).

Notable on the site is a population of the state threatened Sullivant's milkweed (*Asclepias sullivantii*). Sullivant's milkweed occurs along the seepage zone, in the highest quality segment of the lakeplain prairie.

All of the property on the site is privately owned. The core of the site is approximately three quarters of a mile north of Robert's Road and the northern boundary of Algonac State Park. Open land extends south to the park border. Because the site occurs on multiple private ownership it is unlikely that a meaningful management and protection arrangement could be implemented with out acquiring the property. Acquisition is therefore recommended. All of the subject parcels extend across the Marsh Drain. The prairie is restricted to the eastern shore of the drain. Acquisition of the lands east of the drain would provide protection of the extant prairie but acquisition of the lands on both sides of the drain would allow for more management options, both along this fragment as well as on sites, downstream, within Algonac State Park.



Scale 1 : 24,000

SITES: Long Lane Airstrip

LOCATION: St. Clair Delta Subregion, St. Clair County, T3N-R16E Sections 23

USGS QUADRANGLE: Marine City 4208265

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK: D FQI: 23.86 WET CO.: 0.3 $\overline{X}$ COEF. CONS.: 3.82

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

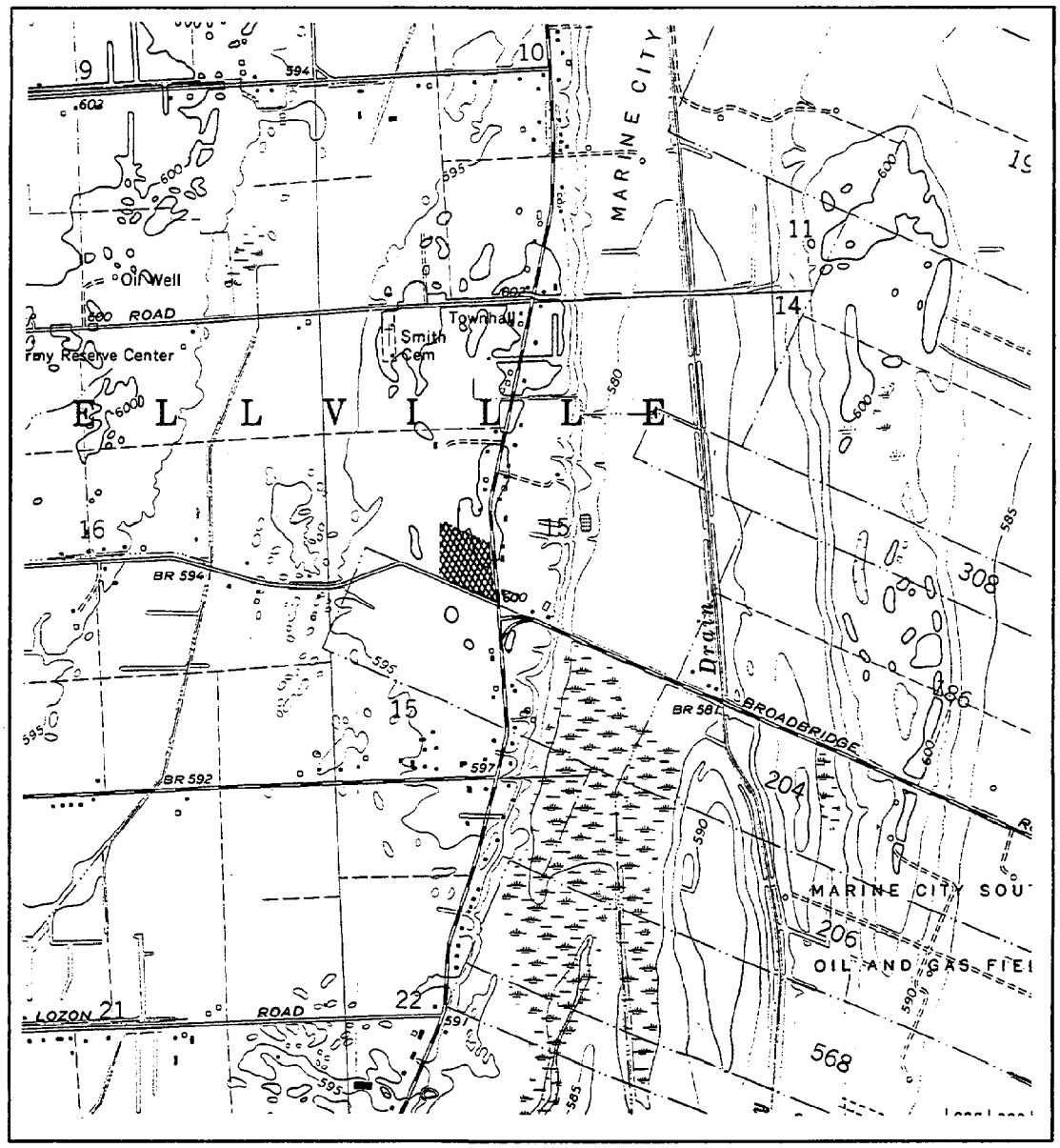
BROADBRIDGE ROAD AND MARSH ROAD PRAIRIE

The Broadbridge Road and Marsh Road prairie is located in St. Clair County, approximately 1.75 miles west of the St. Clair River. The site is on the northwest corner of the junction of Broadbridge Road and Marsh Road. This site is highly degraded with approximately one acre of extant prairie and five acres of restorable land. This site was formerly a go cart track. The one acre of prairie lies along the western edge of the track while the track itself may be restorable. To the west of the one acre prairie is a mature oak woodland. This fragment was once part of a lakeplain prairie, emergent marsh, and lakeplain oak opening which covered over 4,750 acres along the current route of Marsh Drain.

The oak woodland is dominated by black oak (*Quercus velutina*) with white oak (*Q. alba*) and bur oak (*Q. macrocarpa*) present. Also present in low pockets of the forest are red ash (*Fraxinus pensylvanica*), pin oak (*Quercus palustris*), and American elm (*Ulmus americana*). This oak forest may be restorable to lakeplain oak opening.

The D-ranked lakeplain wet-mesic prairie is dominated by little bluestem (*Andropogon scoparius*), big bluestem (*A. gerardii*), and Indian grass (*Sorghastrum nutans*). Other common prairie plants on the site include tall coreopsis (*Coreopsis tripteris*), marsh blazing star (*Liatris spicata*), pale spiked lobelia (*Lobelia spicata*), Canada rush (*Juncus canadensis*), Riddell's goldenrod (*Solidago riddellii*), heath aster (*Virgulus ericoides*), New England aster (*Virgulus nova-anglica*), ironweed (*Vernonia missurica*), and Culver's root (*Veronicastrum virginianum*). The prairie is located on a soil complex comprised of sandy loam of the Allendale Series, silt loam of the Lenawee Series and silt-clay loam of the Toledo Series. Forty nine species were observed during a single visit. The site's Floristic Quality Index is 24.19 ranking it 40th out of 53 lakeplain prairie sites surveyed. The site has a Wetness Coefficient of 0.5 (Fac).

This site is situated on a single private ownership. The property, covering 42 acres, belongs to Joye Peterson et. al. The eastern 20 acres are the highest quality. This parcel is recommended as a low priority acquisition. Protecting it would help preserve a mosaic of prairie remnants but the site is among the two or three poorest quality remnants identified.



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SITE: Junction of Broadbridge Road and Marsh Road

LOCATION: St. Clair Delta Subregion, St. Clair County, T3N-R16E, Section 15

USGS QUADRANGLE: Marine City 4208265

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK: D FQI: 24.19 WET CO.: +0.5 $\bar{X}$ COEF. CONS.: 3.76

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

ALGONAC BORROW PITS PRAIRIE: ALGONAC STATE PARK

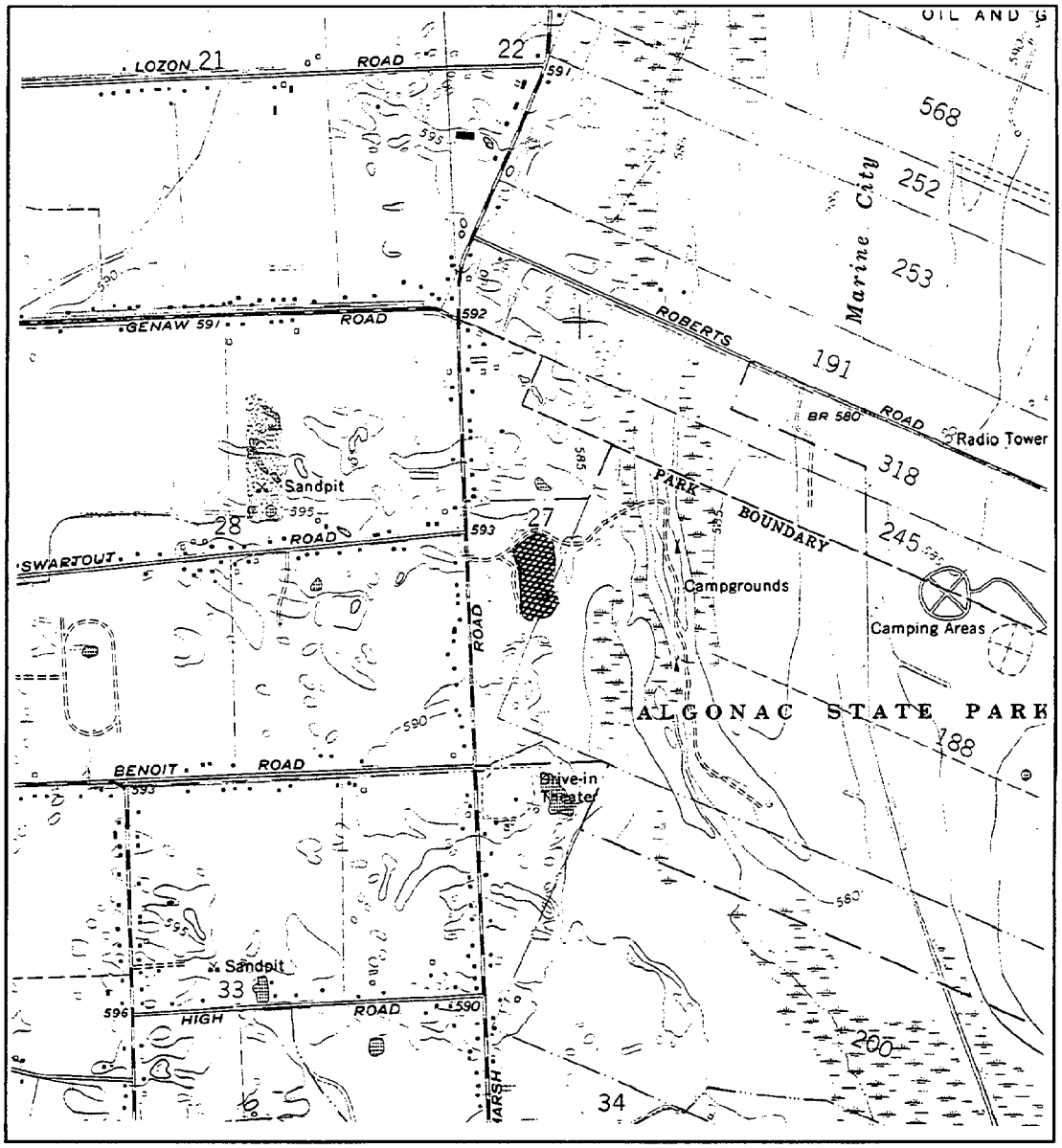
The Algonac borrow pits prairie is located in St. Clair county, approximately 1.5 miles west of the St. Clair River. The site is in the western portion of Algonac State Park, 100 meters east of Marsh Road. Access may be gained from a parking area 100 meters south of Swartout Road. This site includes approximately 10 acres of prairie located in shallow depressions on a low sandy ridge. Some of the depressions are natural and some have resulted from small scale sand mining. Prairie vegetation occurs in both natural and artificial depressions while the upland portion of the ridge supports an oak forest. This prairie is a remnant of a lakeplain prairie, emergent marsh and lakeplain oak opening complex that, prior to European settlement covered over 4,750 acres.

The surrounding oak forest is dominated black oak (*Quercus velutina*) and white oak (*Quercus alba*) with red maple (*Acer rubrum*), sassafras (*Sassafras albidum*) and black cherry (*Prunus serotina*) also common. The shrub layer was dominated by black cherry, red maple and American hazelnut (*Corylus americana*) with a ground cover dominated by the sedge (*Carex pensylvanica*), low bush blueberry (*Vaccinium angustifolium*) and bracken fern (*Pteridium aquilinum*).

The lakeplain wet-mesic prairie is dominated by little bluestem (*Andropogon scoparius*) and switch grass (*Panicum virgatum*). Other plants include common mountain mint (*Pycnanthemum virginianum*), bush clover (*Lespedeza capitata*), common polygala (*Polygala sanguinia*), colic root (*Aletris farinosa*), heath aster (*Virgulus ericoides*), sedges (*Carex muhlenbergia*) and (*C. aurea*), tall coreopsis (*Coreopsis tripteris*), marsh blazing star (*Liatris spicata*), and the grass pink orchid (*Calopogon tuberosus*). The prairie lies on fine sands of the Rousseau, Deford and Wainola Series. The site's Floristic Quality Index is 42.96 ranking it 13th out of 53 lakeplain prairie sites surveyed. Ninety plant species have been recorded from the site during five visits. The site's Wetness Coefficient is -0.1 (Fac).

This prairie fragment contains more special plant species than any other fragment outside of Wayne County. Four state threatened species and three state special concern species have been recorded from the site. Most significant among the threatened species is the only record of Gattinger's gerardia (*Agalinis gattingeri)* to have been found in Michigan since 1935 and only four occurrence ever recorded from the state The other threatened species are, a three awned grass (*Aristida longespica*), short-fruited rush (*Juncus brachycarpus*), and seedbox (*Ludwigia alternifolia*). The special concern species include dwarf bulrush (*Hemicarpha micrantha*), gentian leaved St. John's wort (*Hypericum gentianoides*), and an tall nut rush (*Scleria triglomerata*).

This site is completely contained within the Algonac State Park. The prairie is located near the western, foot only access to the park. It may be advisable to relocate this entrance in order to avoid excessive trampling of the site. Periodic controlled burns should also be conducted on the site. Because this site is near the park boundaries and residential properties these burns should be kept small.



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SITE: Algonac Borrow Pits

LOCATION: St. Clair Delta Subregion, St. Clair County, T3N-R16E, Section 27

USGS QUADRANGLE: Marine City 4208265

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK: CD FQI: 41.00 WET CO.: -0.1 $\bar{X}$ COEF. CONS.: 4.32

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

ALGONAC SOUTH DRAIN PRAIRIE: ALGONAC STATE PARK

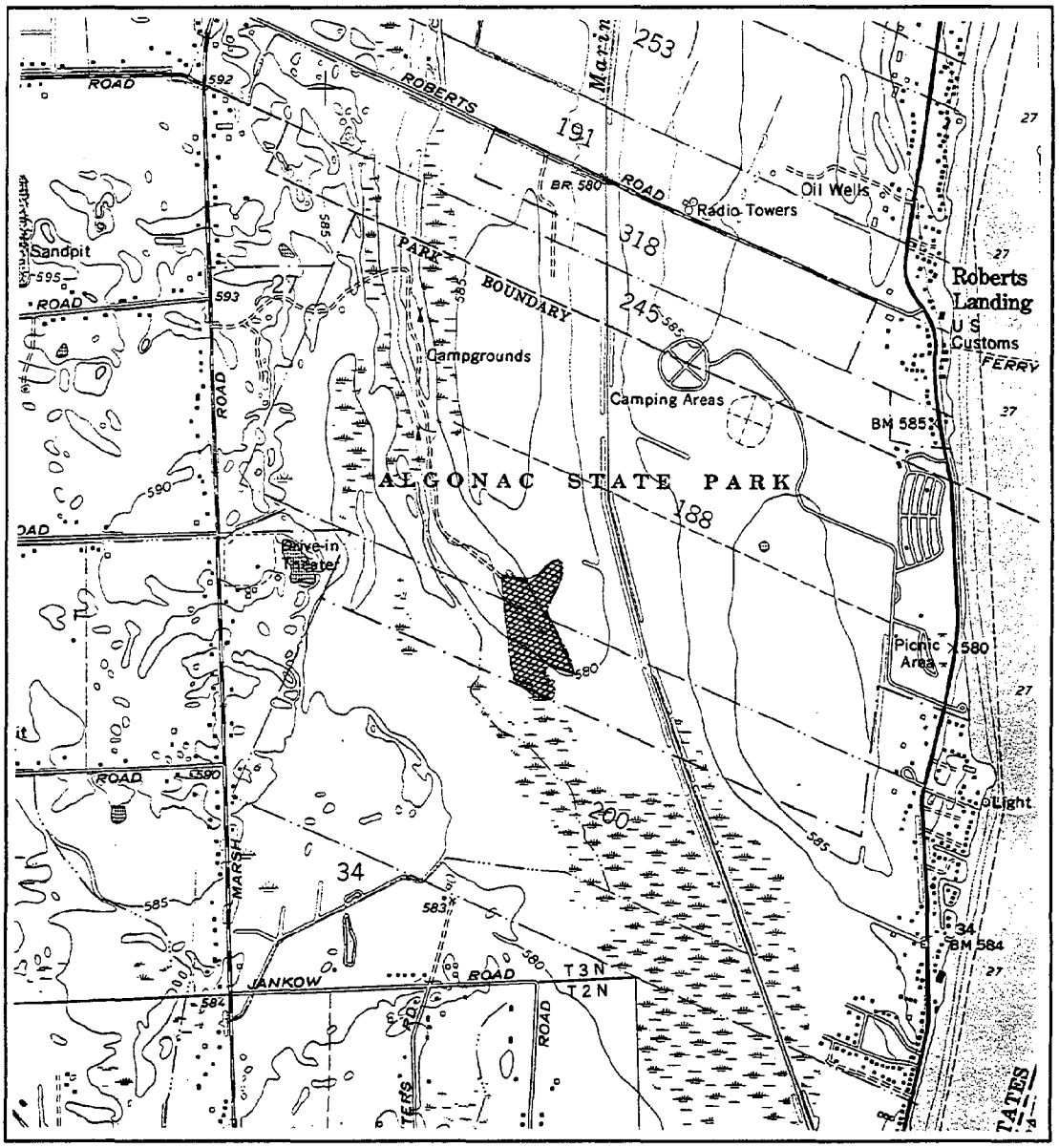
The Algonac South Drain site is a wet-mesic prairie, located in St. Clair County approximately 1.5 miles west of the St. Clair River. The site is within Algonac State Park. Within the park it is located approximately 30 meters south and 100 meters east of the eastern end of Benoit Road. The prairie covers approximately 25 acres sandwiched between 85 acres of oak openings on the west and Marsh Drain on the east. Portions of the prairie and oak openings may have been plowed for a short period but the most significant alteration to the community system has been the construction and maintenance of Marsh Drain which has lowered the water table in the area. This prairie is a remnant of a prairie, emergent marsh, and oak opening that, prior to European settlement, covered approximately 4,750 acres along the current route of Marsh Drain.

The oak opening is dominated by black oak (*Quercus velutina*) and white oak (*Q. alba*) with black cherry (*Prunus serotina*), sassafras (*Sassafras albidum*), red maple (*Acer rubrum*), and shagbark hickory (*Carya ovata*). Non-prairie lands along Marsh Drain include lowland swamp forest dominated by American elm (*Ulmus americana*), red ash (*Fraxinus pensylvanica*), and sycamore (*Platanus occidentalis*) and lowland shrub dominated by red-osier dogwood (*Cornus stolonifera*), silky dogwood (*C. amomum*) and Morrow's honey suckle (*Lonicera morrowi).*

The lakeplain wet-mesic prairie is dominated by big bluestem (*Andropogon gerardii*), and Indian grass (*Sorghastrum nutans*). Other common prairie plants include common mountain mint (*Pycnanthemum virginianum*), heath aster (*Virgulus ericoides*), New England aster (*Virgulus nova-angliea*), shrubby St. John's wort (*Hypericum kalmii*), marsh blazing star (*Liatris spicata*), tall coreopsis (*Coreopsis tripteris*), fringed closed gentian (*Gentiana andrewsii*), ironweed (*Vernonia missurica*), tall sunflower (*Helianthus giganteus*), Ohio goldenrod (*Solidago ohioensis*), Riddell's goldenrod (*S. riddellii*), Culver's root (*Veronicastrum virginicum*), and switch grass (*Panicum virgatum*). The prairie occurs on sandy loam of the Wasapi Series, clay subsoil variant while the oak opening occurs primarily on fine sands in the Wainola and Deford Series. The prairie soil pH averages 8.0 while that of the oak opening is 4.4 to 4.8. The sites Floristic Quality Index is 47.66 ranking it eighth out of 53 lakeplain prairie sites surveyed. One hundred twenty six species have been noted from the site during six visits. The site's composite Wetness Coefficient equals -0.2 (Fac).

Notable occurrences in this community include Skinner's gerardia which is a candidate for federal listing (C2) and is threatened in Michigan. This site was the first recorded Michigan location for this species where it was first observed in 1988. Three unconfirmed reports of Skinner's gerardia have been submitted but Algonac remains the only confirmed location. Also found on the site is Sullivant's milkweed (*Asclepias sullivantii*).

No additional acquisition has been identified which would enhance this fragment. Experimental enhancement via prescribed, controlled burns are being implemented in conjunction with a vegetation and ground water monitoring program (MNFI in prep.). Continued management and monitoring should be conducted on this site



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SITE: Algonac, South Drain

LOCATION: St. Clair Delta Subregion, St. Clair County, T3N-R16E, Section 34

USGS QUADRANGLE: Marine City 4208265

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK: BC FQI: 47.66 WET CO.: -0.2 $\bar{X}$ COEF. CONS.: 4.25

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

ALGONAC JANKOW ROAD PRAIRIE: ALGONAC STATE PARK

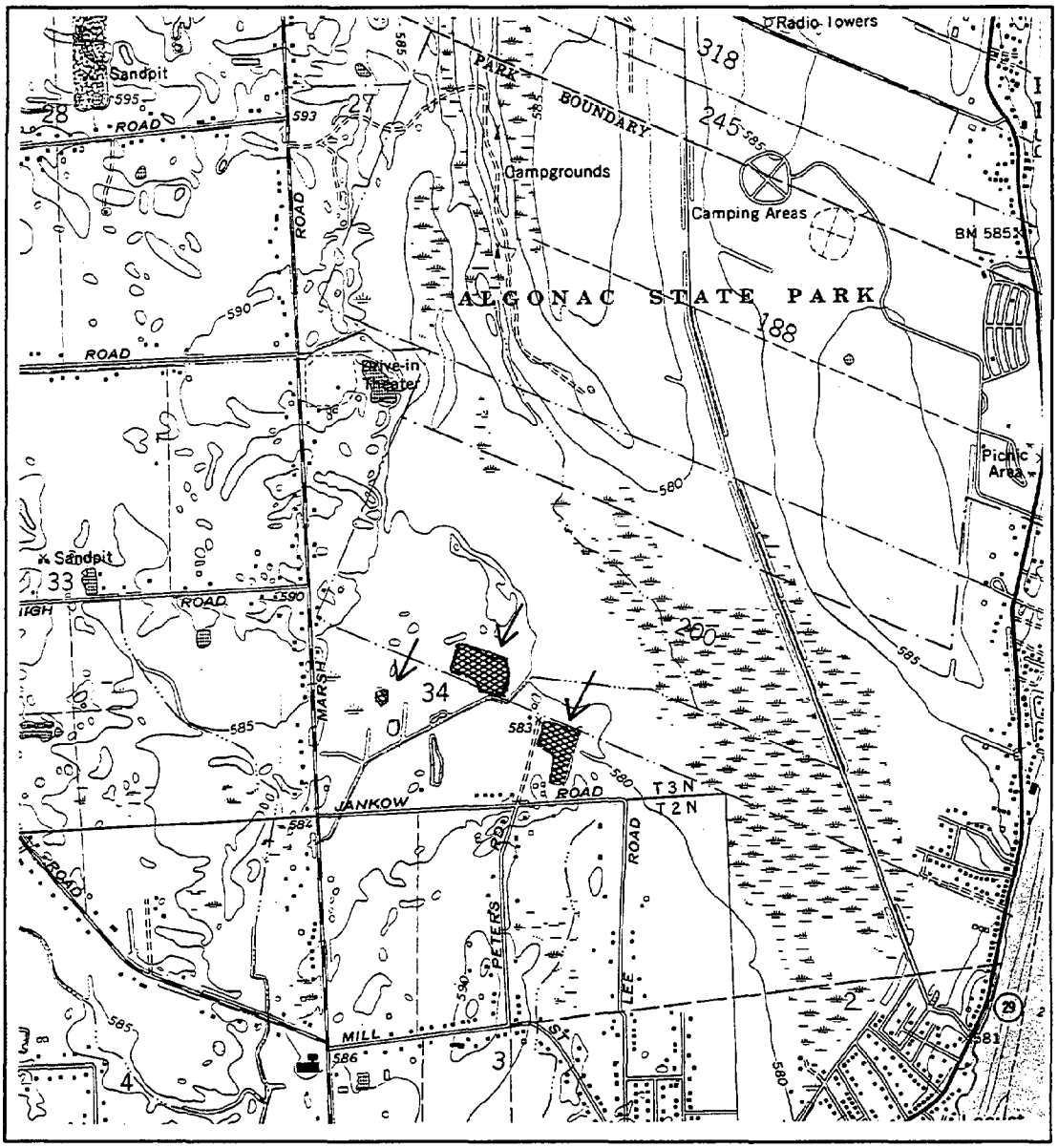
The Algonac Jankow Road lakeplain wet-mesic prairie is located in St. Clair County approximately one mile west of the St. Clair River. The site is 300 - 350 meters north of Jankow Road and 300 - 750 meters east of Marsh Road. The site lies near the southern boundary of Algonac State Park. Only a small portion of the prairie lies within the park boundaries. The prairie occupies about 15 acres that with proper management may be expanded to over 50 acres. This remnant is part of a lakeplain prairie, emergent marsh, lakeplain oak opening complex that, prior to European settlement, covered over 4,750 acres along the current course of Marsh Drain.

The prairie occupies gently sloping land between an upland oak forest and a lowland hardwood forest. Additional areas of low quality, secondary prairie occur in abandoned agricultural lands and small pockets of wet prairie may be found in portions of young lowland hardwood forest. The oak forest is dominated by black oak (*Quercus velutina*), and white oak (*Q. alba*), with swamp white oak (*Q. bicolor*), black cherry (*Prunus serotina*) and sassafras (*Sassafras albidum*). The lowland hardwood forest included red maple (*Acer rubrum*), sugar maple (*A. saccharum*), red ash (*Fraxinus pensylvanica*), American elm (*Ulmus americana*) and pin oak (*Quercus palustris*).

The lakeplain wet-mesic prairie is dominated by little bluestem (*Andropogon scoparius*), big bluestem (*A. gerardii*) and Indian grass (*Sorghastrum nutans*). Other common plants include colic root (*Aletris farinosa*), swamp milkweed (*Asclepias incarnata*), butterfly weed (*A. tuberosa*), heath aster (*Virgulus ericoides*), tall coreopsis (*Coreopsis tripteris*), strawberry (*Fraxinus virginiana*), marsh blazing star (*Liatris spicata*), common mountain mint (*Pycnanthemum virginianum*), grass leaved goldenrod (*Euthamia graminifolia*), Ohio goldenrod (*Solidago ohioensis*), Riddell's goldenrod (*S. riddellii*), and ironweed (*Vernonia missurica*). Ninety five species have been recorded during two visits to the site. The prairie lies on a mosaic of soils including fine sands in the Rousseau, Wasepi and Deford Series, loamy fine sands in the Wainola series and sandy loam in the Wasepi Series, clay subsoil variant. The site's Floristic Quality Index is 37.55, ranking it 17th out of 53 lakeplain prairie sites surveyed. The site's Wetness Coefficient equals -0.3 (Fac).

Two special plant populations were observed on the site. Fifteen stems of the state threatened Sullivant's milkweed (*Asclepias sullivantii*) and a large healthy population of state special concern tall nut rush (*Scleria triglomerata*). In addition the red legged spittlebug (*Prosapia ignipectus*), a state special concern insect has been collected from the site.

The majority of the lakeplain prairie and the special plant species occur outside of the park boundaries. The prairie lies on private lands of Charles Polito (32 acres) and Clifford P. Cox (50 acres). Mr. Polito offered his land to the DNR Parks Division in 1993. Parks Division passed on the offer because the land did not lie within the dedicated boundaries of the park. Efforts should be made to acquire both of these parcels. Acquisition of this site would allow it to managed in conjunction with the Algonac South Drain Prairie providing a larger more viable community.



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SITE: Algonac Jankow Road

LOCATION: St. Clair Delta Subregion, St. Clair County, T3N-R16E, Section 34

USGS QUADRANGLE: Marine City 4208265

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK: C FQI: 37.55 WET CO.: -0.5 $\bar{X}$ COEF. CONS.: 3.85

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

STONE ROAD PRAIRIE

The Stone Road lakeplain mesic prairie is located in St. Clair County, approximately 1.75 miles west of the St. Clair River,, approximately 0.5 miles northwest of the junction of Stone Road and Marsh Road, on the north side of Stone Road. This site has only been identified from the roadside and has not received an on site survey. This 15 acre site is a remnant of a lakeplain prairie, emergent marsh, and lakeplain oak opening complex that, prior to European settlement, covered over 4,750 acres.

The observed prairie is drier than known prairies in the St. Clair River Delta and deserves further investigation. This type of habitat is similar to habitat containing the state endangered few flowered nut rush (*Scleria pauciflora*) in Wayne Co. There is a historical collection of this species from this township. The ownership is unknown and is listed as small tracks in the 1990 plat book (Rockford Map Publishers 1990).

Permission should be sought to survey this site. Acquisition would protect another small fragment of the lakeplain prairie mosaic in this region.

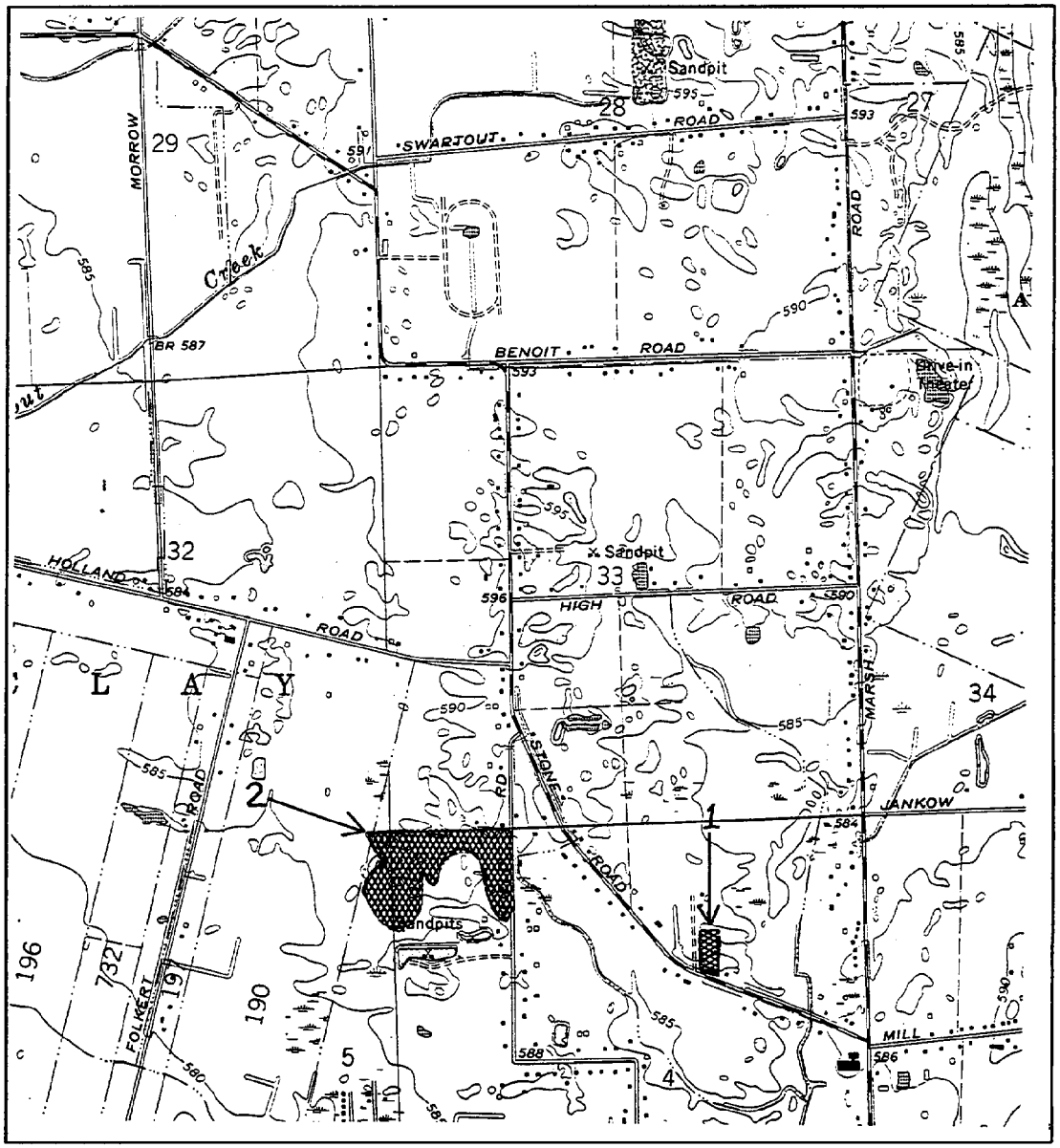
FIELD ROAD PRAIRIE

The Field Road lakeplain wet-mesic prairie is located in St. Clair County approximately 2.25 miles east of the St. Clair River. The site is on the west side of Field Road approximately 200 meters south of the junction of Field Road and Marsh Road. The prairie covers five to ten acres of a 30 acre parcel. Portions of the site have had sand mined from them and remain sparsely vegetated. Other portions have reverted to shrub and aspen forest. This site is located on land that, prior to European settlement, was covered with a mixed hardwood forest but is only 100 meters from lands that were described as lakeplain oak opening.

The lakeplain prairie is dominated by little bluestem (*Andropogon scoparius*) and broom sedge (*A. virginicus*). Other common plants include colic root (*Aletris farinosa*), big bluestem (*Andropogon gerardii*), New England aster (*Virgulus nova-angliae*), tall coreopsis (*Coreopsis tripteris*), bush clover (*Desmodium canadense*), strawberry (*Fragaria virginica*), purple gerardia (*Agalinis purpurea*), sneezeweed (*Helenium autumnale*), Canada goldenrod (*Solidago canadensis*), and Indian grass (*Sorghastrum nutans*). The site lies on fine sands of the Rousseau Series. The site's Floristic Quality Index is 28.34 ranking it 34th out of 53 lakeplain prairie sites surveyed. Forty eight plant species were noted on the site during a single visit. The site's Wetness Coefficient equals +0.5 (Fac).

Special plants on this site include a small population of the state special concern tall nut rush (*Scleria triglomerata*) and the state threatened seedbox (*Ludwigia alternifolia*).

This prairie lies in a 30 acre, private parcel owned by James and Sharon Stiltner. The parcel was marked as for sale by owner in the autumn of 1994. Acquisition of this parcel would provide another fragment of prairie between the two largest prairie sites in the region, St. John's Marsh Prairie and the Algonac State Park Prairies. Preservation of the small fragments between these sites may aid in the preservation of healthy genetic pool by facilitating migration among the remnants.



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SITES: Stone Road (1) and Field Road (2)

LOCATION: St. Clair Delta Subregion, St. Clair County, T2N-R16E, Section 4
T3N-R16E, Section 33

USGS QUADRANGLE: Marine City 4208265

COMMUNITY TYPE(S): lakeplain wet-mesic prairie, lakeplain mesic prairie

ELEMENT RANK (1): D FQI: NA WET CO.: NA $\overline{X}$ COEF. CONS.: NA
ELEMENT RAND (2): CD FQI: 28.34 WET CO.: +0.5 $\overline{X}$ COEF. CONS.: 4.10
FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

FOLKERT ROAD PRAIRIE

The Folkert Road lakeplain wet-mesic prairie is located in St. Clair County approximately 0.5 mile north of the North Channel of the St. Clair River Delta. It lies at the junction of Folkert Road and an unnamed drain. This prairie is a remnant of a lakeplain prairie that, prior to European settlement, covered over 3,500 acres.

This site has been described from the road side and has not received a site visit. It appears to be a secondary prairie that is highly disturbed. Its potential value lies in providing another dispersal fragment to the mosaic of prairie fragments in the region.

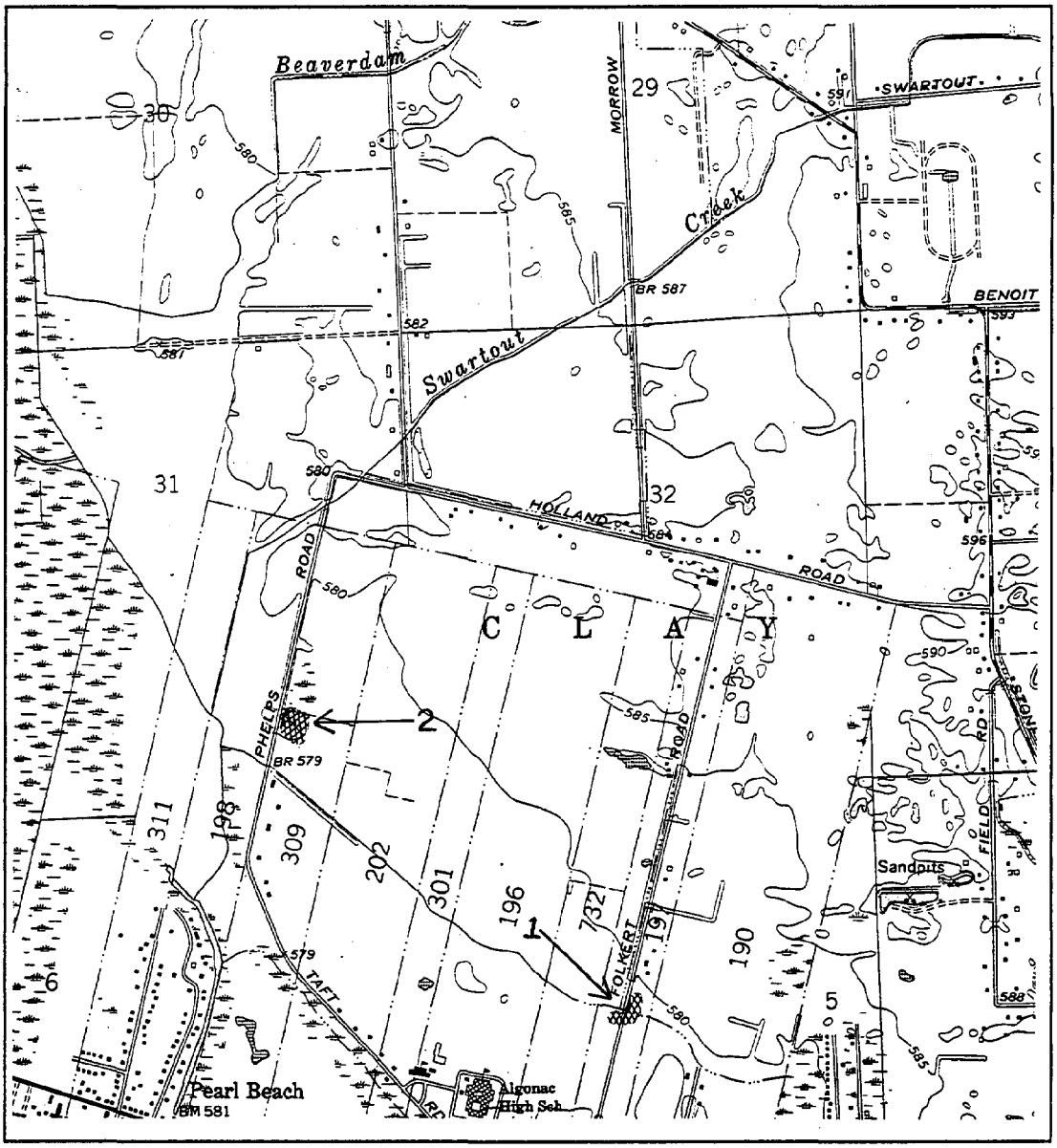
The properties are privately owned, with prairie occurring on lands of F. Gregos west of Folkert Road and S. Raymond east of Folkert Road. More research is needed before recommendations can be made for this site.

PHELPS ROAD PRAIRIE

The Phelps Road lakeplain wet-mesic prairie is located in St. Clair County approximately three miles east of the shore of Bouvier Bay in Lake St. Clair and one half mile north of the North Channel of the St. Clair River Delta. This site was only observed from the road side. It consists of a one to five acre opening in an oak forest. This site is a remnant of a lakeplain prairie that, prior to European settlement, covered over 3,500 acres.

The lakeplain prairie is dominated by big bluestem (*Andropogon gerardii*) and Indian grass (*Sorghastrum nutans*). Other common plants include tall coreopsis (*Coreopsis tripteris*), Cynthia (*Krigia biflora*), pale spiked lobelia (*Lobelia spicata*), common mountain mint (*Pycnanthemum virginianum*), and golden Alexanders (*Zizia aurea*). The site lies on fine sands of the Wainola and Deford Series. Twenty nine plant species were noted from the site. The Floristic Quality Index is 21.18 ranking it 46th out of the 53 lakeplain prairie sites surveyed. It is likely that an on site review would result in a higher rating for this site. The Wetness Coefficient equals 0.4 (Fac-).

This site is located across Phelps Road from the western boundary of the St. John's Marsh Managed Hunting Area, part of the St. Clair Flats Wildlife Area.. Ownership has not been determined.



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SITES: Folkert Road (1) and Phelps Road (2)

LOCATION: St. Clair Delta Subregion, St. Clair County, T2N-R16E, Section 5
T3N-R16E, Section 31

USGS QUADRANGLE: Marine City 4208265

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK (1): D FQI: NA WET CO.: NA $\overline{X}$ COEF. CONS.: NA
ELEMENT RANK (2): D FQI: 21.18 WET CO.: +0.4 $\overline{X}$ COEF. CONS.: 4.15
FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

ST. JOHN'S MARSH PRAIRIE: ST. JOHN'S MARSH MANAGED HUNTING AREA; ST. CLAIR FLATS WILDLIFE AREA

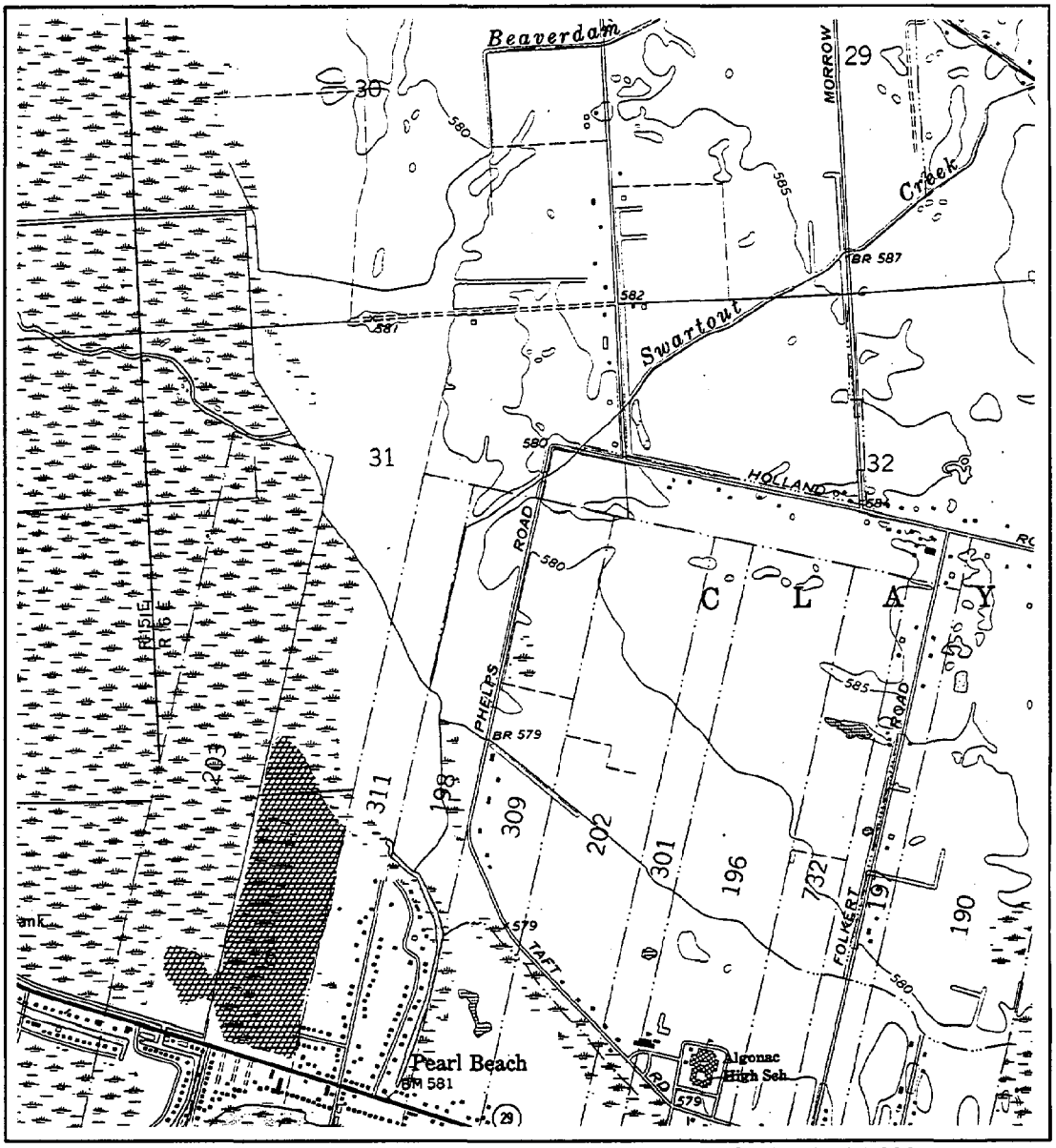
The St. John's Marsh lakeplain wet prairie is located in St. Clair County along the Shores of Bouvier Bay in Lake St. Clair. The site lies inland of an extensive Great Lakes marsh and is bordered inland by oak forest. The prairie covers approximately 60 acres and there are up to 225 acres of land which may be managed for prairie vegetation. The extent of prairie has been reduced by residential housing development in its southeast corner. The hydrology of the site has been altered by drains and road construction but appears to be directly dependent on fluctuations in the water level of Lake St. Clair. This site is a remnant of a prairie that, prior to European settlement, covered over 3,500 acres.

This BC-ranked prairie occurs along the eastern edge of an extensive Great Lakes marsh. The two communities form a mosaic with dogwood (*Cornus spp.*) shrub wetlands. The marsh is dominated by narrow leaved cattail (*Typha angustifolia*), with hard stemmed bulrush (*Scirpus acutus*), soft stemmed bulrush (*S. validus*), blue cattail (*Typha glauca*), mermaid weed (*Proserpinaca palustris*), and the weedy feather grass (*Phragmites australis*). The oak forest is dominated by black oak (*Quercus velutina*), with bur oak (*Q. macrocarpa*) and pin oak (*Q. palustris*) also present.

The prairie is restricted to the wet end of its potential with upland portions having reverted to forest or been converted to housing. The prairie is dominated by big bluestem (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), and blue-joint (*Calamagrostis canadensis*). Other common prairie species include dogbane (*Apocynum sibiricum*), sedges (*Carex aurea*) and (*C. aquatilis*), strawberry (*Fragaria virginiana*), common mountain mint (*Pycnanthemum virginianum*), tall goldenrod (*Solidago altissima*), Ohio goldenrod (*S. ohioensis*), ironweed (*Vernonia missurica*), Culver's root (*Veronicastrum virginicum*), marsh blazing star (*Liatris spicata*), field thistle (*Cirsium discolor*), wild bergamot (*Monarda fistulosa*), swamp candle (*Lysimachia terrestris*) and giant evening primrose (*Oenothera pilosella*). The prairie lies on very fine sandy loam in the Sanilac Series and fine sandy loam of the Bach Series. The pH of the soil ranges from 7.2 to 8.0. The Floristic Quality Index equals 45.77 ranking the site seventh out of 53 lakeplain prairie sites surveyed. One hundred and seventy three plant species have been noted from the site during at least eight visits. The site has Wetness Coefficient of -1.2 (Fac+).

The prairie includes the state threatened Sullivant's milkweed (*Asclepias sullivantii*) and of the state threatened small white lady slipper orchid (*Cypripedium candidum*).

The prairie is completely contained within the St. Clair Flats Wildlife Area. Some burn management has been conducted on the site and should be pursued. No monitoring stations have been established on the site to document the effects of burning. Monitoring should be implemented. Any undeveloped land in the southwest corner of the site should be acquired to maximize the potential prairie habitat.



Scale 1 : 24,000

SITE: St. John's Marsh

LOCATION: St. Clair Delta Subregion, St. Clair Co. T2N-R16E

USGS QUADRANGLE: Marine City 4208265

COMMUNITY TYPE(S): lakeplain wet prairie

ELEMENT RANK: BC FQI: 45.77 WET CO.: -1.2 $\bar{X}$ COEF. CONS.: 3.48

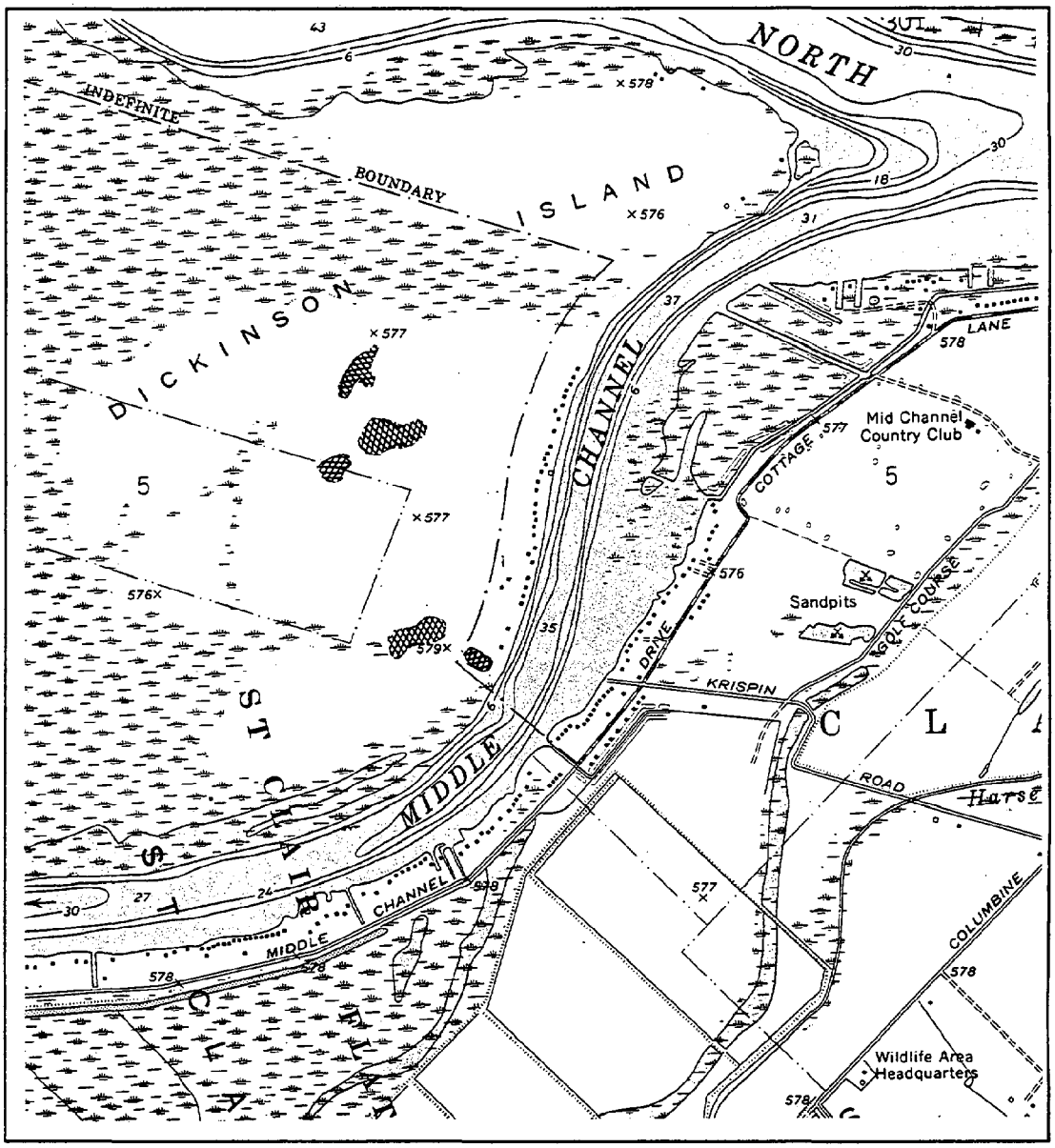
FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

DICKENSON ISLAND PRAIRIE; DICKENSON ISLAND: ST. CLAIR FLATS WILDLIFE AREA

The Dickenson Island lakeplain wet prairie is located on Dickenson Island in St. Clair County. The site consists of five small fragments, of two to five acres each, that lie between 0.25 and 0.75 mileS west of the Middle Channel of the St. Clair River Delta. Much of original prairie has reverted to oak forest with large bur oaks (*Quercus macrocarpa*), swamp white oaks (*Q. bicolor*), and pin oaks (*Q. palustris*) in the canopy. Other areas are currently covered by gray dogwood (*Cornus foemina*). This site is a remnant of a prairie which covered over 350 acres of the island prior to European settlement.

The wet prairie is dominated by blue-joint (*Calamagrostis canadensis*), prairie cord grass (*Spartina pectinata*), and meadow sedge (*Carex stricta*). Other common prairie vegetation includes a sedge (*Carex bebbii*), grass leaved goldenrod (*Euthamia graminifolia*), common mountain mint (*Pycnanthemum virginianum*), strawberry (*Fragaria virginiana*), black eyed Susan (*Rudbeckia hirta*), silverweed (*Potentilla anserina*), pale spiked lobelia (*Lobelia spicata*), and marsh bells (*Campanula aparinoides*). The prairie lies on very fine sandy loam of the Sanilac Series with a pH of 7.4. Seventy nine species have been recorded from the site during three visits. The Floristic Quality Index equals 33.98 ranking the site 26th out of 53 lakeplain prairie sites surveyed. The site's Wetness Coefficient is -2.0 (FacW).

This site is contained within the St. Clair Flats Wildlife Area. Without active fire management of the site it is unlikely that the remaining, small prairie fragments will persist.



Scale 1 : 24,000

SITE: Dickensen Island

LOCATION: St. Clair Delta Subregion, St. Clair Co., T2N-R15E, French Claims

USGS QUADRANGLE: Algonac 4208255

COMMUNITY TYPE(S): lakeplain wet prairie

ELEMENT RANK: CD FQI: 32.98 WET CO.: -2.0 $\bar{X}$ COEF. CONS.: 3.82

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

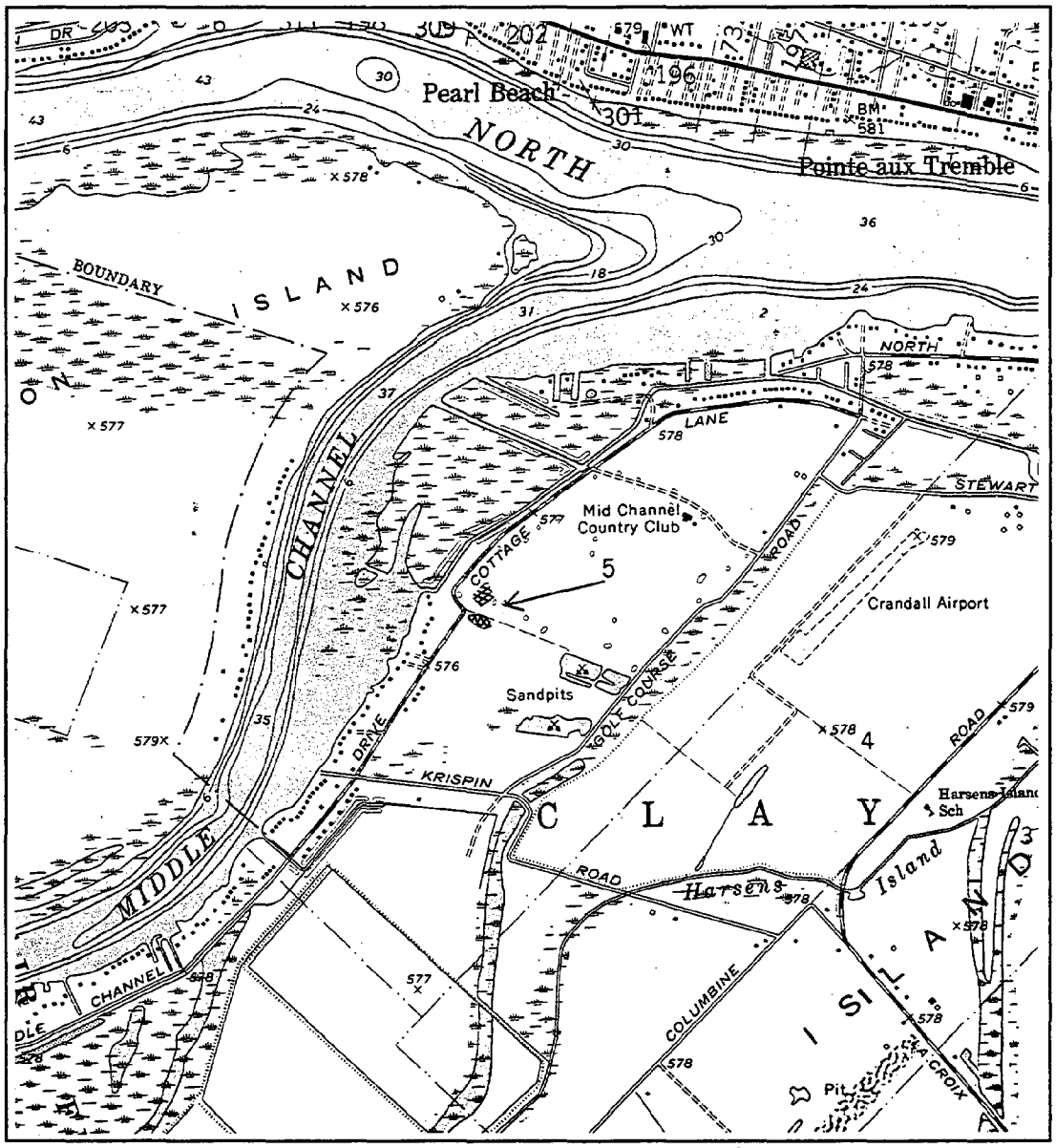
MIDDLE CHANNEL PRAIRIE; HARSONS ISLAND

The Middle Channel lakeplain wet-mesic prairie is located in St. Clair County, on Harson's Island, approximately 150 meters east of the Middle Channel of the St. Clair River Delta. This prairie on this site is contained with in a golf course and fairways have reduced it on all sides. In earlier lakeplain prairie surveys this site was described as the best remnant in Michigan. Improvements to the golf course, since the prairie's first description in 1961, and subsequent discoveries of other lakeplain prairie sites have greatly reduced the quality ranking for this site. Four acres of prairie habitat remain however a roadside observation indicated that much of this has shrubbed in and is in need of a controlled burn. An additional small fragment of prairie exists to the south-southwest along the border of the country club property. This site is a remnant of nearly 3,000 acres of prairie that occurred on Harson's Island prior to European settlement.

The prairie is dominated by blue-joint (*Calamagrostis canadensis*), big bluestem (*Andropogon gerardii*), and Indian grass (*Sorghastrum nutans*). Other common plants include heath aster (*Virgulus ericoides*), New England aster (*Aster nova-angliea*), fleabane (*Erigeron philadelphicus*), marsh blazing star (*Liatris spicata*), switch grass (*Panicum virgatum*), Ohio goldenrod (*Solidago ohioensis*), sedges including (*Cares crawei*), (*C. aurea*), (*C. buxbaumii*), (*C. aquatilis*), and (*C. tetanica*), spikerush (*Eleocharis elliptica*), strawberry (*Fragaria virginiana*), silverweed (*Potentilla anserina*), and Le Conte's violet (*Viola affinis*). The prairie lies on very fine sandy loam in the Sanilac Series with a pH of 7.8 to 8.0. The site has a Floristic Quality Index of 45.42 ranking it ninth out of 53 lakeplain prairie sites surveyed. Ninety six plant species have been recorded from the site during at least five visits. The site has a Wetness Coefficient of -1.5 (Fac+).

This site contains one special Michigan plant species. The state threatened Sullivant's milkweed (*Asclepias sullivantii*). Another four species listed in Michigan are known to have occurred within this prairie. The state special concern tall nut rush (*Scleria triglomerata*) was recorded in 1904 and then again in 1966 but has not been observed since. State threatened Leiberg's panic grass (*Panicum leibergii*) was collected in 1899 then again in 1961 but has not been seen since. Two plants now believed to be extinct in Michigan, the chestnut sedge (*Fimbristylis puberula*) (collected in 1904), and pink milkwort (*Polygala incarnata*) (collected in 1896) were also collected within the presettlement boarders of this prairie.

Conversations with the managers of the country club have previously been conducted to promote the proper management of this site. Some controlled burns have been conducted during the last two decades. Communications should be reestablished and management encouraged. There are also small prairie fragments on the parcel south of the golf course. This parcel was for sale in the autumn of 1994. Acquisition of this parcel, which abuts the St. Clair Flats Wildlife Area should be pursued and prairie restoration attempted on the site. This site has more historical data then has been found for other prairie fragments in the state.



Scale 1 : 24,000

SITE: Middle Channel Golf Course

LOCATION: St. Clair Delta Subregion, St. Clair Co., Harsens Island, T2N-R16E, French Claims

USGS QUADRANGLE: Algonac 4208255

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK: CD FQI: 45.42 WET CO.: -1.5 $\bar{X}$ COEF. CONS.: 4.64

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

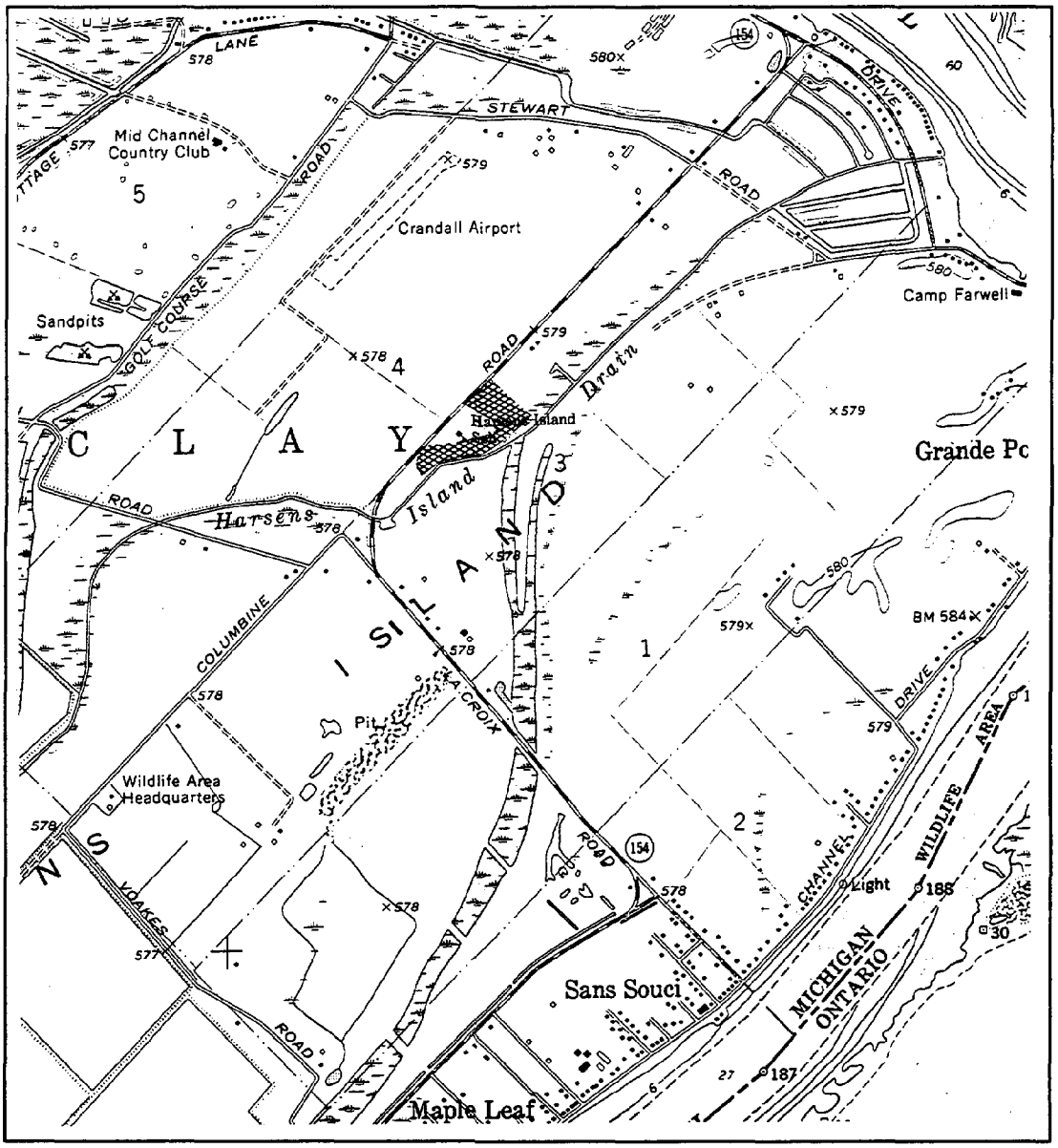
HARSENS ISLAND SCHOOL PRAIRIE; HARSENS ISLAND

The Harsens Island School lakeplain wet prairie is located in St. Clair County on Harsens Island. The site is approximately one mile south of the North Channel of the St. Clair River Delta along the Harsens Island Drain, on the northeast corner of the junction of Columbine Road and La Croix Road. There is a mature oak forest across Columbine Road to the west and marsh along the Harsens Island Drain to the east. The prairie wraps around the Harsens Island School with the best quality portion being north of the school. This site is a remnant of the Harsens Island prairie and grasslands that, prior to European settlement, covered over 2,800 acres.

The lakeplain prairie is dominated by little bluestem (*Andropogon scoparius*), big bluestem (*A. gerardii*), Indian grass (*Sorghastrum nutans*), and a sedge (*Carex aquatilis*). Other common prairie species include dogbane (*Apocynum cannabinum*), heath aster (*Virgulus ericoides*), a spikerush (*Eleocharis elliptica*), fringed closed gentian (*Gentiana andrewsii*), sneeze weed (*Helenium autumnale*), marsh blazing star (*Liatris spicata*), common mountain mint (*Pycnanthemum virginianum*), Canada goldenrod (*Solidago canadensis*), Ohio goldenrod (*S. ohioensis*), Riddell's goldenrod (*S. riddellii*), and grass leaved goldenrod (*Euthamia graminifolia*). The prairie lies on fine sandy loam of the Sanilac and Bach Series. The sites Floristic Quality Index is 29.05 ranking it 29th out of 53 lakeplain prairie sites surveyed. The site Wetness Coefficient is -1.3 (Fac+).

Unique features of the site include small population of the state threatened Sullivant's milkweed (*Asclepias sullivantii*).

This site occurs on a single private ownership. In the fall of 1994 there was an old for sale sign on the southern portion of the property. Acquisition of this site is recommended. Because the site is adjacent to a grammar school it should also be expected to be used as a teaching tool. Additional prairie fragments may persist on the east side of the Harsens Island Drain. Surveys should be conducted in this area.



Scale 1 : 24,000

SITE: Harsens Island School

LOCATION: St. Clair Delta Subregion, St. Clair Co., Harsens Island, T2N-R16E, French Claims

USGS QUADRANGLE: Algonac 4208255

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK: CD FQI: 29.05 WET CO.: -1.3 $\bar{X}$ COEF. CONS.: 3.75

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

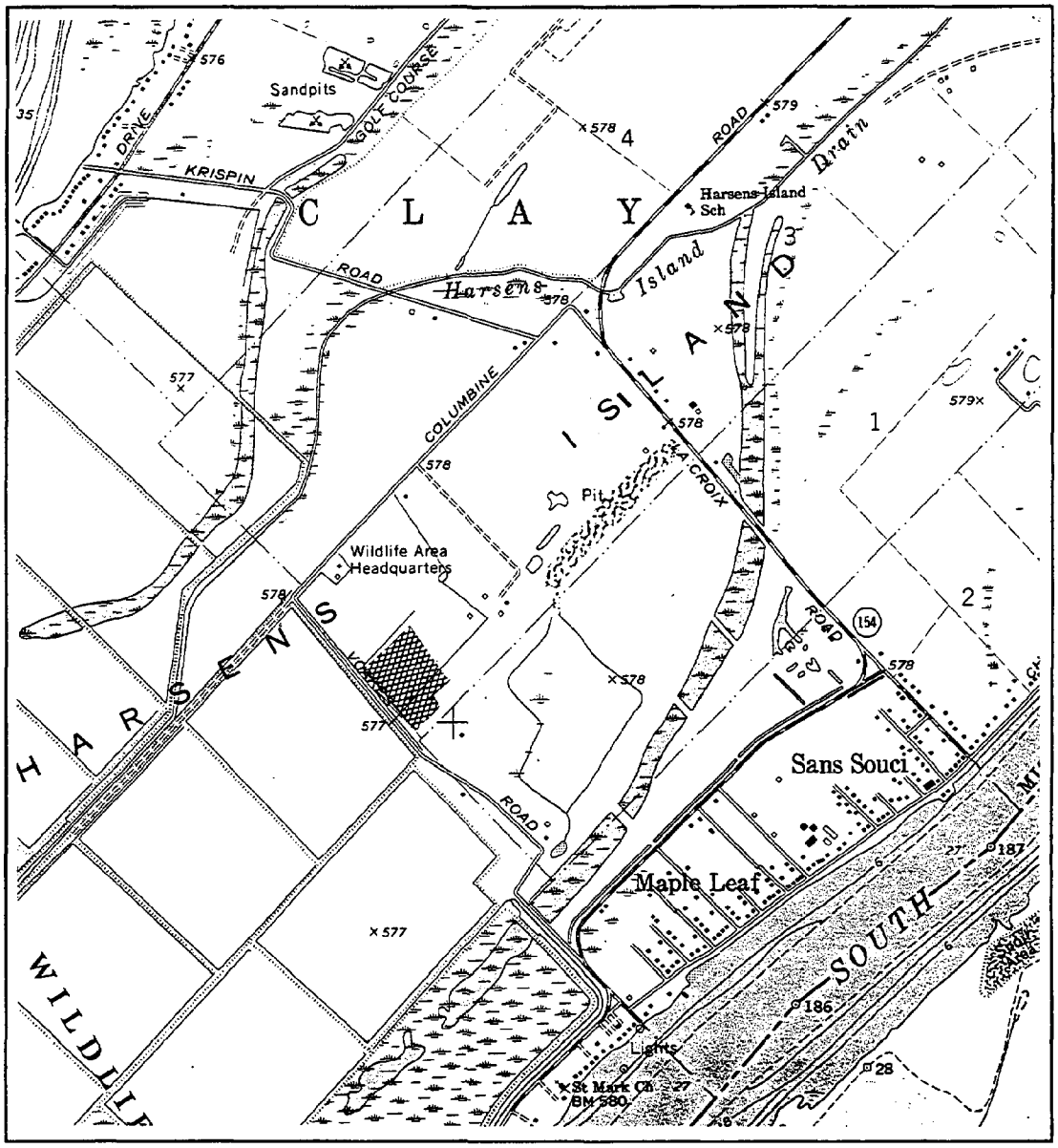
VOLKES ROAD NORTHWEST PRAIRIE; HARSENS ISLAND: ST. CLAIR FLATS WILDLIFE AREA

The Volkes Road Northwest lakeplain wet-mesic prairie is located in St. Clair County, on Harson's Island. The site sits approximately one mile west-northwest of the South Channel of the St. Clair River Delta and 0.25 miles east of the junction of Columbine Road and Volkes Road. The site consists of approximately 15 acres of lush secondary prairie. Extensive drainage in the immediate vicinity has undoubtedly altered the site. This remnant is part of the Harson's Island prairie and grasslands that, prior to European settlement, covered over 2,800 acres.

The lakeplain wet-mesic prairie is dominated by big bluestem (*Andropogon gerardii*), little bluestem (*A. scoparius*), and Indian grass (*Sorghastrum nutans*) which form a lush mass of grasses up to six or seven feet tall. The diversity of this site is somewhat lower than other lakeplain prairie remnants but common prairie species include heath aster (*Virgulus ericoides*), pasture thistle (*Cirsium discolor*), purple gerardia (*Agalinis purpurea*), marsh blazing star (*Liatris spicata*), sneezeweed (*Helenium autumnale*), Canada goldenrod (*Solidago canadensis*), Riddell's goldenrod (*S. riddellii*), grass leaved goldenrod (*Euthamia canadensis*), prairie cord grass (*Spartina pectinata*) and common gerardia (*Agalinis tenuifolia*). The prairie lies on very fine sandy loam in the Sanilac Series. Thirty three species were noted during one half hour of survey. The site's Floristic Quality Index is 24.37 ranking it 43rd out of 53 lakeplain prairie sites surveyed. The Wetness Coefficient equals -1.2 (Fac+).

No special species were observed on the site. The most notable feature was the density and vigor of the prairie grasses.

The site abuts the St. Clair Flats Wildlife area on the west, south and east. To the north the site grades into a dense expanse of the adventive, feather grass (*Phragmites australis*). The land to the north has also been identified as a toxic dump sites where paints had been dumped. A clean up of the site has been conducted the results of which are not known. It is recommended that this site be purchased and added to the St. Clair Flats Wildlife Area. A regime of burn management should then be conducted. The possibility of restoring the natural hydrology of the site should also be investigated.



Scale 1 : 24,000

SITE: Volkes Road Northwest

LOCATION: St. Clair Delta Subregion, St. Clair Co., Harsens Island, T2N-R16E, French Claims

USGS QUADRANGLE: Algonac 4208255

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK: CD FQI: 24.37 WET CO.: -1.2 $\overline{X}$ COEF. CONS.: 4.24

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

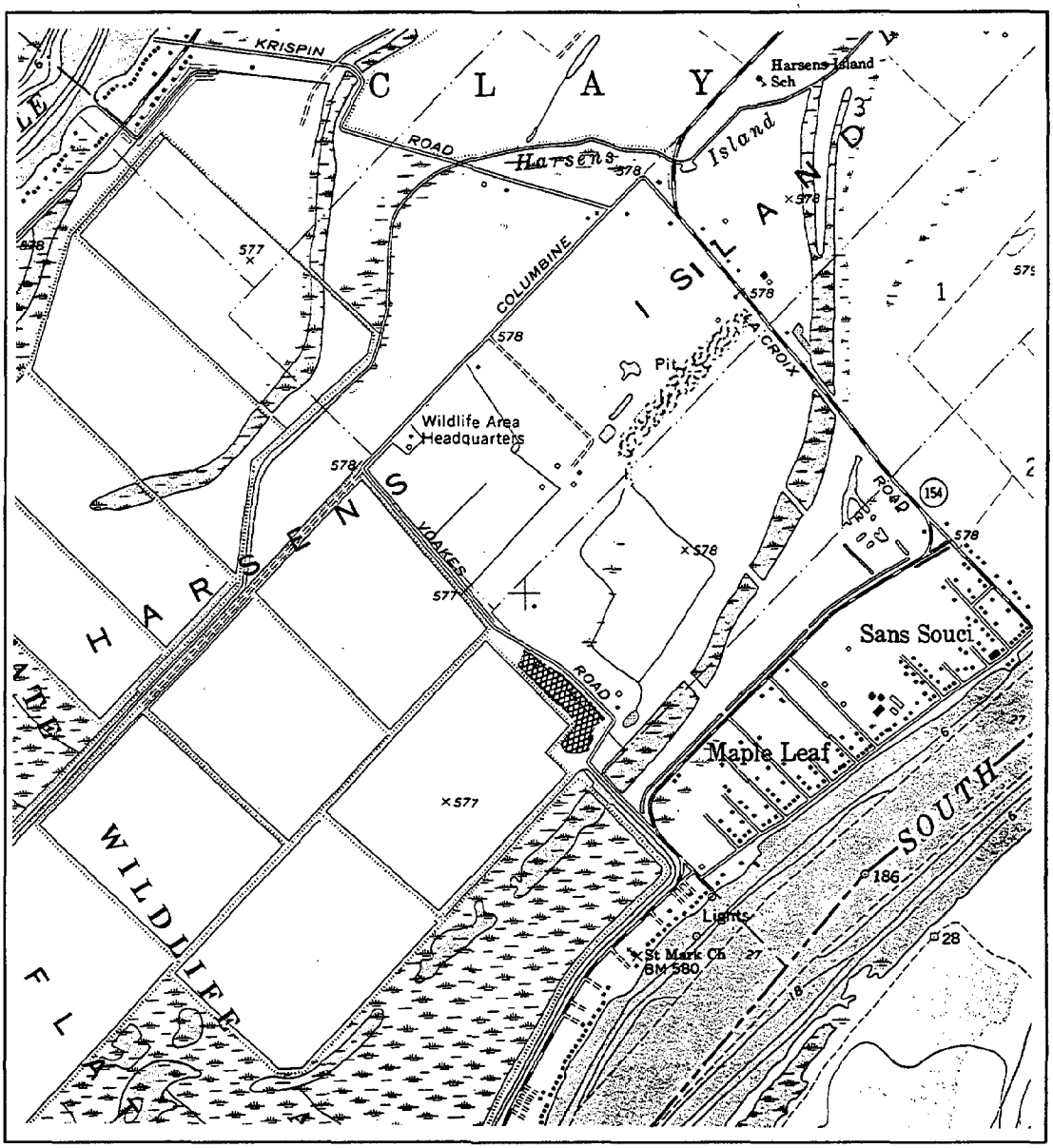
VOLKES ROAD SOUTHEAST PRAIRIE; HARSON'S ISLAND: ST. CLAIR FLATS WILDLIFE AREA

The Volkes Road Southeast lakeplain wet-mesic prairie is located on Harson's Island in St. Clair County. The site is 0.5 mile northwest of the South Channel of the St. Clair River Delta, south of Volkes Road, 0.25 mile west-northwest of the junction of Volkes Road and Michigan Route 154. The prairie persists in a narrow wedge of land between the road and a dike and drain complex surrounding MDNR, Wildlife Division, corn fields. The prairie is secondary, occurring on abandoned agricultural lands. The hydrology of the site appears to have been severely altered by drainage resulting in the current water table being much below historical water tables. This site is a 10 acre remnant of the Harson's Islands prairies and grasslands which, prior to European settlement, covered over 2,800 acres.

The prairie is dominated by prairie cord grass (*Spartina pectinata*) with big bluestem (*Andropogon gerardii*) and Indian grass (*Sorghastrum nutans*) dominant in small pockets. The prairie is being rapidly overgrown by gray stemmed dogwood (*Cornus foemina*) and red-osier dogwood (*Cornus stolonifera*). The shrub growth is posing a serious threat to the viability of prairie on this site. Remedial management should be undertaken immediately Other common plants include blue-joint (*Calamagrostis canadensis*), strawberry (*Fragaria virginiana*), switch grass (*Panicum virgatum*), silverweed (*Potentilla anserina*), common mountain mint (*Pycnanthemum virginianum*), tall goldenrod (*Solidago altissima*), grass leaved goldenrod (*Euthamia graminifolia*), and ironweed (*Vernonia missurica*). The prairie lies on very fine sandy loam of the Sanilac Series. The sites Floristic Quality index is 30.46, ranking it 27th out of 53 lakeplain prairie sites surveyed. Fifty eight species have been recorded from the site during three visits. The site's Wetness Coefficient is -1.3(Fac+).

Notable on this site contains an AB-ranked population of the state threatened Sullivant's milkweed (*Asclepias sullivantii*). Up to 470 individual stems have been counted on this site but only 25 were observed in 1994. This population is probably suffering from shading by the lush dogwood growth.

The site is contained on lands of the St. Clair Flats Wildlife Area. Active management is needed on this site if the prairie is going to persist.



Scale 1 : 24,000

SITE: Volkes Road Southeast

LOCATION: St. Clair Delta Subregion, St Clair Co., Harsens Island, T2N-R16E, French Claims

USGS QUADRANGLE: Algonac 4208255

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK: D FQI: 30.28 WET CO.: -1.3 $\bar{X}$ COEF. CONS.: 4.00

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

LA CROIX ROAD PRAIRIE; HARSON'S ISLAND

The La Croix Road lakeplain wet-mesic prairie is located on Harson's Island in St. Clair County. The site is just under 0.5 mile west of the South Channel of the St. Clair River Delta on the northwest corner of the junction of La Croix Road and Green Road. The site has been noted from the road side but has not received an on site investigation. This 20 acre site is a remnant of the Harson's Island prairie and grasslands that, prior to European settlement, covered over 2,800 acres.

The prairie is dominated by big bluestem (*Andropogon gerardii*) and Indian grass (*Sorghastrum nutans*). No other floristic information is available.

This site is privately owned and is part of supervisors plat #34. It is believed that the land is under single ownership but that ownership has not been determined. Acquisition of this site is tentatively recommended, pending additional survey.

CHANNEL ROAD PRAIRIE; HARSON'S ISLAND

The Channel Road lakeplain wet prairie is located on Harson's Island in St. Clair County. The site is 0.25 mile west of the South Channel of the St. Clair River Delta. The site boarders the east and west sides of an emergent marsh within an abandoned distributary channel of the St. Clair Delta. The western edge of the prairie is bordered by a mature oak forest. This site is a 25 acre remnant of the Harson's Island prairie and grasslands that, prior to European settlement, covered over 2,800 acres.

This site has been identified from the roadside only and has not received an on site investigation.

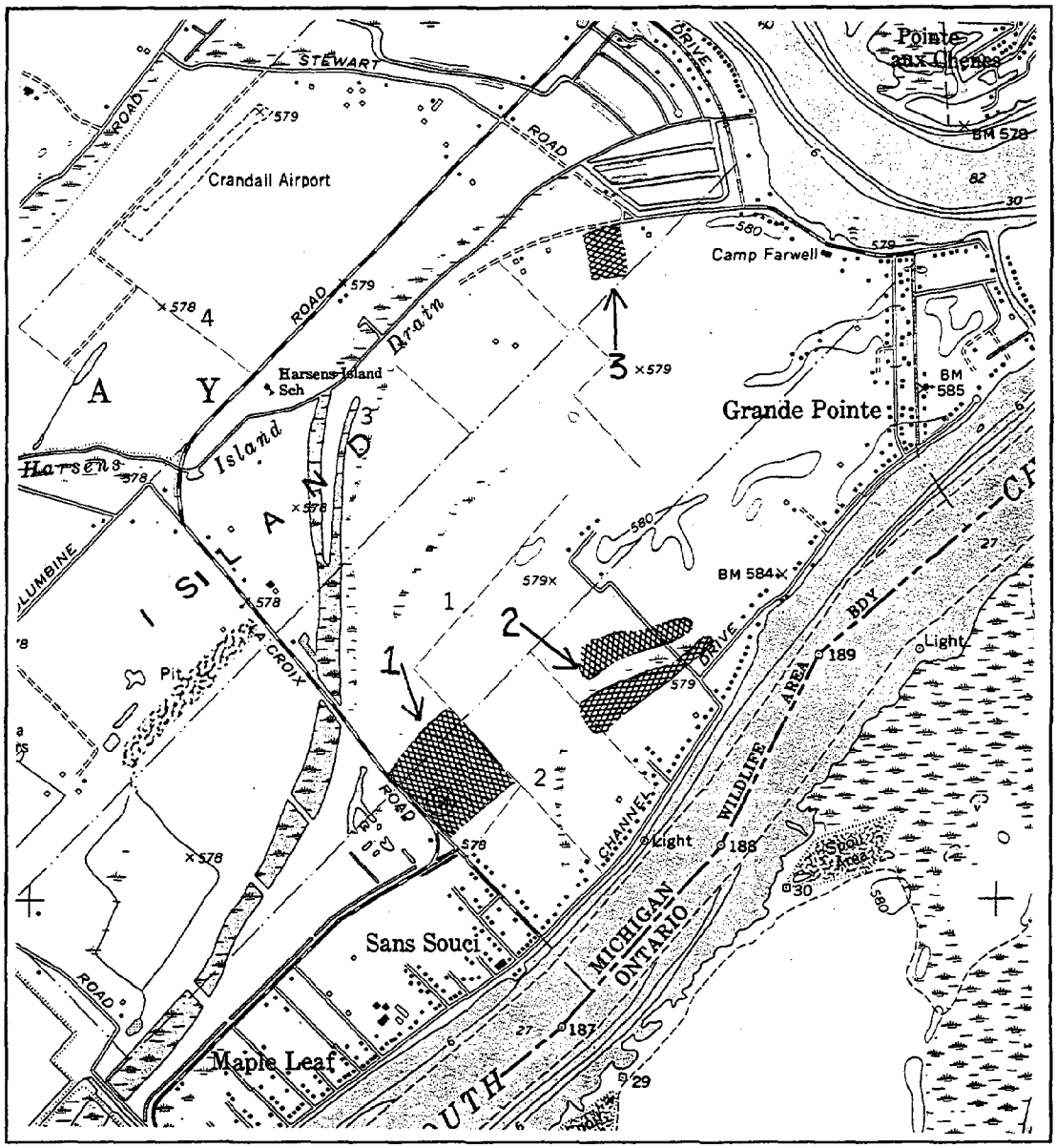
The southern portion of the prairie is on supervisors plat #34, while the northern portion is on land of William E. Smith. Acquisition of this site is recommended even without additional survey. Indications visible from the road, including the zonal structure of the vegetation, visible dominant grasses and hydrology, identify this site as a viable prairie fragment.

LITTLE ROAD; HARSON'S ISLAND

The Little Road lakeplain wet-mesic prairie is located on Harson's Island in St. Clair County. The site is 0.5 mile south of the North Channel of the St. Clair River Delta along the southeast side of Little Road. The prairie lies among old agricultural lands and is probably a secondary prairie. This site is a 20 acre remnant of the Harson's Island prairie and grasslands that once covered over 2800 acres.

This site has been identified from road side survey only. No on site investigation has been conducted. The site is dominated by big bluestem (*Andropogon gerardii*) and Indian grass (*Sorghastrum nutans*). No further floristic work has been conducted.

The property is owned by one "E. F.", according to the 1990 plat book (Rockwell Map Publishers, 1993). Acquisition of the site is recommended pending the results of further survey.



Scale 1 : 24,000

SITES: (1)La Croix Road, (2)Channel Road), (3)Little Road
LOCATION: St. Clair Delta Subregion, St. Clair Co., Harsens Island, T2N-R16E, French Claims

USGS QUADRANGLE: Algonac 4208255

COMMUNITY TYPE(S): lakeplain wet-mesic prairie, lakeplain wet prairie

ELEMENT RANK (1): D FQI: NA WET CO.: NA $\bar{X}$ COEF. CONS.: NA
ELEMENT RANK (2): C FQI: NA WET CO.: NA $\bar{X}$ COEF. CONS.: NA
ELEMENT RANK (3): D FQI: NA WET CO.: NA $\bar{X}$ COEF. CONS.: NA
FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

SIBLEY ROAD PRAIRIE; GREATER SIBLEY PRAIRIE COMPLEX

The Sibley Road prairie complex is located in Sections 7 & 8 of Brownstown Township, Wayne County. This site is the largest and most diverse lakeplain prairie remnant in Michigan and represents our greatest hope for preserving a functional lakeplain prairie ecosystem. The prairie has remained remarkably intact. It has had less hydrologic alteration due to draining, has no record of agricultural use (outside of small pockets along the site's margins) and represents the largest land area not dissected by roadways in Wayne County (although it is dissected by a railway). The Sibley Road prairie complex covers nearly 700 acres with 200 acres currently considered prairie. Aerial photography from 1940, 1971, 1978 and 1988 all show very low levels of disturbance on the site, indicating that this is primary prairie. There are smaller prairie fragments surrounding this complex that have been treated in separate site reviews. These sites, including the Telegraph Road prairie, the West Road prairie, the Beech-Daly Road prairie and the King Road prairie, are all part of the same ecological unit and should all be considered and managed as part of the Greater Sibley Road Prairie Complex. They have been treated separately because they have been identified at different times and present different acquisition and management opportunities and because, since the vast majority of the complex is privately owned they may be separated by development activities. There are nearly 350 acres of extant prairie fragments within this complex and approximately 1000 acres of open land that should be pursued and managed as a single unit. The Sibley Road prairie complex is a remnant of a prairie that, prior to European settlement covered over 16,000 acres.

The Sibley Road prairie lies primarily on loamy fine sands in the Tedrow, Granby, and Bellville Series with loamy sands in the Thetford Series and small ridges of fine sand in the Oakville Series. The prairie and oak openings are found in a mosaic with moderately drained oak forest and poorly drained, tree/shrub-dominated depressions. Independent species lists for the wet prairie, wet-mesic prairie, and oak opening segments of the Sibley Road site are not available. Locally dominant species include big bluestem (*Andropogon gerardii*), little blue stem (*A. scoparius*), Indian grass (*Sorghastrum nutans*), blue joint (*Calamagrostis canadensis*), and a sedge (*Cares lacustris*). Other common plants include purple gerardia (*Agalinis purpurea*), common gerardia (*A. tenuifolia*), colic root (*Aletris farinosa*), heath aster (*Virgulus ericoides*), New England aster (*Virgulus novae-angliae*), wild indigo (*Baptisia tinctoria*), grass pink (*Calopogon tuberosus*), sedges including, (*Carex buxbaumii*), (*C. granularis*), (*C. muskingumensis*), and (*C. swanii*), Indian paintbrush (*Castilleja coccinea*), tall coreopsis (*Coreopsis tripteris*), sneezeweed (*Helenium autumnale*), tall sunflower (*Helianthus giganteus*), woodland sunflower (*H. divaricatus*), shrubby St. John's wort (*Hypericum prolificum*), Cynthia (*Krigia biflorus*), northern blazing star (*Liatris scariosa*), rough blazing star (*L. aspera*), marsh blazing star (*L. spicata*), Ohio goldenrod (*Solidago ohioensis*), Riddell's goldenrod (*S. riddellii*), and Culver's root (*Veronicastrum virginicum*). The oak opening portions of the site are dominated by black oak (*Quercus velutina*), swamp white oak (*Q. bicolor*), pin oak (*Q. palustris*), and bur oak (*Q. macrocarpa*). One hundred and ninety plant species have been identified during four site surveys. The site's Floristic Quality Index is 69.65. This the highest ranked site out of 53 lakeplain prairie sites surveyed. The average Coefficient of Conservatism for plants on the site is 5.05, this is the highest ranking for any site with over 50 species recorded. The site's composite Wetness Coefficient is -0.9 (Fac+).

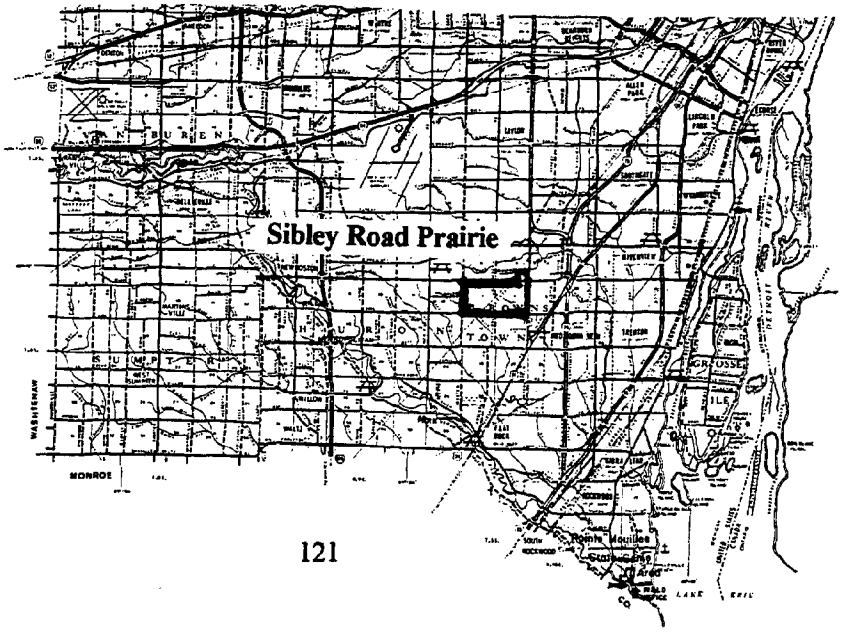
Sibley Road prairie is also rich in special plant species. There have been 14 special plant species identified on the site along with three community element occurrences and one state threatened butterfly, Duke's skipper (*Euphyes dukesi*). The special plant occurrences include seven state threatened species and seven state special concern species. The state threatened species occurrences include a three awned grass (*Aristida longispica*), tall green milkweed (*Asclepias hirtella*), short fruited rush (*Juncus brachycarpus*),

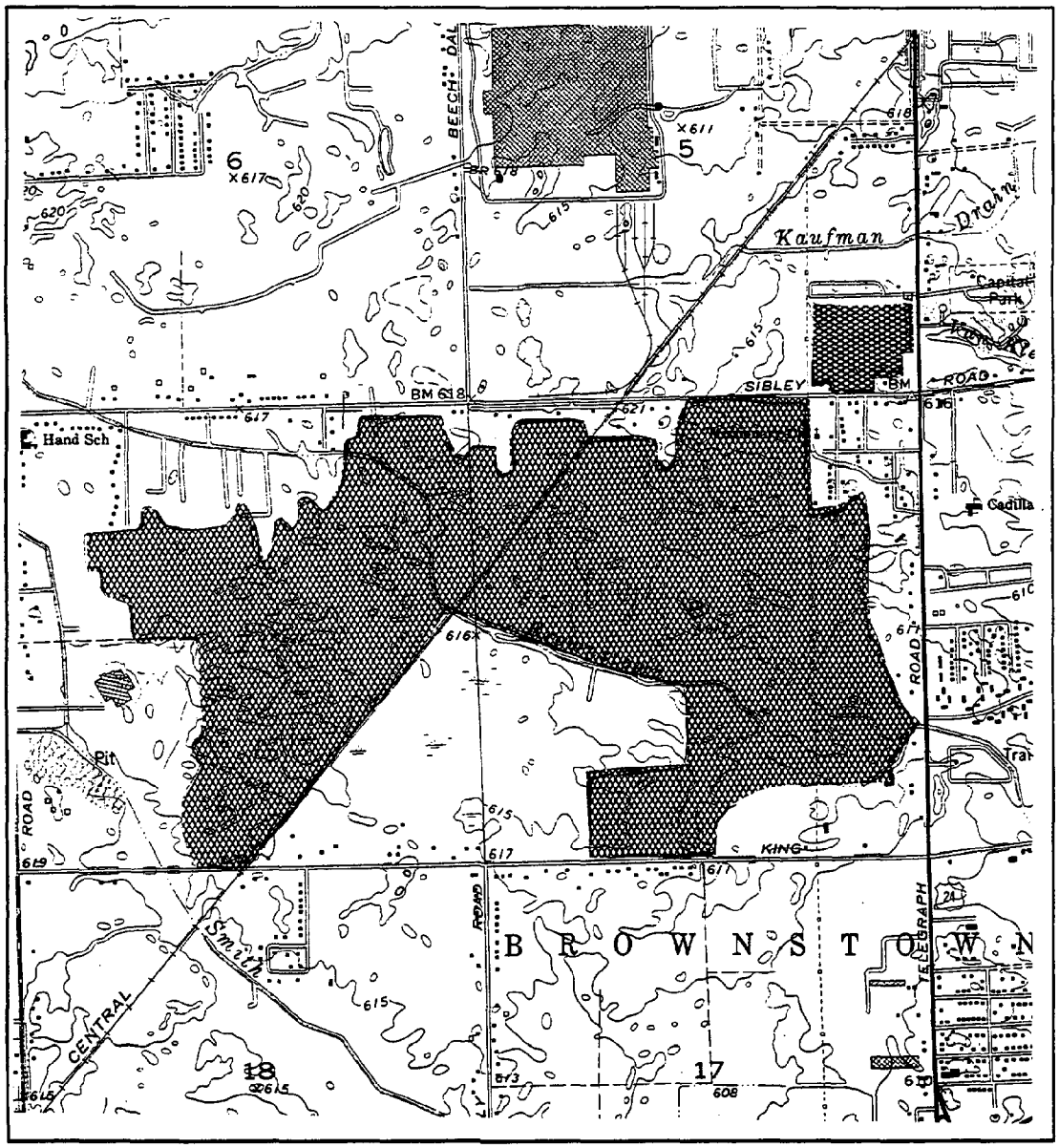
Vasey's rush (*J. vaseyi*), seedbox (*Ludwigia alternifolia*), appressed bog clubmoss (*Lycopodiella subappressa*), and a population of Clinton's bulrush (*Scirpus clintonii*). Four of these threatened plant populations are among the highest quality occurrences for the species in Michigan. The high quality of these populations adds to the value and uniqueness of this site. The seven state special concern species include hairy angelica (*Angelica venenosa*), gentian leaved St. John's wort (*Hypericum gentianoides*), two-flowered rush (*Juncus biflorus*), cross-leaved milkwort (*Polygala cruciata*), prairie rose (*Rosa setigera*), tooth-cup (*Rotala ramosior*), and a population of tall nut rush (*Scleria triglomerata*). Not only is this the largest lakeplain prairie community in the state but it holds exemplary populations of nine special plants. In addition *Conobea multifida*, no common name, was located on the site, representing the first record of this species in Michigan. Subsequent investigations have identified four or five additional *Conobea mulfifida* populations in similar habitats, this species is not currently listed but will be reviewed during the next update of the Michigan Special Plant List.

The Sibley Road lakeplain prairie extends over approximately 200 privately owned parcels. The State of Michigan owns two lots and Brownstown Township owns two lots within the complex. In addition the Michigan Nature Association owns one five acre lot. By far the majority of the site is privately owned and vulnerable to development and other disturbances. Much of the site is wetland and would require a wetlands permit before it could be legally developed. In addition most major land owners have been informed of the presence of state threatened species on their property and the need to obtain an endangered species permit before a take can be made. The danger of loss due to small unpermited activities is still large.

Initial steps toward the protection of this site have been undertaken. The site has been approved for acquisition of development rights under the Farm Lands and Open Space Act. The site has also been approved for a fee title acquisition by The Natural Resources Trust Fund. Management responsibilities after acquisition would rest with the Michigan Department of Natural Resources, Wildlife Division. The largest property owner, Fritz Enterprises Inc., has responded unfavorably to inquires regarding purchase of its lands. Continued efforts toward the acquisition and protection of this site should be pursued in conjunction with nearby lakeplain prairie fragments.

WAYNE COUNTY





Scale 1 : 24,000

SITE: Sibley Road

LOCATION: Southeast Region, Sibley Complex, Wayne Co., T4S-R10E, Sections 7 + 8

USGS QUADRANGLE: Flat Rock NE 4208323

COMMUNITY TYPE(S): lakeplain wet prairie, lakeplain wet-mesic pr., lakeplain oak opening

ELEMENT RANK: AB FQI: 69.65 WET CO.: -0.9 $\overline{X}$ COEF. CONS.: 5.05

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

BEECH-DALY ROAD PRAIRIE; GREATER SIBLEY PRAIRIE COMPLEX

The Beech-Daly Road lakeplain wet-mesic prairie is located in Section 18 of Brownstown Township, Wayne County. The prairie consists of approximately 20 acres in an area which has had its topsoil and perhaps some sand mined. The removal of the surface soils may have resulted in the re-establishment of hydrologic conditions similar to those that existed prior to extensive draining of the area and which may be critical to the maintenance of lakeplain prairies. The site lies between a lowland hardwood forest and old field habitat which occurs on slightly higher ground. This prairie is a remnant is ecologically a part of the Greater Sibley Road prairie complex. This complex is composed of a series of prairie fragments that represent a remnant of a lakeplain prairie that, prior to European settlement, covered over 16,000 acres.

The lakeplain wet-mesic prairie is dominated by big bluestem (*Andropogon gerardii*) and Indian grass (*Sorghastrum nutans*). Other common plants include colic root (*Aletris farinosa*), purple gerardia (*Agalinis purpurea*), swamp milkweed (*Asclepias incarnata*), tall coreopsis (*Coreopsis tripteris*), Culver's root (*Veronicastrum virginicum*), tall sunflower (*Helianthus giganteus*), pale spiked lobelia (*Lobelia spicata*) and marsh blazing star (*Liatris spicata*). This site was observed from the road and abutting property. On site survey needs to be conducted.

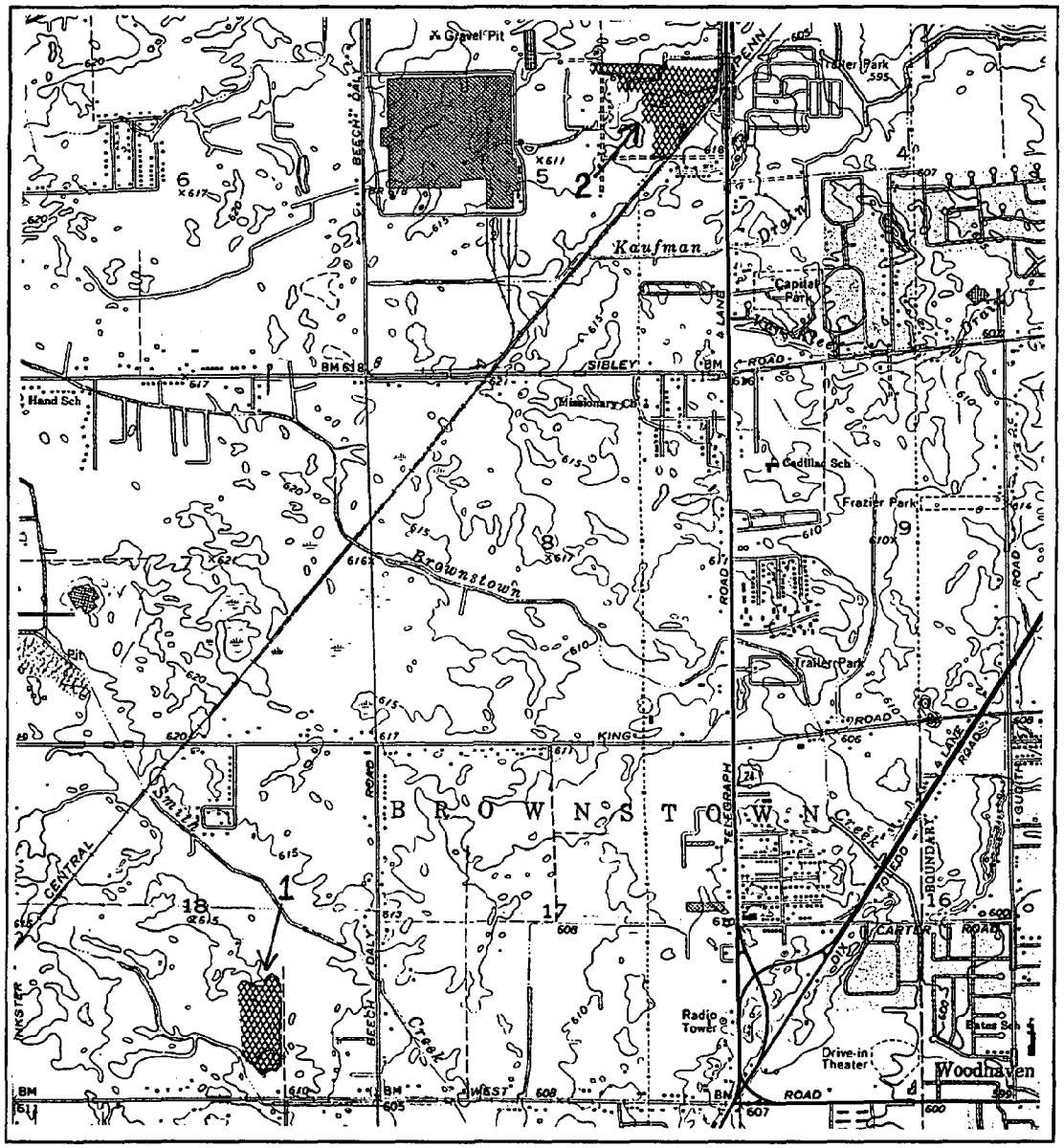
The site is privately owned and is in one to four ownerships. The owners have not been identified. Acquisition of this site is recommended as part of the Greater Sibley Road complex.

TELEGRAPH ROAD PRAIRIE; GREATER SIBLEY PRAIRIE

The Telegraph Road lakeplain wet-mesic prairie is located in Section 5 of Brownstown Township, Wayne County. The site is approximately one mile north of the Sibley Road prairie and is separated from it by a mix of oak forest, mixed hardwood forest, old field and prairie remnants and residential development. This property is privately owned and has only been identified from the roadside. It has not been surveyed. The site was in agricultural use in 1940 aerial photographs. In the 1977 soil survey it is listed as cut and fill land, indicating that sand has been mined from the site. Since that date a pipeline has been run through the land. The persistence of prairie vegetation despite these documentable disturbances may provide invaluable insights into what variables are essential for the persistence of lakeplain prairie.

Acquisition of this site is recommend in conjunction with other portions of the Greater Sibley prairie. It may provide an ideal location for monitoring and experimental manipulation to determine the critical hydrologic and other geo-physical factors that maintain lakeplain prairies.

The site is dominated by big bluestem (*Andropogon gerardii*) and Indian grass (*Sorghastrum nutans*). No furthers botanical investigations have been conducted. The soil survey maps the site as cut and filled land.



Scale 1 : 24,000

SITES: (1)Beech-Daly Road, (2)Telegraph Road

LOCATION: Southeast Region, Sibley Complex, Wayne Co., T4S-R10E, Section 18
T4S-R10E, Section 5

USGS QUADRANGLE: Flat Rock NE 4208323

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK (1): C FQI: NA WET CO.: NA $\bar{X}$ COEF. CONS.: NA
ELEMENT RANK (2): D FQI: NA WET CO.: NA $\bar{X}$ COEF. CONS.: NA
FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

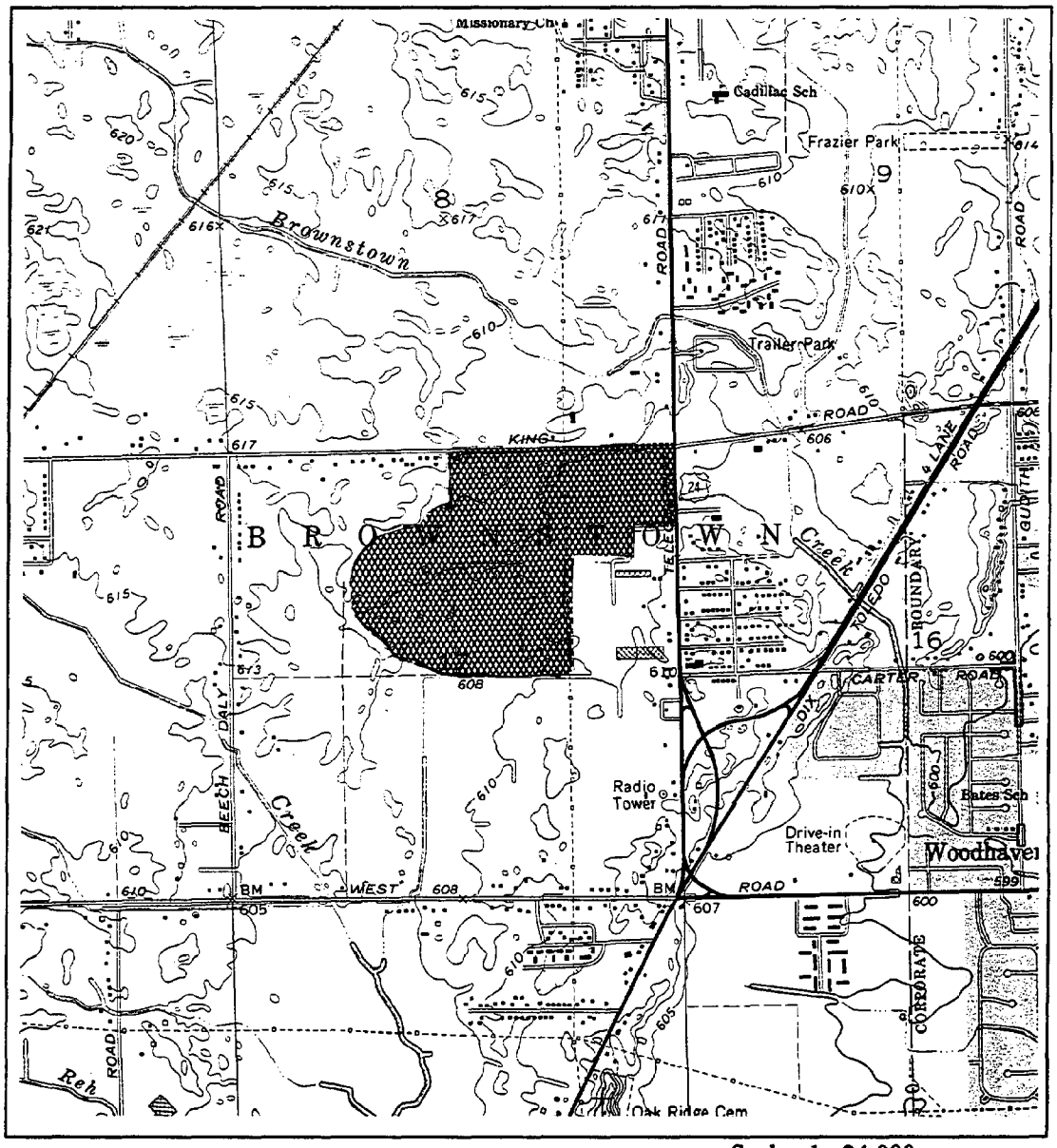
KING ROAD PRAIRIE; GREATER SIBLEY PRAIRIE COMPLEX

The King Road prairie is located in Section 17, Brownstown Township, Wayne County. The site covers approximately 120 acres including some the finest lakeplain prairie existing in Michigan. The prairie includes wet depressions and dry sandy ridges in a mosaic across the landscape. This site is part of a remnant of lakeplain prairie that, prior to European settlement, covered over 16,000 acres. The King Road prairie in conjunction with six other sites form an ecological unit including 370 acres of prairie. This prairie complex is six times larger than any other extant lakeplain prairie in the state. The King Road fragment is the second most important remnant of this complex - following the Sibley Road prairie fragment. Most of this site was farmed early in this century and includes a house site. Small pockets within the site appear to have remained unplowed and may have provided a seed source for the spread of prairie vegetation after farming was abandoned. A portion of the site has had sand mined from it and has subsequently reverted to prairie vegetation.

The lakeplain prairie is broken in to zones dominated by big bluestem (*Andropogon gerardii*), little bluestem (*A. scoparius*), and Indian grass (*Sorghastrum nutans*). Other common prairie plants include purple gerardia (*Agalinis purpurea*), common gerardia (*A. tenuifolia*), colic root (*Aletris farinosa*), Indian hemp (*Apocynum cannabinum*), wild indigo (*Baptisia tinctoria*), blue-joint (*Calamagrostis canadensis*), tall coreopsis (*Coreopsis tripteris*), strawberry (*Fragaria virginiana*), fringed gentian (*Gentianopsis crinita*), sneezeweed (*Helenium autumnale*), Cynthia (*Krigia biflora*), northern blazing star (*Liatris scariosa*), marsh blazing star (*Liatris spicata*), hairy beard-tongue (*Penstemon hirsutus*), field milkwort (*Polygala sanguinea*), common mountain mint (*Pycnanthemum virginianum*), ironweed (*Vernonia missurica*), and heath aster (*Virgulus ericoides*). The prairie lies on a complex mosaic of soils which include fine sands in the Oakville Series, fine sandy loam in the Corunna Series, loamy sands in the Thetford, Belleville, and Gilford Series, and loam in the Blout and Pewamo Series. The site has a Floristic Quality Index of 51.35, ranking it fourth out of 53 lakeplain prairie sites surveyed. One hundred twenty eight species have been recorded from the site during three visits. The site has a composite Wetness Coefficient of -0.3 (Fac).

This site is rich in special plant species with nine species recorded. The special plant list includes five species threatened in Michigan; a three awned grass (*Aristida longispica*), Sullivant's milkweed (*Asclepias sullivantii*), short fruited rush (*Juncus brachycarpus*), seedbox (*Ludwigia alternifolia*), and Clinton's bulrush (*Scirpus clintonii*). There are also four plants listed as special concern in Michigan; hairy angelica (*Angelica venenosa*), gentian leaved St. John's wort (*Hypericum gentianoides*), two flowered rush (*Juncus biflorus*), and tall nut rush (*Scleria triglomerata*). The Sullivant's milkweed is the first recorded population for Wayne County.

The prairie on this site is privately owned but the majority lies in two ownerships. The N2, NE4 of Section 17 is owned by Volk, Rousek, and Myler and was being offered for sale in the autumn of 1994. The SW4, NE4 of Section 17 is owned by ABC Paving Co. These parcels and abutting parcels to the west should be acquired. This site is immediately south of the southwestern portion of Sibley Road Prairie and should be pursued and managed as part of the Sibley Road Complex.



Scale 1 : 24,000

SITE: King Road

LOCATION: Southeast Region, Sibley Complex, Wayne Co., T4S-R16E, Section 17

USGS QUADRANGLE: Flat Rock NE 4208323

COMMUNITY TYPE(S): lakeplain wet-mesic prairie, lakeplain oak opening

ELEMENT RANK: B FQI: 51.35 WET CO.: -03 $\bar{X}$ COEF. CONS.: 4.54

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

WEST ROAD PRAIRIE; GREATER SIBLEY PRAIRIE COMPLEX

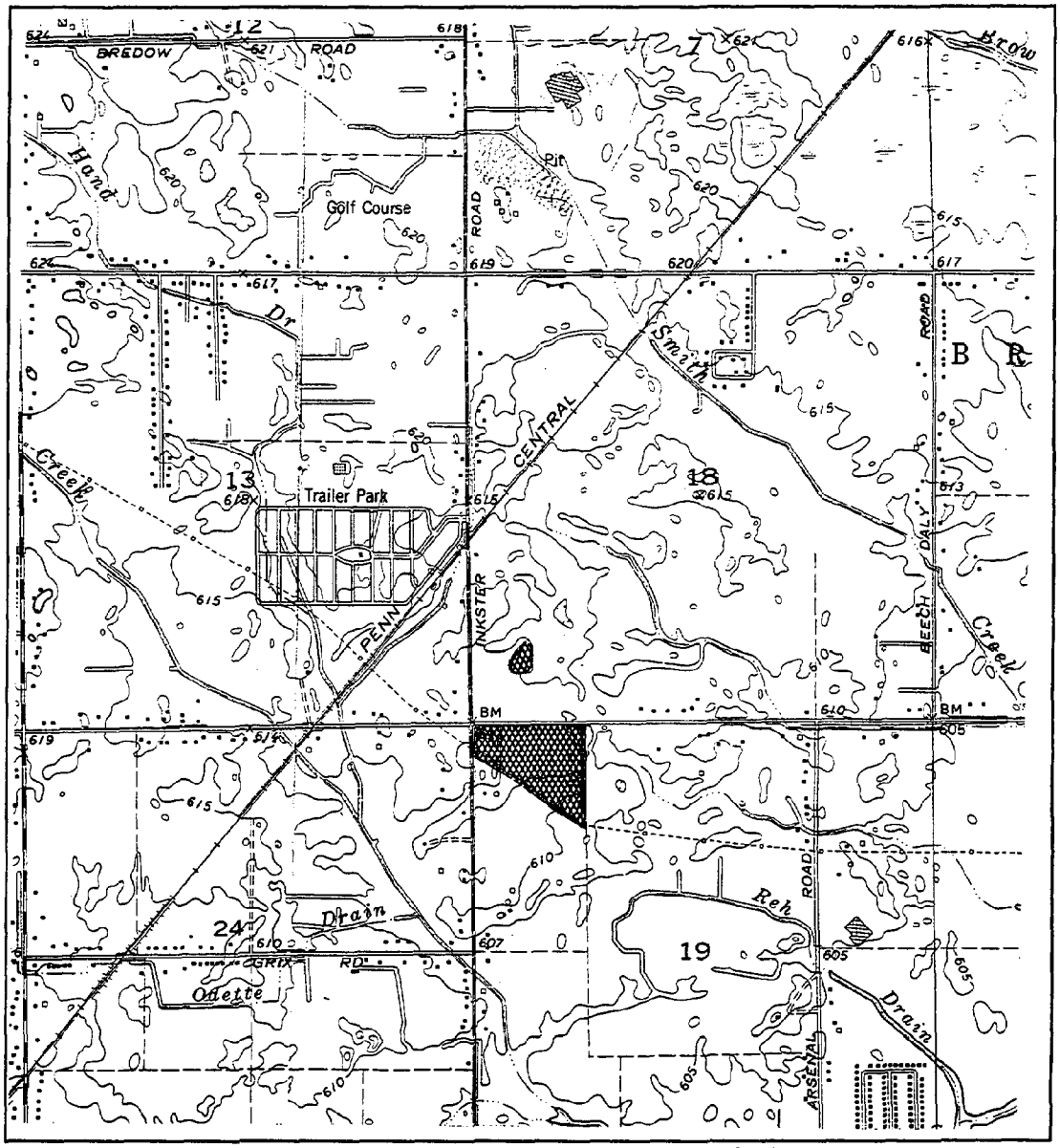
The West Road lakeplain wet-mesic prairie is located in Section 18 and 19 of Brownstown Township, Wayne County. The largest section of the site lies on the southeast corner of the junction of West Road and Inkster Road. A small fragment is also found within an oak woodland on the northeast corner. The southeastern fragment covers approximately 20 acres while the northeast fragment is only one acre. This prairie occurs within an area in which the topsoil has been removed and some sand may have been mined. We believe that the removal of the upper layers of the soil has brought the ground surface closer to the mean high water table and perhaps recreating hydrologic conditions similar to those that existed prior to extensive draining of the area. The site represents the southwestern corner of the Greater Sibley Prairie complex, to which it is ecologically connected. Prior to European settlement this prairie covered over 16,000 acres.

The site is surrounded by mixed hardwood forest, oak forest and abandoned agricultural land. Some residential development has taken place but its density is still low. Portions of the oak forest may be restorable to lakeplain oak openings.

The lakeplain wet-mesic prairie is dominated by big bluestem (*Andropogon gerardii*), little bluestem (*A. scoparius*), Indian grass (*Sorghastrum nutans*), and broom-sedge (*Andropogon virginiana*). Other common plants include colic root (*Aletris farinosa*), purple gerardia (*Agalinis purpurea*), three awned grasses (*Aristida* spp.), Canada rush (*Juncus canadensis*), fringed gentian (*Gentianopsis crinita*), strawberry (*Fragaria virginiana*), common ladies tresses (*Spiranthes cernua*), grass leaved goldenrod (*Euthamia graminifolia*), eastern red cedar (*Juniperus virginiana*) and the exotic European white birch (*Betula pendula*). The prairie lies on soils listed as cut and fill but are predominately fine and very fine sands. Sixty one plant species have been noted during two visits to the site. The site's Floristic Quality Index is 37.13, ranking it 21st out of 53 lakeplain prairie sites surveyed. The Wetness Coefficient is -1.0 (Fac+).

Notable occurrences on the site include three state threatened plants and one state special concern plant. The three threatened species are a three awned grass (*Aristida longispica*), small fruited rush (*Juncus brachycarpus*) and seedbox (*Ludwigia alternifolia*). The state special concern species is tall nut rush (*Scleria triglomerata*). The survey of this site should not be considered complete, existing survey was conducted from the road side.

The property is privately owned with a single owner north of West Road, Anderson Brass Co. of Hartsville, South Carolina, and a single unidentified owner to the south of West Road. Acquisition of this remnant is recommended in conjunction or separate from the Sibley Road prairie complex.



Scale 1 : 24,000

SITE: West Road

LOCATION: Southeast Region, Sibley Complex, Wayne Co., T4S-R10E, Sections 18 + 19

USGS QUADRANGLE: Flat Rock NE 4208323

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK: C FQI: 37.13 WET CO.: -1.0 $\bar{X}$ COEF. CONS.: 4.75

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

SILVER CREEK PRAIRIE

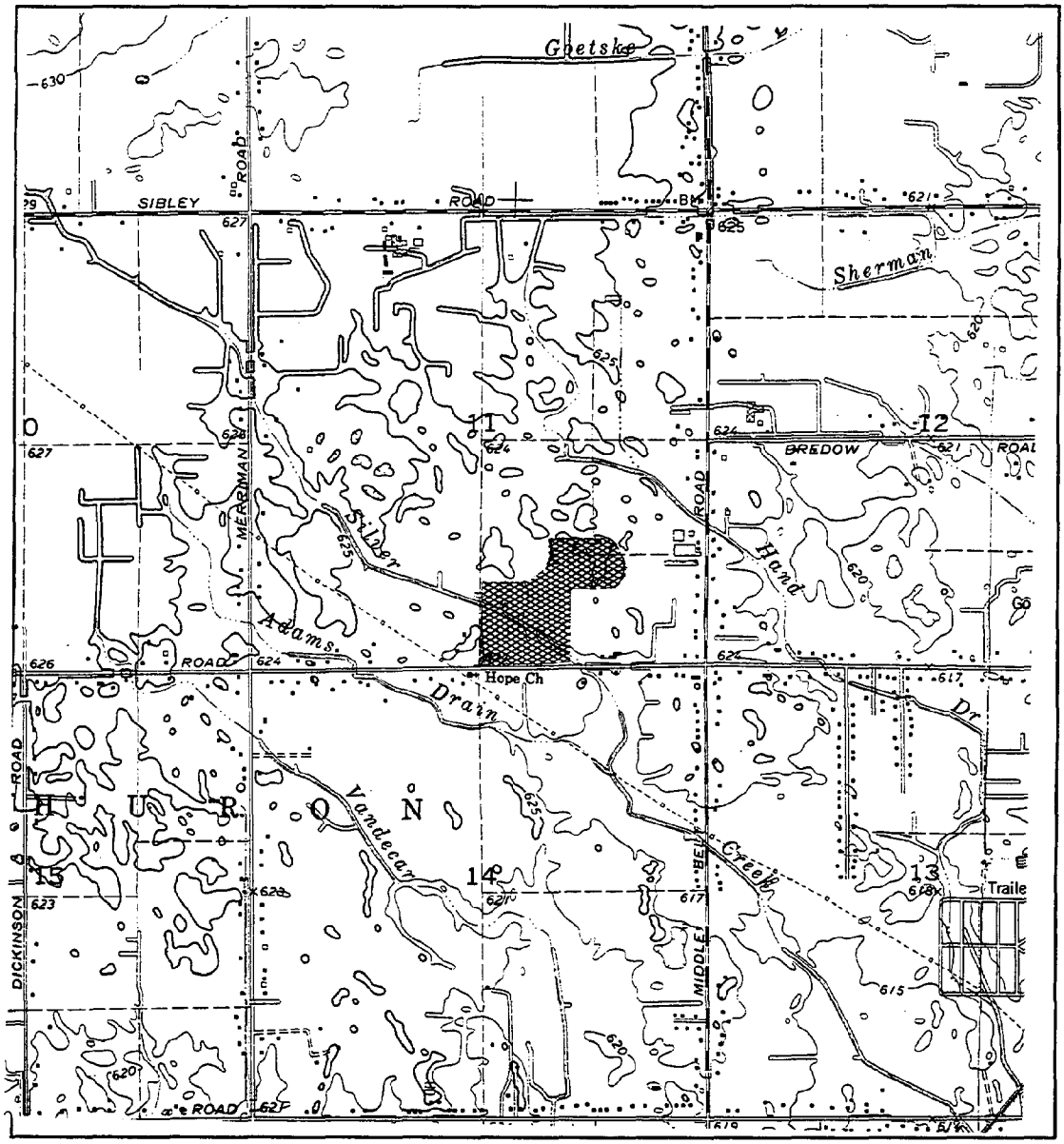
The Silver Creek lakeplain wet-mesic prairie is located in Section 11, Huron Township, Wayne County. The site is on the north side of Sibley Road and approximately 0.5 mile west of Middle Belt Road. This 20 acre site includes an abandoned house site in the south which is fairly weedy. The northern portion of the site has been recently destroyed during construction of microwave towers for a cellular phone company. The surrounding land use includes residential, light industrial, retail and agriculture. This site is a remnant of an extensive prairie that, prior to European settlement covered over 16,000 acres.

Lakeplain prairie is restricted to the E2 SW4 of Section 11. This parcel has apparently been under single ownership for many years. The prairie is dissected by Silver Creek with the highest quality prairie lying north of the creek. The prairie is dominated by big bluestem (*Andropogon gerardii*) and Indian grass (*Sorghastrum nutans*). Other common species include colic root (*Aletris farinosa*), New England aster (*Virgulus nova-angliae*), grass leaved goldenrod (*Euthamia graminifolia*), yellow eyed grass (*Xyris torta*), Canada rush (*Juncus canadensis*), and eastern red cedar (*Juniperus virginiana*). This site has received only a cursory survey during which 24 species were noted. The Floristic Quality Index for the site is 23.68 ranking it 44th out of 53 lakeplain prairie sites surveyed. This value is undoubtedly low due based on the partial species list. The site's Wetness Coefficient is -0.7 (Fac+).

The site includes populations of two state threatened species; seedbox (*Ludwigia alternifolia*) and a three awned grass (*Aristida longispica*). This site needs furthers botanical survey and likely contains other listed species.

This property is believed to be in a single private ownership. Ownership information has not been verified. It is believed that the owner is a cellular telephone company. A conservation easement should be sought with the owner. Management and enhancement of the site as a prairie should be compatible with the operation and management of the microwave towers on the site.

The Silver Creek prairie lies within the pre-European settlement boundaries of the Greater Sibley prairie. This extant fragment is ecologically separated from the extant Sibley Prairie.



Scale 1 : 24,000

SITE: Silver Creek

LOCATION: Southeast Region, Sibley Complex, Wayne County, T4S-R9E

USGS QUADRANGLE: Flat Rock NE 4208323

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK: C FQI: 23.68 WET CO.: -0.7 $\overline{X}$ COEF. CONS.: 4.83

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

BREST ROAD PRAIRIE

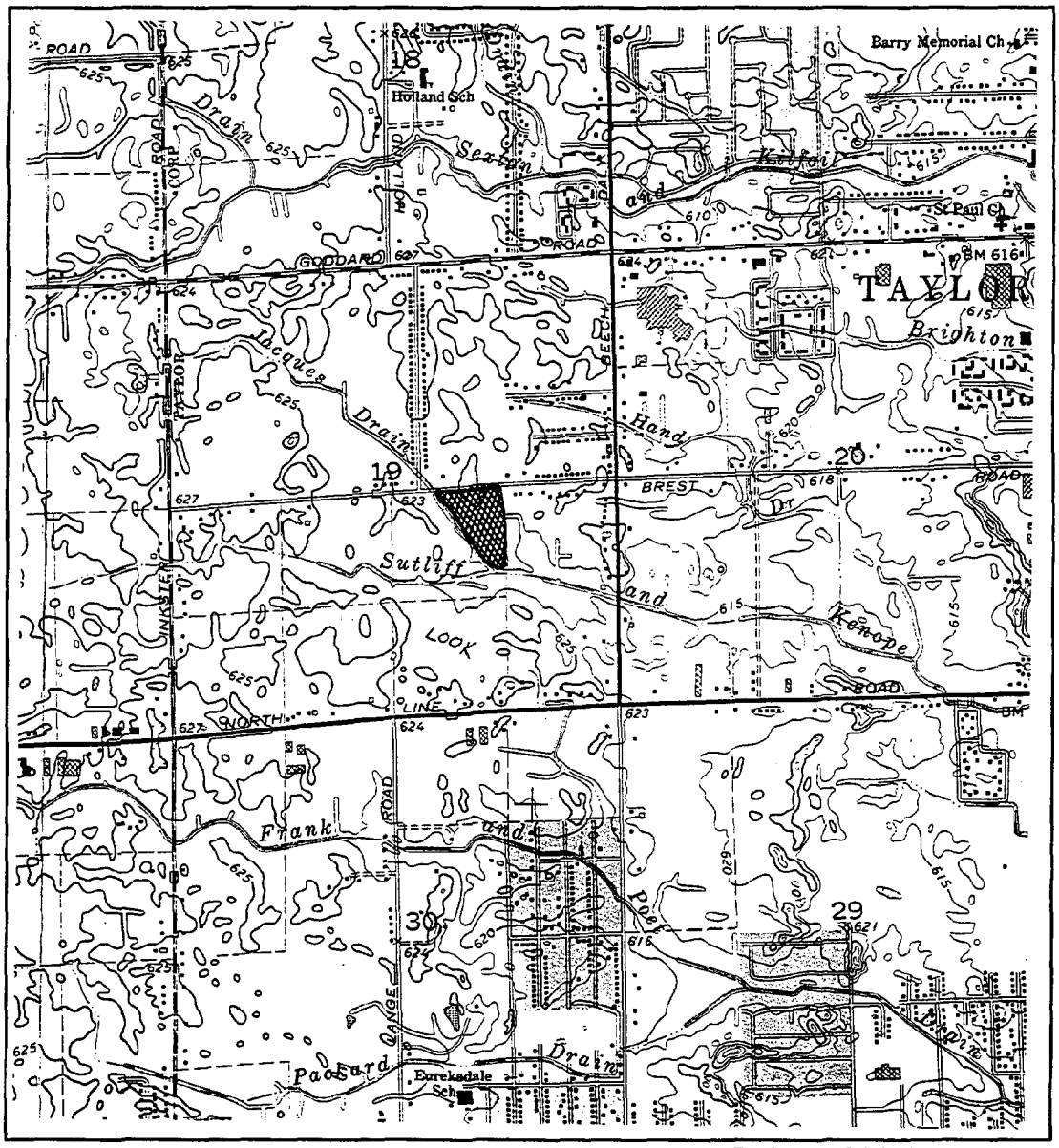
The Brest Road lakeplain wet-mesic prairie is located in Section 19 in the City of Taylor, Wayne County. The site lies on the south side of Brest Road, just east of the junction of Brest Road and Cape Cod Road. Fifteen acres of prairie lies to the northeast of Jacques Drain. Most of the land south of the drain has been severely degraded but may include additional small, prairie fragments. This site lies within the pre-European settlement boundaries of the a lakeplain oak opening that was adjacent to the Greater Sibley Prairie. The prairie covered over 16,000 acres, no acreage is currently available for the oak opening segment of the community complex.

The surrounding lands appear to be either severely degraded or converted to residential housing. No other extant natural communities were observed adjacent to the prairie.

The lakeplain prairie is dominated by big bluestem (*Andropogon gerardii*), little bluestem (*A. scoparius*), and Indian grass (*Sorghastrum nutans*). Other common prairie species include colic root (*Aletris farinosa*), three awned grasses (*Aristida* spp.), butterflyweed (*Asclepias tuberoses*), bushy aster (*Aster dumosus*) heath aster (*Virgulus ericoides*), New England aster (*Virgulus nova-angliae*), tall coreopsis (*Coreopsis tripteris*), strawberry (*Fragaria virginiana*), purple gerardia (*Agalinis purpurea*), common gerardia (*A. tenuifolia*), shrubby St. John's wort (*Hypericum prolificum*), wild bergamot (*Monarda fistulosa*), common mountain mint (*Pycnanthemum virginianum*), tall nut rush (*Scleria triglomerata*), ironweed (*Vernonia missurica*), and pinweeds (*Lechea* spp.). The prairie is located loamy fine sands with a loamy substrate in the Tedrow Series and includes a small ridge of fine sands in the Oakville Series. The site's Floristic Quality Index is 37.78, ranking it 17th out of 53 lakeplain prairie sites surveyed. Eighty one species were observed on the site during a single visit. The site's Wetness Coefficient is 0.2 (Fac).

Notable on this small site are six confirmed special plant species. This list includes two state threatened species seedbox (*Ludwigia alternifolia*) and a three awned grass (*Aristida longispica*). The remaining four species are state special concern. These are hairy angelica (*Angelica venenosa*), two flowered rush (*Juncus biflorus*), gentian leaved St. John's wort (*Hypericum gentianoides*) and tall nut rush (*Scleria triglomerata*). The tall nut rush is common on the site.

The site is believed to be in a single private ownership, although exact ownership has not been determined. Acquisition of this site is recommend, despite its small size. Its concentration of special plants is significant. It may also be used a core for restoration of surrounding lands since approximately half a section adjacent to the site is currently idle.



Scale 1 : 24,000

SITE: Brest Road

LOCATION: Southeast Region, Sibley Complex, Wayne Co., T3S-R10E

USGS QUADRANGLE: Flat Rock NE 4208323

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK: C FQI: 37.78 WET CO.: 0.2 $\bar{X}$ COEF. CONS.: 4.20

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

SUMPTER TOWNSHIP PRAIRIE

The Sumpter Township lakeplain wet-mesic prairie and lakeplain mesic prairie are located in Section 27 of Sumpter Township, Wayne County. The site includes approximately 40 acres of prairie and another 60 acres which may be restorable. Much of the prairie on this site has been degraded by farming, borrow pits, ditching and other activities. There remain approximately 10-15 acres of high quality lakeplain prairie that has not been severely disturbed. Much of this site has been brush hogged within the last five years. This remnant is part of a lakeplain prairie complex that, prior to European settlement, extended over 12,000 acres. Included on the site was a small lakeplain oak opening.

The surrounding land is in agricultural production - or has been recently abandoned - , is idle open land, or is lowland hardwood forest. The lowland hardwood is primarily red ash (*Fraxinus pensylvanicus*) and American elm (*Ulmus americana*).

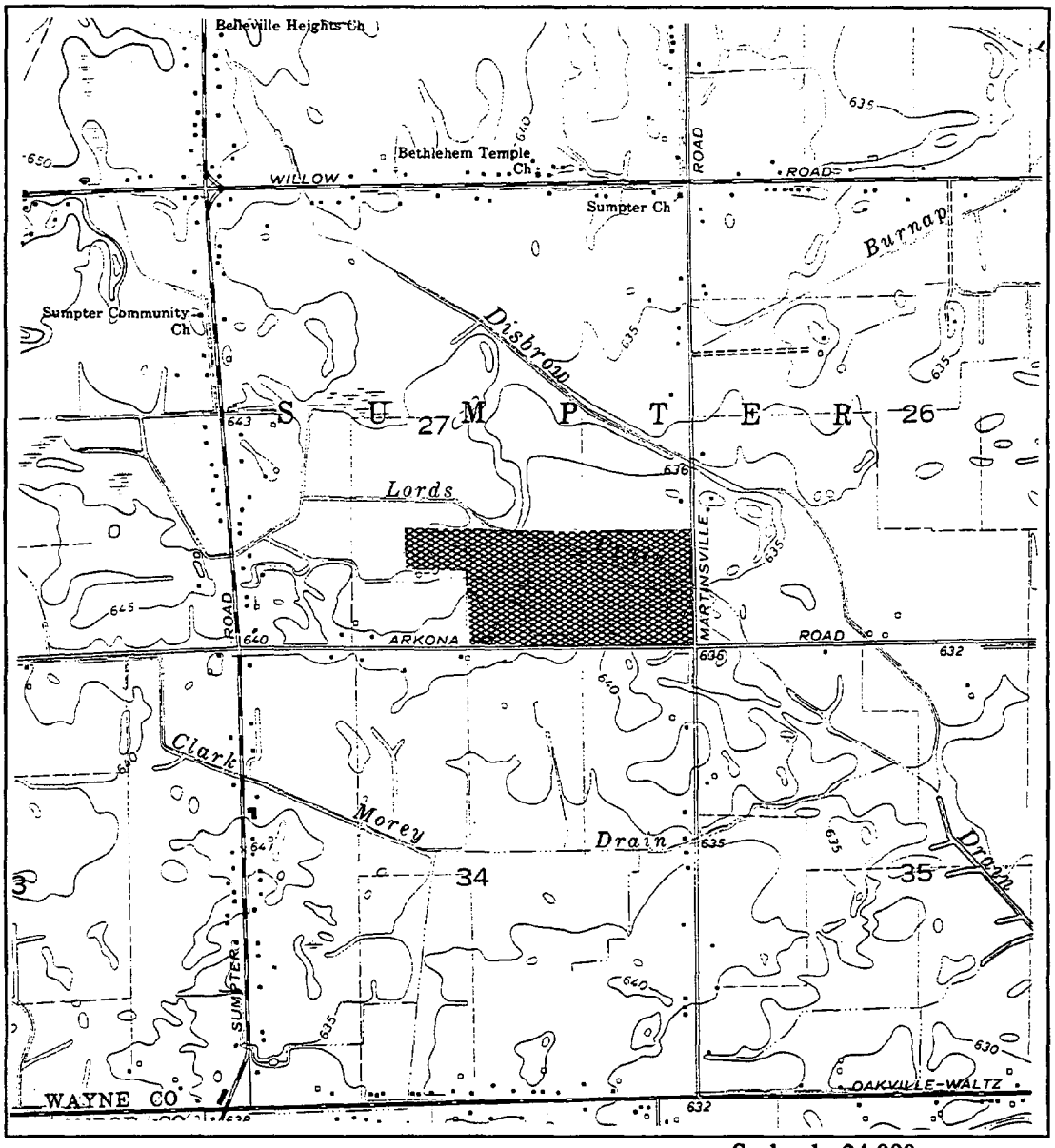
The lakeplain wet-mesic prairie is dominated by big bluestem (*Andropogon gerardii*), little bluestem (*A. scoparius*), and Indian grass (*Sorghastrum nutans*). Other common prairie plants include purple gerardia (*Agalinis purpurea*), common gerardia (*Agalinis tenuifolia*), colic root (*Aletris farinosa*), swamp milkweed (*Asclepias incarnata*), sedges (*Carex granularis*), (*C. pensylvanica*), (*C. scoparia*), twig rush (*Cladium mariscoides*), tall coreopsis (*Coreopsis tripteris*), grass leaved goldenrod (*Euthamia graminifolia*), strawberry (*Fragaria virginiana*), fringed closed gentian (*Gentiana andrewsii*), fowl manna grass (*Glyceria striata*), sneezeweed (*Helenium autumnale*), woodland sunflower (*Helianthus divaricatus*), tall sunflower (*Helianthus giganteus*), shrubby St. John's wort (*Hypericum prolificum*), grass-leaved rush (*Juncus marginatus*), Cynthia (*Krigia biflorus*), marsh blazing star (*Liatris spicata*), muhly grass (*Muhlenbergia uniflora*), switch grass (*Panicum virgatum*), foxglove beard tongue (*Penstemon digitalis*), hairy beard tongue (*P. hirsutus*), common mountain mint (*Pycnanthemum virginianum*), beak rush (*Rhynchospora capitellata*), prairie willow (*Salix humilis*), showy goldenrod (*Solidago speciosa*), ironweed (*Vernonia missurica*), heath aster (*Virgulus ericoides*), and New England aster (*Virgulus novae-angliae*). The mesic prairie is dominated by little bluestem, big bluestem, and broom-sedge (Andropogon virginicus). Other common plants include butterfly-weed (*Asclepias tuberosa*), wild indigo (*Baptisia tinctoria*), sedges (*C. muhlenbergii*), (*C. swanii*), strawberry, long-bearded hawkweed (*Hieracium longipilum*), northern blazing star (*Liatris scariosa*), wild lupine (*Lupinus perennis*), black eyed Susan (*Rudbeckia hirta*), and arrow-leaved violet (*Viola sagittata*). The prairie lies on loamy fine sands in the Bellville, Granby and Tedrow Series with occasional small ridges of fine sand in the Oakville Series. Two hundred and eleven species have been recorded from the site during four visits. The site's Floristic Quality Index is 60.86, ranking it second, behind Sibley Road Prairie, out of 53 lakeplain prairie sites surveyed. The composite site Wetness Coefficient is -0.4 (Fac). The site may be divided in to different regions with both and wetter aspects.

Eight state special plants have been identified on the site. Most significant among these is an extremely small and vulnerable population of the state endangered, few flowered nut rush or Carolina whip grass (*Scleria pauciflora*). This species is relatively common along the Gulf Coastal plain and the Southern Atlantic Coastal plain but this is only the fourth record in Michigan. It was collected in St. Clair County in 1903 and Van Buren County in 1904. It was not seen again until collected by Bill Brodowitz in Muskegon County in 1988. This collection is approximately 75 miles from the nearest historical collection and 150 miles from the nearest extant station. The species is known from four extant populations in Ohio where it is listed as Ohio threatened. The species is common enough not to merit listing in either Indiana or Illinois. Also observed on the site were two state threatened species and five state special concern species. The threatened species are a three awned grass (*Aristida longispica*) and seedbox (*Ludwigia alternifolia*). The

special concern species are hairy angelica (*Angelica venenosa*), gentian leaved St. John's wort (*Hypericum gentianoides*), two flowered rush (*Juncus biflorus*), tall nut rush (*Scleria triglomerata*), and Engelman's spike rush (*Eleocharis engelmannii*). This is the first modern record for Engelman's spike rush east of Calhoun County. Engelman's spike is a coastal plain disjunct species that, in Michigan, occurs primarily in coastal plain marshes in the southwestern corner of the state. There is an historical collection from Wayne County in 1900 and two collections from Jackson County in 1893. All other occurrences are within the Lake Michigan watershed.

The Sumpter Township Prairie lies on two parcels. The larger of the two encompasses 80 acres, 65 of which are prairie or restorable to prairie. This parcel is owned by Sumpter Township. An additional 20 acres occurs on the northern end of adjacent farm, the ownership has not been determined. Sumpter Township has expressed interest in developing the site as a golf course. Early intervention should be undertaken to protect this prairie remnant before the town invests design and engineering funds into the site. Creative alternatives, such as acquiring other suitable lands for a golf course, should be pursued. The Township has also sighted concerns of losing potential tax revenues if the site is converted to a nature preserve.

This site is located just northwest of the Detroit Metropolitan Airport Wetland Mitigation Site that covers over 800 acres. Because this land has already been removed from potential development the town is concerned about further erosion of its tax base. Extra time and effort should be invested to create a protection scenario that address the town's concerns.



Scale 1 : 24,000

SITE: Sumpter Township Prairie

LOCATION: Southeast Region, Sumpter Complex, Wayne Co., T4S-R16E, Section 27

USGS QUADRANGLE: Carleton 4208314

COMMUNITY TYPE(S): lakeplain wet-mesic prairie, lakeplain mesic prairie

ELEMENT RANK: BC FQI: 60.86 WET CO.: -0.4 $\overline{X}$ COEF. CONS.: 4.19

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

LINCOLN MIDDLE SCHOOL PRAIRIE

The Lincoln Middle School lakeplain wet-mesic prairie is located in Section 19 of Sumpter Township, Wayne County. This five acre fragment lies just west of the northwest corner of the Lincoln Middle School athletic fields. The site appears to be shrubbing in rapidly. Slightly moister soils in the immediate vicinity, show as open on 1978 aerial photography, are now completely covered with a thick growth of red-osier dogwood (*Cornus stolonifera*) and silky dogwood (*C. amomum*). This lakeplain prairie is a remnant of a prairie that, prior to European settlement, covered over 12,000 acres and reached into Monroe and Washtenaw Counties.

The mesic prairie no longer supports a dominance of prairie grasses and is shaded by a woodland canopy with 25% closure. Prairie species persisting on the site include colic root (*Aletris farinosa*), big bluestem (*Andropogon gerardii*), tall coreopsis (*Coreopsis tripteris*), long bearded hawkweed (*Hieracium longipilum*), common bergamot (*Monarda fistulosa*), winged sumac (*Rhus copallina*), brown eyed Susan (*Rudbeckia hirta*), ninebark (*Physocarpus opulifolius*), and the state special concern tall nut rush (*Scleria triglomerata*). The prairie lies on loamy fine sand of the Granby Series and loamy sand of the Thetford Series. Only thirteen species were noted during a single brief visit. This abbreviated species list yielded a Floristic Quality Index of 13.87, ranking the site 52nd out of 53 lakeplain prairie sites surveyed. The site Wetness Coefficient is +2.5 (FacU).

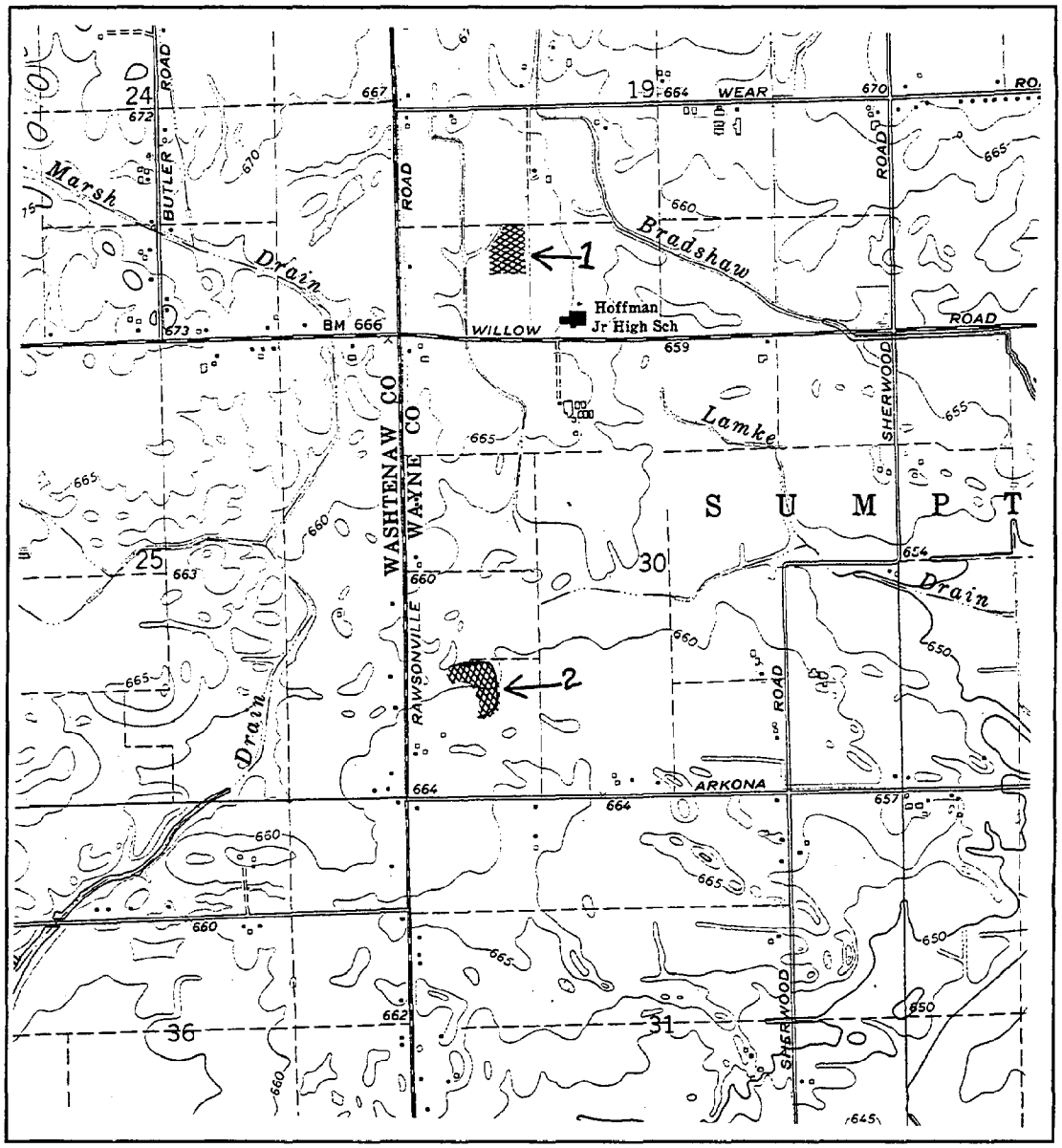
The site is privately owned by Alex P. Nelipovich. Acquisition of the site is recommended pending further survey. Management should provide for its use by the middle school as an ecological classroom.

RAWSONVILLE ROAD PRAIRIE

The Rawsonville Road lakeplain wet-mesic prairie is located in Section 30 of Sumpter Township, Wayne County. This site covers approximately two acres northeast of the junction of Arkona Road and Rawsonville Road. This prairie remnant is highly degraded and is almost completely shrubbed in. The surrounding land includes agricultural fields, old fields and young lowland forest. This site is a remnant of a lakeplain prairie system that, prior to European settlement, covered over 12,000 acres and reached in Monroe and Washtenaw Counties.

The abutting woodland is dominated by young red maple (*Acer rubrum*. The lakeplain prairie fragments are dominated by blue-joint (*Calamagrostis canadensis*) or by a mixture of forbs. Other common prairie plants include colic root (*Aletris farinosa*), big bluestem (*Andropogon gerardii*), little bluestem (*A. scoparius*), sedges (*Carex granularis*) and (*C. stipata*), tall coreopsis (*Coreopsis tripteris*), red-osier dogwood (*Cornus stolonifera*), gray stemmed dogwood (*C. foemina*), Cynthia (*Krigia biflorus*), pale spiked lobelia (*Lobelia spicata*), common mountain mint (*Pycnanthemum virginianum*). This prairie lies on loamy fine sands of the Granby Series and loamy sands of the Thetford Series. Seventy two species have been noted from the prairie. The sites Floristic Quality Index is 27.32 ranking it 36th out of 53 lakeplain prairie sites surveyed. The Wetness Coefficient for the site is -0.4 (Fac+). This site contains a large population of the state special concern meadow beauty (*Rhexia virginiana*)

The property is in a single private ownership, Mr. Thalon, who is planning construction of a residence on the front of the lot. Information explaining the history and current status of lakeplain prairies in Michigan should be forwarded to Mr. Thalon and an attempt made to interest him in reclamation efforts for this small prairie remnant.



Scale 1 : 24,000

SITE: (1)Lincoln Middle School and (2)Rawsonville Road

LOCATION: Southeast Region, Sumpter Complex, Wayne County, T4S-R8E, Section 19
T4S-R8E, Section 30

USGS QUADRANGLE: Maybee 4208315

COMMUNITY TYPE(S): lakeplain mesic prairie

ELEMENT RANK (1): D FQI: 13.87 WET CO.: +2.5 $\bar{X}$ COEF. CONS.: 3.85
ELEMENT RANK (2): D FQI: 27.32 WET CO.: -0.4 $\bar{X}$ COEF. CONS.: 3.22
FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

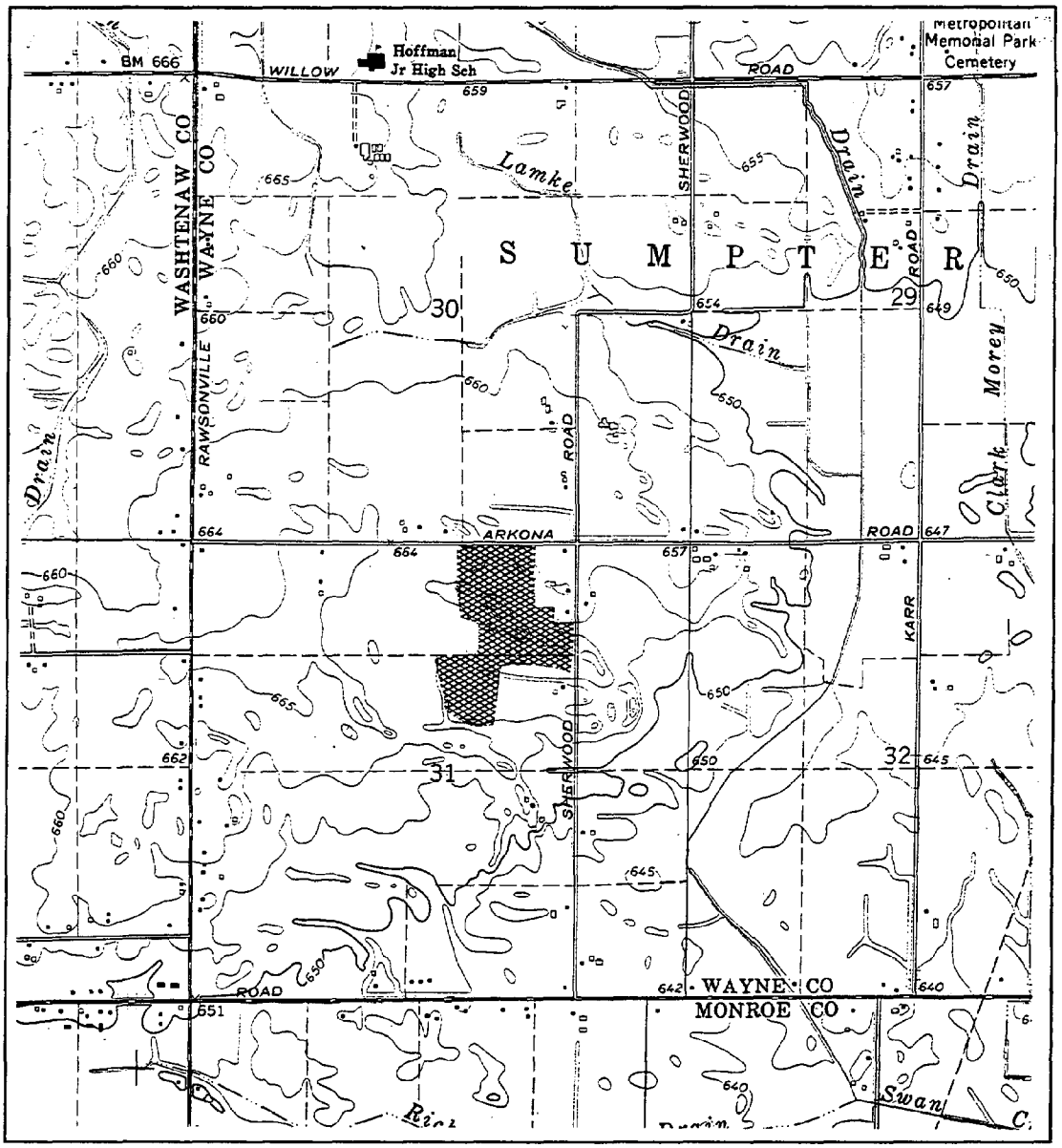
SUMPTER BORROW PITS PRAIRIE

The Sumpter Borrow Pits lakeplain wet-mesic prairie is located in Section 32 of Sumpter Township, Wayne County. As the site name suggests much of this site has had sand mined from the surface. Within the hollows of the borrow pits lakeplain prairie vegetation has emerged, including many special plant species. In addition, a few small prairie openings occur in the oak woodland to the southwest of the borrow pits. This site is a remnant of a lakeplain prairie system that, prior to European settlement covers over 12,000 acres in southwestern Wayne County as well as adjacent lands in Monroe and Washtenaw Counties.

The lakeplain wet-mesic prairie is dominated by big bluestem (*Andropogon gerardii*) and little bluestem (*A. scoparius*). Other common prairie plants include colic root (*Aletris farinosa*), hairy aster (*Aster pilosus*), tall flat toped white aster (*Aster umbellata*), tall coreopsis (*Coreopsis tripteris*), strawberry (*Fragaria virginiana*), purple gerardia (*Agalinis purpurea*), grass leaved goldenrod (*Euthamia graminifolia*), northern blazing star (*Liatris scoparius*), and sagittate leaved violet (*Viola sagittata*). The site lies on loamy fine sands in the Tedrow and Granby Series and includes (or included prior to mining) small ridges of fine sand in the Oakville series. Sixty species have been noted during three visits to the site. The site's Floristic Quality Index is 29.18, ranking it 31st out of 53 lakeplain prairie sites surveyed. The site's Wetness Coefficient is -0.4 (Fac-).

This sites includes a high number of special plants with three state threatened species and five state special concern species. The three threatened species include seedbox (*Ludwigia alternifolia*), the short fruited rush (*Juncus brachycarpus*), and the three awned grass (*Aristida longispica*). The five special concern plants include Missouri rock cress (*Arabis missouriensis*), tooth-cup (*Rotala ramosior*), meadow beauty (*Rhexia virginica*), the two flowered rush (*Juncus biflorus*), and yellow nut-grass (*Cyperus flavescens*).

This site is in a single private ownership. The current owner has not been determined. This site is recommended for acquisition and consideration should be given to acquisition of adjacent lands to the south and west. Maintenance of disturbed site conditions may be critical for some of the listed species on this site.



Scale 1 : 24,000

SITE: Sumpter Borrow Pits

LOCATION: Southeast Region, Sumpter Comples, Wayne Co., T4S-R8E, Section 31

USGS QUADRANGLE: Maybee 4208315

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK: CD FQI: 29.18 WET CO.: -0.4 $\bar{X}$ COEF. CONS.: 3.77

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

SHERWOOD ROAD PRAIRIE

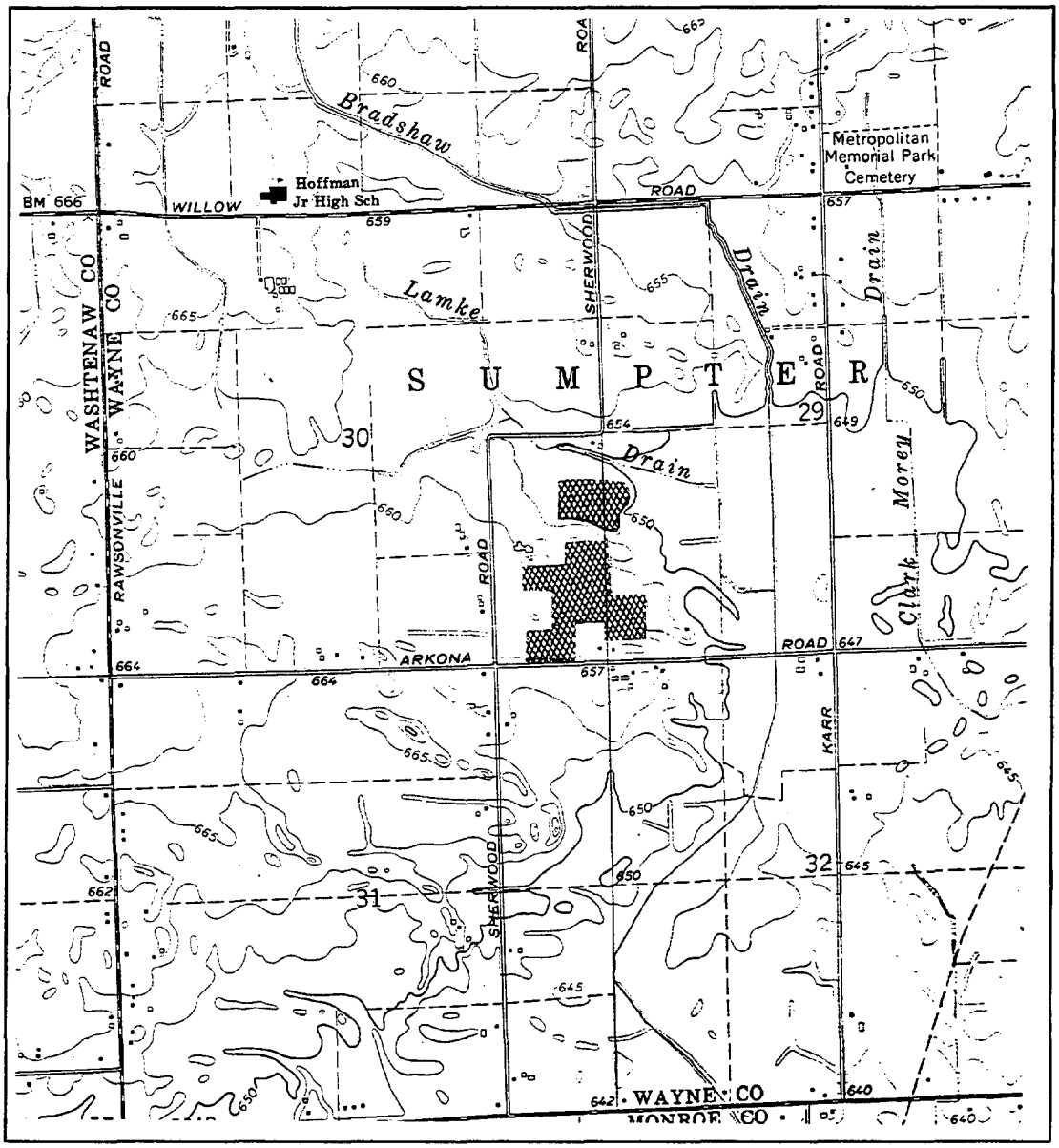
The Sherwood Road lakeplain wet-mesic prairie and lakeplain mesic prairie is located in Section 29 of Sumpter Township, Wayne County. The site encompasses approximately 25 acres of small, degraded prairie fragments. Much of the site is dry with exposed sandy soils but includes lower moister areas more typical of other lakeplain prairie remnants. Portions of the site have been plowed and some small scale sand mining has taken plaice. This site is a remnant of a lakeplain prairie system that, prior to European settlement, covered over 12,000 acres.

Much of the surrounding land has been degraded so that it no longer supports prairie species or has undergone residential development. Extensive areas adjacent to the site are dominated by broom-sedge (*Andropogon virginicus*) with exposed sands.

The lakeplain prairie is dominated by big bluestem (*Andropogon gerardii*), little bluestem (*A. scoparius*) and Indian grass (*Sorghastrum nutans*). Other common prairie plants include colic root (*Aletris farinosa*), sedges (*Carex muhlenbergii*), (*C. pensylvanica*), and (*C. granularis*), tall coreopsis (*Coreopsis tripteris*), common fleabane (*Erigeron philadelphicus*), strawberry (*Fragaria virginiana*), shrubby St. John's wort (*Hypericum prolificum*), Cynthia (*Krigia biflorus*), dwarf dandelion (*K. virginica*), northern blazing star (*Liatris scariosa*), hairy beard tongue (*Penstemon hirsutus*), and ironweed (*Vernonia missurica*). The prairie lies on loamy fine sands in the Granby and Tedrow Series and includes small ridges of fine sand in the Oakville Series. The sites Floristic Quality Index is 25.34, ranking it 39th out of 53 lakeplain prairie sites surveyed. Fifty eight species were recorded from the site during two visits. The site's Wetness Coefficient is +1.1 (Fac-).

The site includes a small population of the state threatened seedbox (*Ludwigia alternifolia*).

The site resides in multiple private ownerships, often of the rear portions of house lots. This site is recommended for purchase if available.



Scale 1 : 24,000

SITE: Sherwood Road

LOCATION: Southeast Region, Sumpter Complex, Wayne Co., T4S-R8E, Sections 29 + 30

USGS QUADRANGLE: Maybee 4208315

COMMUNITY TYPE(S): lakeplain mesic prairie

ELEMENT RANK: D FQI: 25.34 WET CO.: +1.1 $\bar{X}$ COEF. CONS.: 3.33

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

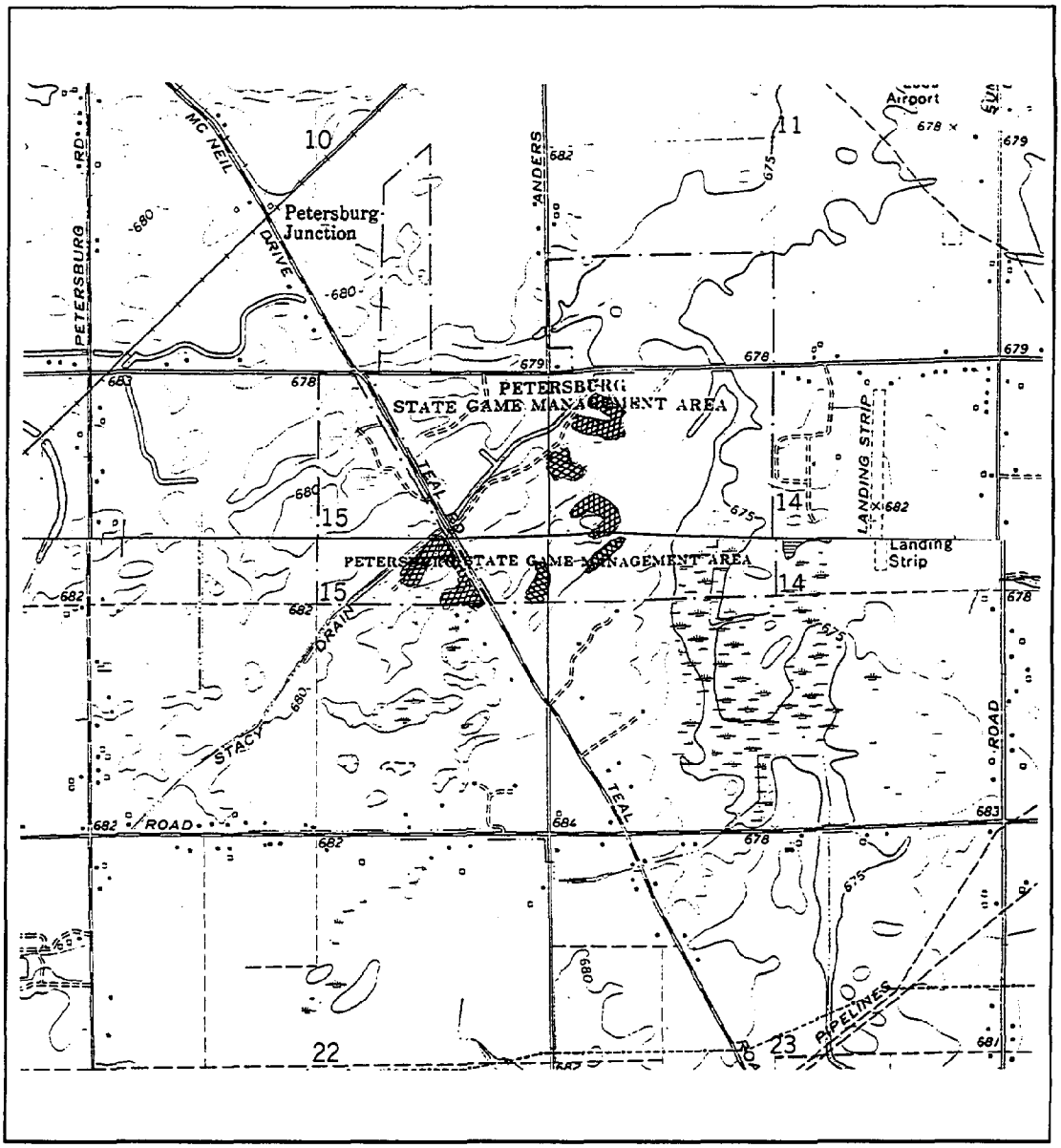
PETERSBURG PRAIRIE: PETERSBURG STATE GAME AREA

The Petersburg lakeplain wet-mesic and lakeplain mesic prairie is located in Sections 14 and 15 of Summerfield Township, Monroe County. The site is partially contained within the Pertersburg State Game Area. The lakeplain prairie on this site exists in small scattered fragments of one to five acres. This site, along with the Sumpter Town Prairie, contains the dries remnants of lakeplain prairie in Michigan. These fragments are remnant from a prairie that, prior to European settlement, covered 1,750 acres and was part of a lakeplain prairie and lakeplain oak opening complex that extended, unbroken, for over 17,500 acres.

The lakeplain wet-mesic prairie is dominated by big bluestem (*Andropogon gerardii*). Other common plants include colic root (*Aletris farinosa*), heath aster (*Virgulus ericoides*), New England aster (*Aster novae-angliea*), sedges (*Carex sartwellii*), and (*C. aurea*), tall coreopsis (*Coreopsis tripteris*), strawberry (*Fragaria virginiana*), fringed closed gentian (*Gentiana andrewsii*), yellow star grass (*Hypoxis hirsuta*), marsh blazing star (*Liatris spicata*), purple gerardia (*Agalinis purpurea*), pale spiked lobelia (*Lobelia spicata*), meadow sweet (*Spiraea alba*), ironweed (*Vernonia missurica*), and Culver's root (*Veronicastrum virginicum*). The lakeplain mesic prairie is dominated by little bluestem (*Andropogon scoparius*) with big bluestem locally co-dominant. Other common mesic prairie species include butterflyweed (*Asclepias tuberosa*), wild indigo (*Baptisia tinctoria*), Indian pain brush (*Castilleja coccinea*), Pennsylvania sedge (*Carex pensylvanica*), bastard toadflax (*Comandra umbellata*), strawberry, saw toothed sunflower (*Helianthus grosseserratus*), wood rush (*Luzula multiflora*), rough blazing star (*Liatris aspera*), and black eyed Susan (*Rudbeckia hirta*). The lakeplain mesic prairie lies on fine sands in the Oakville and Ottokee Series and on loamy fine sands in the Granby Series. The lakeplain wet-mesic prairie lies on loamy sands in the Thetford Series and sandy loam in the Gilford Series. A sub-soil pH of 5.4 has been recorded in wet sands. A total of 184 plant species have been recorded from the site, including 32 adventive species. This is the highest number of adventives recorded for any lakeplain prairie sites. The site's Floristic Quality Index is 49.02, ranking it sixth out of 53 lakeplain prairie sites surveyed. The composite Wetness Coefficient for the site is 1.3 (Fac-). This is the second driest Wetness Coefficient recorded for any site with a complete species list.

Three special plants have been recorded from the complex. They include state threatened tall green milkweed (*Asclepias hirtella*), an occurrence of state threatened seedbox (*Ludwigia alternifolia*) and a population of state special concern hairy angelica (*Angelica venenosa*). In addition the state special concern tall nut rush (*Scleria triglomerata*) is mentioned in a 1983 species list but has never been recorded as an element occurrence.. In addition five special Lepidopterans with prairie affinities have been collected with in the game area. These include the federally endangered and state threatened Karner blue butterfly (*Lycaeides melissa samuelis*), the state threatened dusted skipper (*Atrytonopsis hianna*), and three state special concern species: Culver's root borer moth (*Papaipema sciata*), wild indigo dusky wing (*Erynnis baptisiae*), and the barrens buckmoth (*Hemileuca maia*). This is the largest concentration of special insect species that has thus far been identified occurring with any lakeplain prairie remnant.

Those portions of the lakeplain prairie remnant deserve more intensive brush control management, preferably via controlled burning. In addition it is recommended the acquisition be pursued in the SE of Section 15 and all in the remainder of Section 14. There is room to leave residential development along the roads but attempts should be made to acquire conservation easements or fee simple in the interior of these lots. There are 21 private landowners represented in this area. Most of the recommended purchase lies within the dedicated boundaries of the state game area. Lands in the NE4 and E2 SE4 are not within the dedicated boundaries.



Scale 1 : 24,000

SITE: Petersburg Prairie, Petersburg State Game Area
LOCATION: Southeast Region, Monroe County, T7S-R6E, Sections 14 + 15
USGS QUADRANGLE: Dundee 4108386, Lambertville West 4108376
COMMUNITY TYPE(S): lakeplain wet mesic prairie, lakeplain mesic prairie
ELEMENT RANK: BC mesic, D wet-mesic FQI: 49.02 WET CO.: +1.3 $\bar{X}$ COEF. CONS.: 3.61

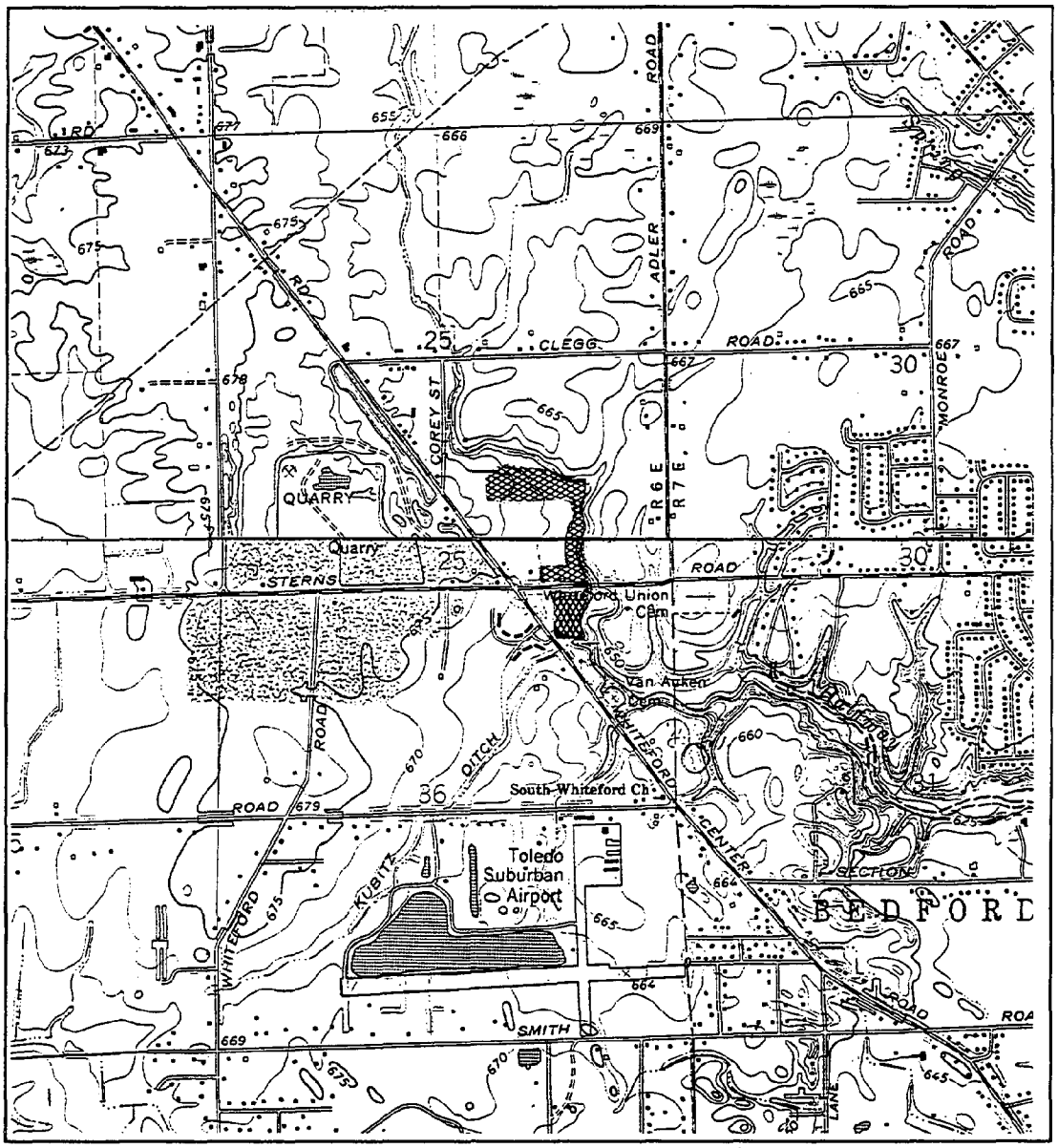
FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

STERNS ROAD PRAIRIE

The Sterns Road prairie is located in Section 25 of Whiteford Township, Monroe County. The site lies just east of the junction of Sterns Road and Whiteford Center Road. Prairie exists both north and south of Sterns Road but the highest quality section lies to the south along Halfway Creek. This lakeplain prairie remnant lies approximately one mile outside of the closest prairie indicated on during the Government Land Office Surveys. It occurred in a pin oak (*Quercus palustris*), black oak (*Q. velutina*) complex that is often intermixed with prairie communities. Extant areas of this oak complex were searched during this survey for lakeplain prairie remnants.

The lakeplain prairie is dominated by big bluestem (*Andropogon gerardii*) and Indian grass (*Sorghastrum nutans*). Other common prairie plaints include prairie dock (*Silphium terebinthinaceum*), little bluestem (*Andropogon scoparius*), sedges (*Carex aurea*) and (*C. granularis*), tall coreopsis (*Coreopsis tripteris*), strawberry (*Fragaria virginiana*), long bearded hawkweed (*Hieracium longipilum*), bog lobelia (*Lobelia kalmii*), hairy beard-tongue (*Penstemon hirsutus*), yellow coneflower (*Ratibida pinnata*), prairie ragwort (*Senecio plattensis*), meadow parsnips (*Thaspium barbinode*) and (*T. trifoliatum*), ironweed (*Vernonia missurica*), heath aster (*Virgulus ericoides*), and golden alexanders (*Zizia aurea*). The prairie lies on loam of the Channahon Series with a pH of 8.0. Seventy plant species have been recorded from the site during two visits. The site's Floristic Quality Index is 30.33, ranking it 33rd out of 53 lakeplain prairie sites surveyed. The site's Wetness Coefficient is +1.5 (FacU-). This is one of the driest sites identified.

The northern portion of the prairie lies on lands owned by Whiteford Township, while the southern portion lies on privately owned lands of Don Ray. Acquisition of the southern portion is recommended. It is also important to make the township aware of the prairie on their property and encourage to manage it, at least in part, as a natural resource, a potential educational facility and a unique property. Combining the two parcels will aid in the preservation and management of this fragment.



Scale 1 : 24,000

SITE: Sterns Road

LOCATION: Southeast Region, Monroe County, T8S-R6E, Section 25

USGS QUADRANGLE: Lambertville West 4108376, Sylvania 4108366

COMMUNITY TYPE(S): lakeplain mesic prairie

ELEMENT RANK: C FQI: 27.85 WET CO.: +1.8 $\bar{X}$ COEF. CONS.: 3.33

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

GOOSE LAKE PRAIRIE: ALLEGAN STATE GAME AREA

The Goose Lake lakeplain wet-mesic prairie is located in Section 13, Heath Township, Allegan County. The prairie lies east of 38th Street an just south of Beech Hill. The principle natural community here is a coastal plain marsh. The prairie forms a narrow ring around the edge of the marsh. No prairies were noted in this region during the Government Land Office Surveys.

The lakeplain prairie is dominated by switch grass (*Panicum virgatum*), blue-joint (*Calamagrosits canadensis*), meadow sweet (*Spiraea alba*), and prairie willow (*Salix humilis*). Other common prairie plants include big bluestem (*Andropogon gerardii*), little bluestem (*Andropogon scoparius*), prairie cord grass (*Spartina pectinata*), Green's rush (*Juncus greenei*), switch grass (*Panicum virgatum*) and sand bar willow (*Salix interior*). The site lies on mucky fine sands in the Newton Series. Only 20 species were recorded from this site during a single survey. The site's Floristic Quality Index is 27.50 ranking it 40th out of 53 lakeplain prairie sites surveyed. The site Wetness Coefficient is -1.1(Fac+).

Four listed plant species are recorded from the lakeplain wet-mesic prairie—coastal plain marsh complex. These include two state threatened species; prairie drop seed (*Sporobolus heterolepis*) and a spike rush (*Eleocharis tricostata*), and two state special concern species; two flowered rush (*Juncus biflorus*) and toothcup (*Rotala ramosior*).

This site is completely contained within the Allegan State Game Area. Management should focus on periodic controlled burns of the prairie portion of the site.

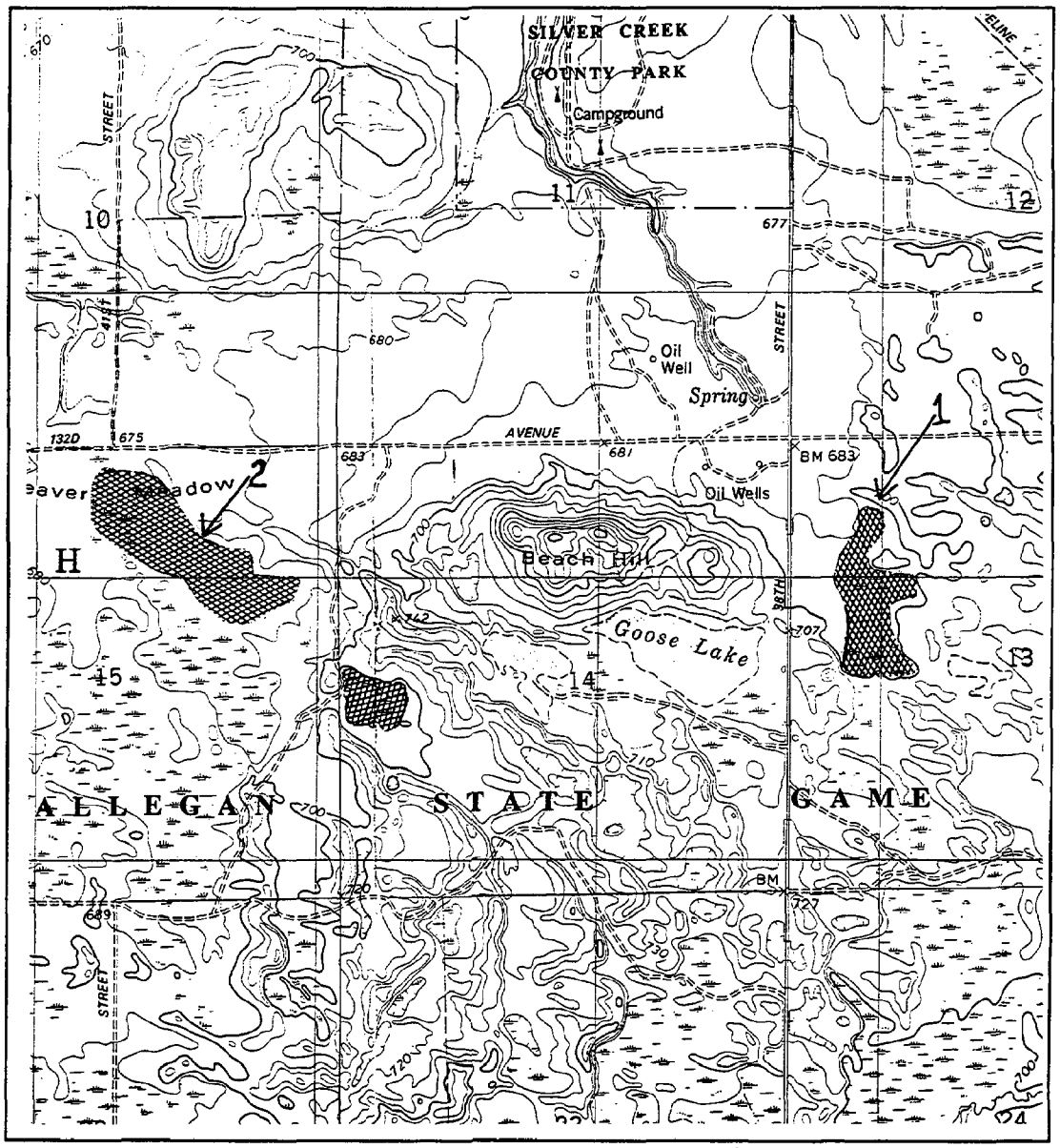
BEAVER MEADOW PRAIRIE: ALLEGAN STATE GAME AREA

The Beaver Meadow lakeplain wet-mesic prairie is located in Sections 14 and 15 of Heath Township, Allegan County. The prairie lies just south of the Junction of 132nd Avenue and 41st Street. This site contains a coastal plain marsh natural community surrounded by lakeplain wet-mesic prairie. No prairies were noted in this area during the Government Land Office Surveys.

The lakeplain prairie is dominated by big bluestem (*Andropogon gerardii*), switch grass (*Panicum virgatum*), and prairie cord grass (*Sorghastrum nutans*). Other common prairie plants include Culver's root (*Veronicastrum virginicum*), rough leaved goldenrod (*Solidago rugosa*), heath aster (*Virgulus ericoides*), blue-joint (*Calamagrostis canadensis*), marsh blazing star (*Liatris spicata*), beaked rush (*Rhynchospora capitellata*), and meadow sweet (*Spiraea alba*). Only twelve species were noted during a single hurried survey. This abbreviated list yields a Floristic Quality Index 0f 19.05, ranking this site 50th out of 53 lakeplain prairie sites surveyed. A more complete species list would raise this value. The site's Wetness Coefficient is 0.3 (Fac).

One state threatened plant, a rush (*Juncus scirpoides*), and two state special concern species, two flowered rush (*Juncus biflorus*) and whorled mountain mint (*Pycnanthemum verticillatum*) were observed within the lakeplain wet-mesic prairie—coastal plain marsh complex.

This site is contained within the Allegan State Game Area. Management should focus on periodic controlled burning of the lakeplain prairie portions of this complex. Long term management should focus on maintain the hydrology of the area.



Scale 1 : 24,000

SITES: 1 Goose Lake, Allegan State Game Area and 2 Beaver Meadow, Allegan State Game Area

LOCATION: Southwest Region, Allegan County, T3N-R15E, Section 14 + 15

USGS QUADRANGLE: Hamilton East 4208568

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK (1): C FQI: 27.50 WET CO.: +1.1 $\bar{X}$ COEF. CONS.: 6.15
ELEMENT RANK (2): D FQI: 19.05 WET CO.: +0.3 $\bar{X}$ COEF. CONS.: 5.50
FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

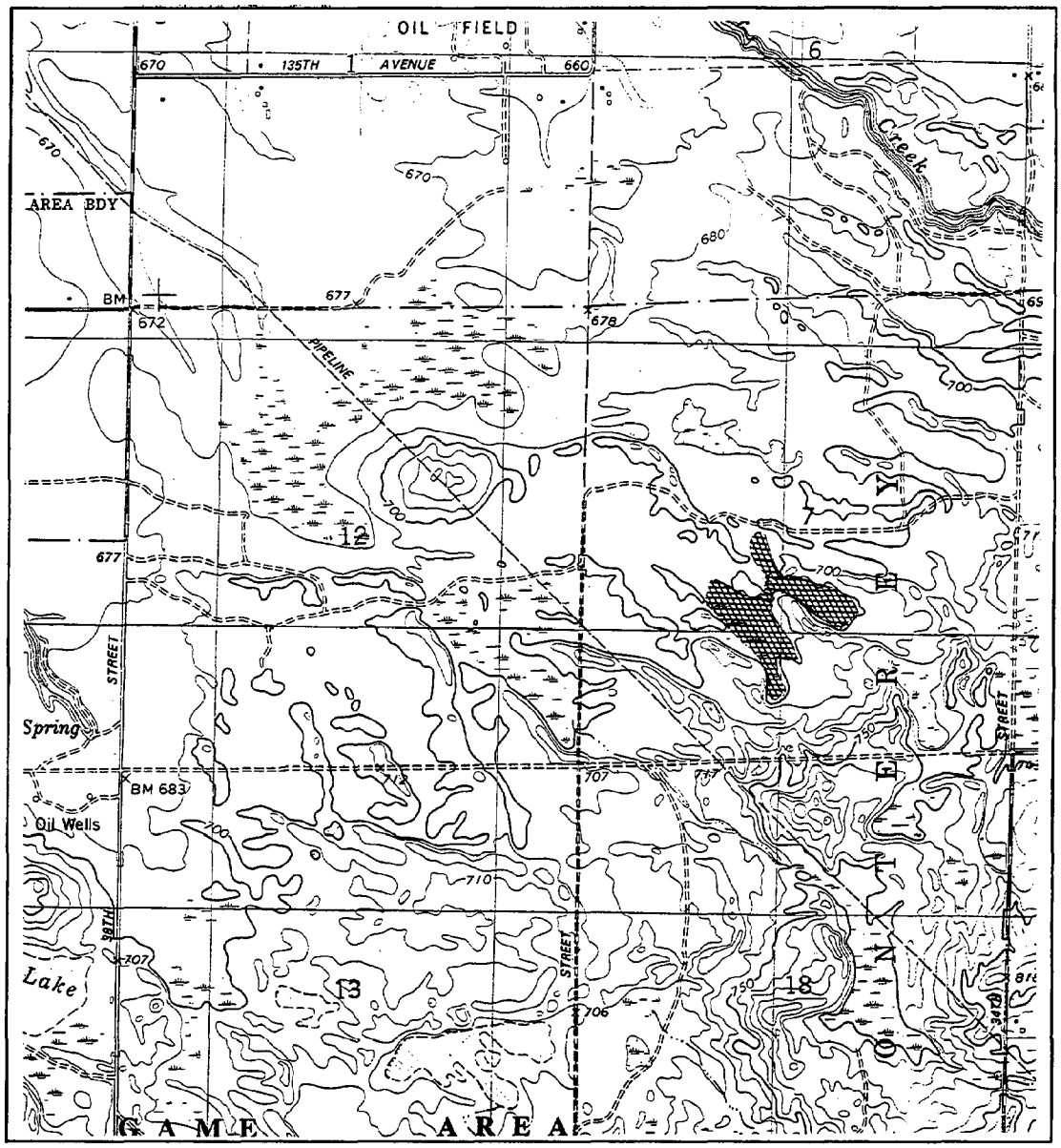
PIPELINE EAST PRAIRIE: ALLEGAN STATE GAME AREA

The Pipeline East lakeplain wet-mesic prairie is located in Section 7 of Monterey Township, Allegan County. The sites is approximately 100 meters northeast of the junction of 132nd Avenue and 36th Street. This prairie occurs as a ring around the upland portion of a coastal plain marsh natural community. No prairies were noted in this region during the Government Land Office Surveys.

The lakeplain prairie is dominated big bluestem (*Andropogon gerardii*), blue-joint (*Calamagrostis canadensis*), and Indian grass (*Sorghastrum nutans*). Other common prairie plants include marsh blazing star (*Liatris spicata*), meadow sweet (*Spiraea alba*), beaked rush (*Rhynchospora capitellata*), prairie cord grass (*Spartina pectinata*), switch grass (*Panicum virgatum*), little bluestem (*Andropogon scoparius*), tall coreopsis (*Coreopsis tripteris*), common mountain mint (*Pycnanthemum virginianum*), and common ladies tresses (*Spiranthes cernua*). Sixty eight species have been recorded from the site during two visits. The site's Floristic Quality Index is 44.26, ranking it tenth out of 53 lakeplain prairie sites surveyed. It should be noted that this value is based on both the coastal plain marsh and lakeplain prairie natural communities. The site's Wetness Coefficient is -1.1 (Fac+).

There are seven special plants in the coastal plain marsh—lakeplain prairie natural complex. This includes three state endangered species, one of which Hall's bulrush (*Scirpus hallii*) is under consideration for federal listing. Also listed as state endangered are dwarf burhead (*Echinodorus tenellus*) and downy gentian (*Gentiana puberulenta*). There are also two state threatened species; three ribbed spike rush (*Eleocharis tricostata*) and scirpus-like rush (*Juncus scirpoides*). Finally there are two state special concern species; Engelman's spike rush (*Eleocharis engelmannii*) and toothcup (*Rotala ramosior*). The presence of three state endangered species in one small community is truly unique and adds to the value of this site.

The lakeplain wet-mesic prairie and the coastal plain marsh are contained within the Allegan State Game Area. Management should include controlled burning in the lakeplain prairie.



Scale 1 : 24,000

SITE: Pipeline Prairie East; Allegan State Game Area

LOCATION: Southwest Region, Allegan County, T3N-R13W, Section 7

USGS QUADRANGLE: Hamilton East 4208568

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK: BC FQI: 44.26 WET CO.: -1.4 $\bar{X}$ COEF. CONS.: 5.37

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

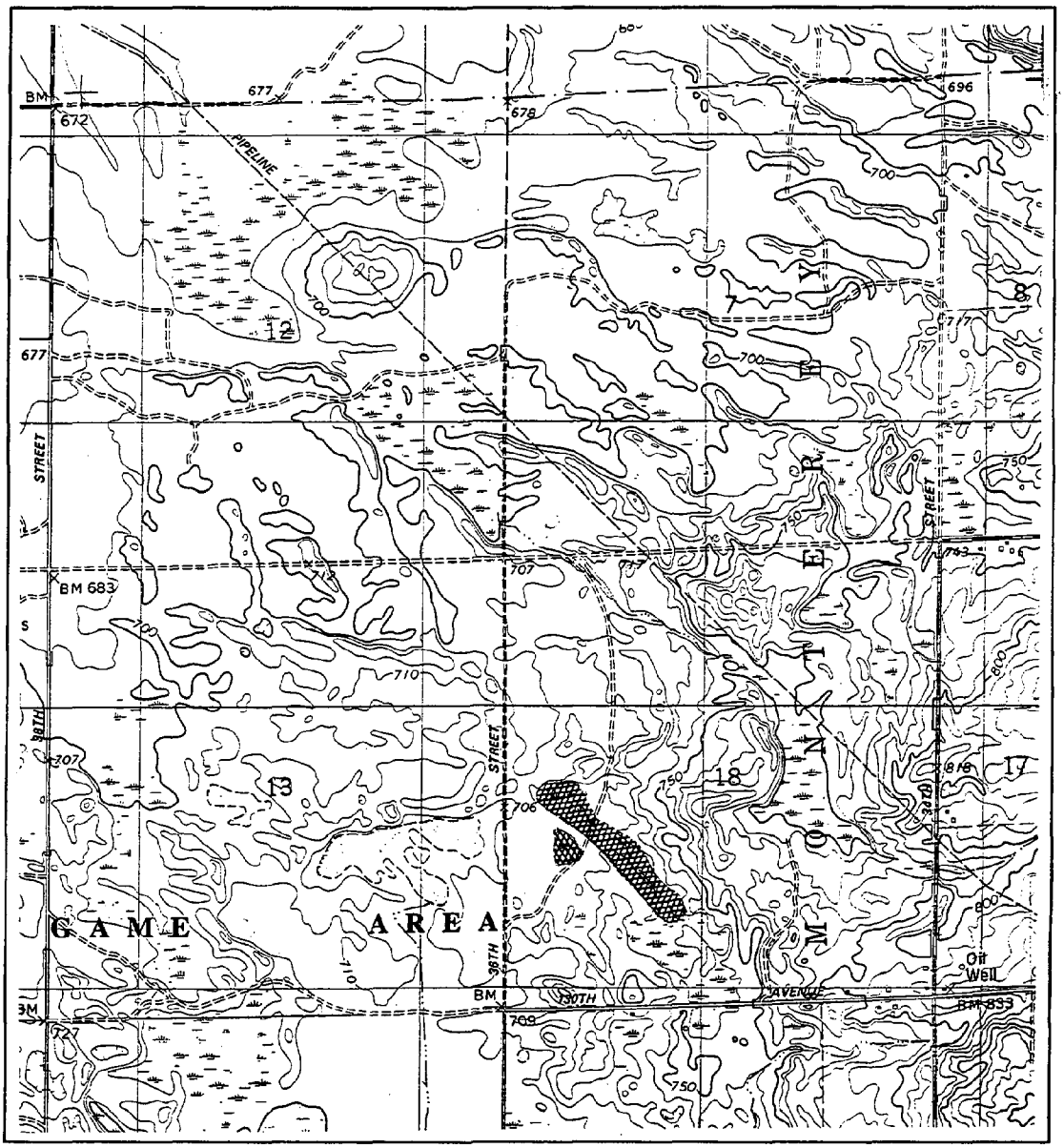
130TH AVENUE PRAIRIE: ALLEGAN STATE GAME AREA

The 130th Avenue lakeplain wet-mesic prairie is located in section 18, Monterey Township, Allegan County. The site is approximately 100 meters north of the junction of 130th Avenue and 36th Street, along an intermittent water course. The prairie forms a ring around the upland portions of a coastal plain marsh natural community. No prairies were noted in this area during the Government Land Office Surveys.

The lakeplain prairie is dominated by big bluestem (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), prairie cord grass (*Spartina pectinata*), and switch grass (*Panicum virgatum*). Other common prairie plants include a three awned grass (*Aristida purpurascens*), bushy aster (*Aster dumosus*), blue-joint (*Calamagrostis canadensis*), strawberry (*Fragaria virginiana*), fringed closed gentian (*Gentiana andrewsii*), marsh blazing star (*Lobelia spicata*), winged loosestrife (*Lythrum alatum*), tall goldenrod (*Solidago altissima*), rough goldenrod (*Solidago rugosa*), grass leaved goldenrod (*Euthamia graminifolia*), coastal plain flat topped goldenrod (*Euthamia tenuifolia*), and Culver's root (*Veronicastrum virginiana*). The prairie lies on mucky fine sands in the Newton Series and fine sand in the Morocco Series. Forty three species have been identified during two visits to the site. The site's Floristic Quality Index is 38.89, ranking it 19th out of 53 lakeplain prairie sites surveyed. The site Wetness Coefficient is -1.3 (Fac+).

Four state special plants have been observed within the lakeplain prairie—coastal plain marsh complex. These include the state special concern two flowered rush (*Juncus biflorus*) and three state threatened species. The state threatened species are scirpus -like rush (*Juncus scirpoides*), three ribbed spikerush (*Eleocharis tricostata*), and a blue eyed grass (*Sisyrinchium atlanticum*).

This site is completely contained within the Allegan State Game Area. Management should include periodic controlled burns of the lakeplain prairie portions of the site. This site drains west into the 36th Street lakeplain prairie - coastal plain marsh complex, also within the Allegan State Game Area.



Scale 1 : 24,000

SITE: 130th Avenue Prairie; Allegan State Game Area

LOCATION: Southwest Region, Allegan County, T3N-13W, Section 18

USGS QUADRANGLE: Hamilton East 4208568

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK: C FQI: 38.89 WET CO.: -1.3 $\bar{X}$ COEF. CONS.: 5.93

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

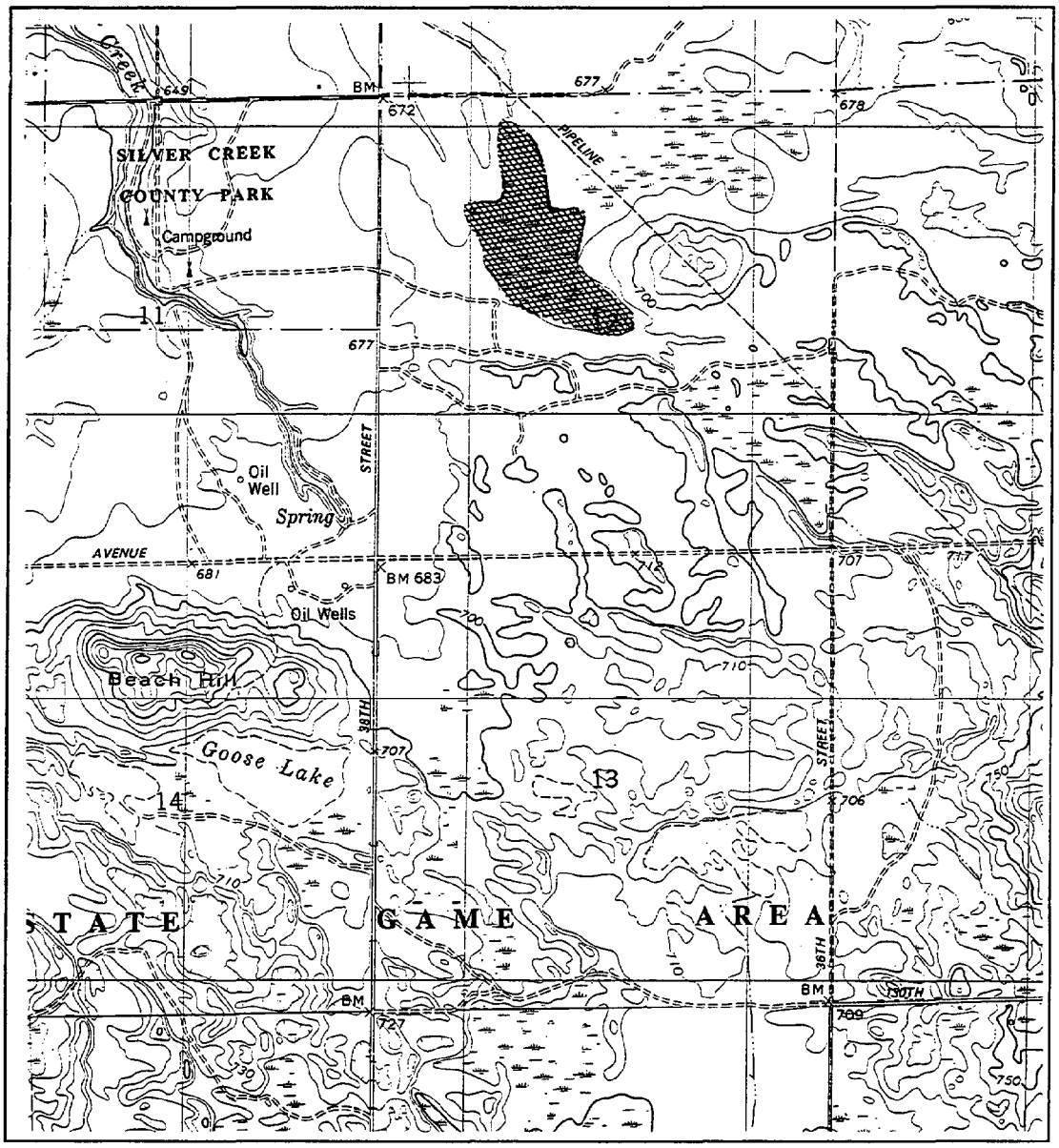
36TH STREET PRAIRIE: ALLEGAN STATE GAME AREA

The 36th Street lakeplain wet-mesic prairie is located in Section12 of Monterey Township, Allegan County. The site is approximately 100 meters northwest of the junction of 132nd Avenue and 36th Street. The lakeplain prairie occurs around the margins of a coastal plain marsh. No prairies were noted in this region during the Government Land Office Survey.

The lakeplain prairie is dominated by big bluestem (*Andropogon gerardii*), blue-joint (*Calamagrostis canadensis*), a sedge (*Carex aquatilis*) and prairie cord grass (*Spartina pectinata*). Other common prairie plants include little bluestem (*Andropogon scoparius*), bushy aster (*Aster dumosus*), smooth aster (*Aster laevis*), fringed, closed gentian (*Gentiana andrewsii*), marsh blazing star (*Liatris spicata*), common mountain mint (*Pycnanthemum virginianum*), blue eyed grass (*Sisyrinchium atlanticum*), common ladies tresses (*Spiranthes cernua*), and beak rush (*Rhynchospora capitellata*). Fifty four species have been recorded during three surveys of the site. The site's Floristic Quality Index is 44.23, ranking it twelfth out of 53 lakeplain prairie sites surveyed. The site's Wetland Index is -1.4 (Fac+).

Ten special plants have been recorded from the coastal plain marsh—lakeplain prairie complex. These include five state threatened species and five state special concern species. The state threatened species are scirpus-like rush (*Juncus scirpoides*), three ribbed spike rush (*Eleocharis tricostata*), Atlantic blue eyed grass (*Sisyrinchium atlanticum*), small fruited rush (*Juncus brachycarpus*), and Vasey's rush (*Juncus vaseyi*). The state special concern species are two flowered rush (*Juncus biflorus*), tall nut rush (*Scleria triglomerata*), whorled mountain mint (*Pycnanthemum verticillatum*), toothcup (*Rotala ramosior*), and cross-leaved milkwort (*Polygala cruciata*).

This site is contained within the Allegan State Game Area. Management should include periodic controlled burning of the lakeplain prairie.



Scale 1 : 24,000

SITE: 36th Street Prairie; Allegan State Game Area

LOCATION: Southwest Region, Allegan County, T3N-R14W, Section 12

USGS QUADRANGLE: Hamilton East 4208568

COMMUNITY TYPE(S): lakeplain wet-mesic prairie

ELEMENT RANK: C FQI: 42.33 WET CO.: -1.4 $\bar{X}$ COEF. CONS.: 6.02

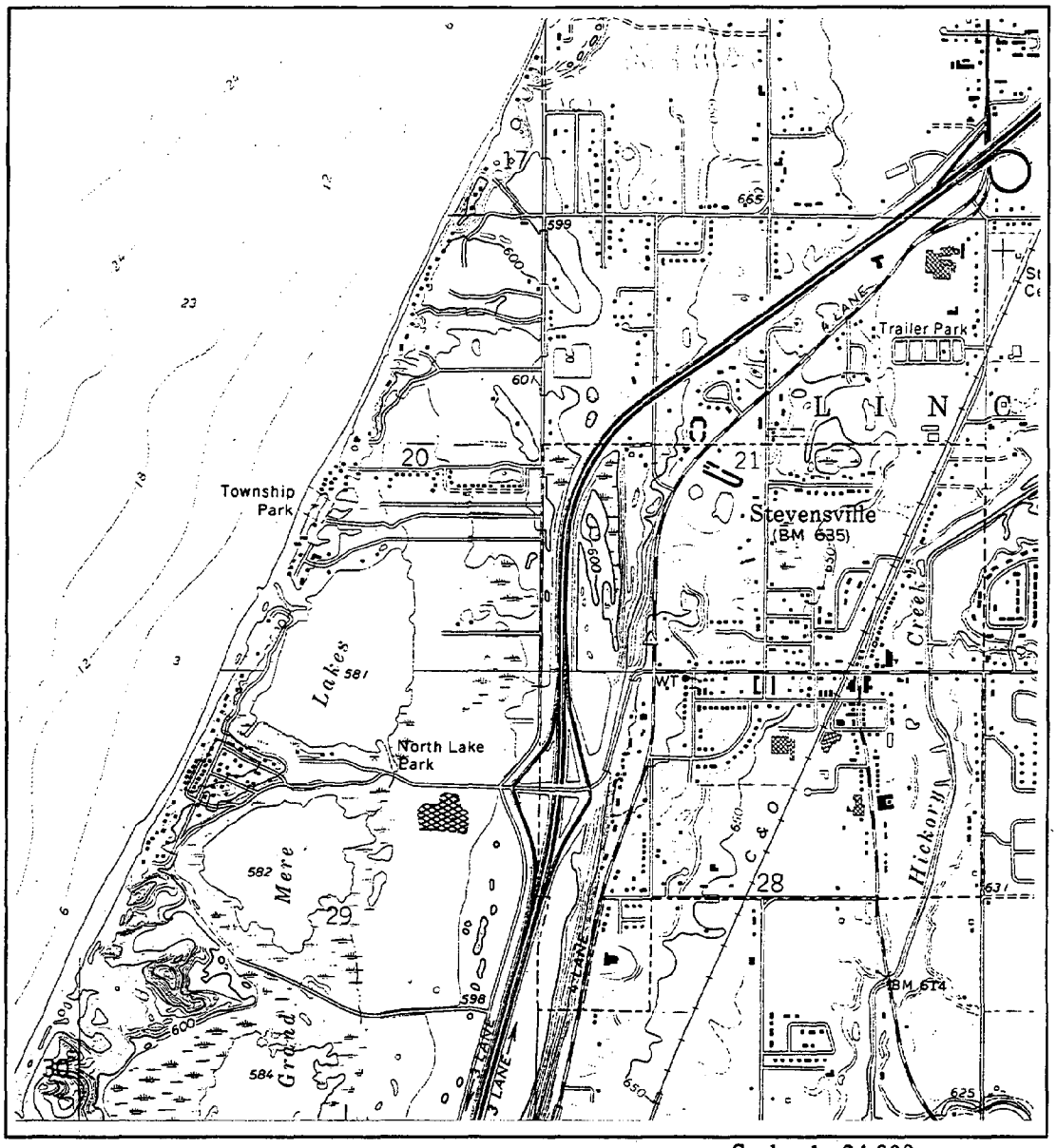
FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

GRAND MERE PRAIRIE: GRAND MERE STATE PARK

The Grand Mere lakeplain wet-mesic prairie is located in Section 29 of Lincoln Township, Berrien County. The site is south of North Lake Park Road, just west of the I-94 interchange. This is a secondary prairie that has emerged on lands described as a cedar swamp during the Government Land Office Survey.

The dominant species in the prairie is big bluestem (*Andropogon gerardii*). Other common species include ninebark (*Physocarpus opulifolius*), red ash (*Fraxinus pensylvanica*), shrubby St. John's wort (*Hypericum kalmii*), meadow sedge (*Carex stricta*) strawberry (*Fragaria virginiana*), tall coreopsis (*Coreopsis tripteris*), woodland sunflower (*Helianthus divaricatus*), tall sunflower (*H. giganteus*), little bluestem (*Andropogon scoparius*), and ironweed (*Vernonia missurica*). The prairie lies on loamy sand in the Morocco Series with a pH of 6.8. Eighty five species have been recorded from the site during two site surveys. The site's Floristic Quality Index is 35.25, ranking it 23rd out of 53 lakeplain prairie sites surveyed. The site's Wetness Coefficient is -0.7 (Fac+).

One state threatened plant, the rose pink (*Sabatia angularis*) is common on the site
The site is contained within the Grand Mere State Park. Management should include periodic controlled burns.



Scale 1 : 24,000

SITE: Grand Mere Prairie; Grand Mere State Park

LOCATION: Southwest Region, Berrien County, T5S-R19W, Section 29

USGS QUADRANGLE: Stevensville 4208615

COMMUNITY TYPE(S): lakeplain wet prairie

ELEMENT RANK: D FQI: 35.25 WET CO.: -0.7 $\overline{X}$ COEF. CONS.: 3.82

FQI= Floristic Quality Index ; WET COEF. = Average Wetness Coefficient;. COEF. CONS. = Average Coefficient of Conservatiosm

Appendix II

Data Analyses

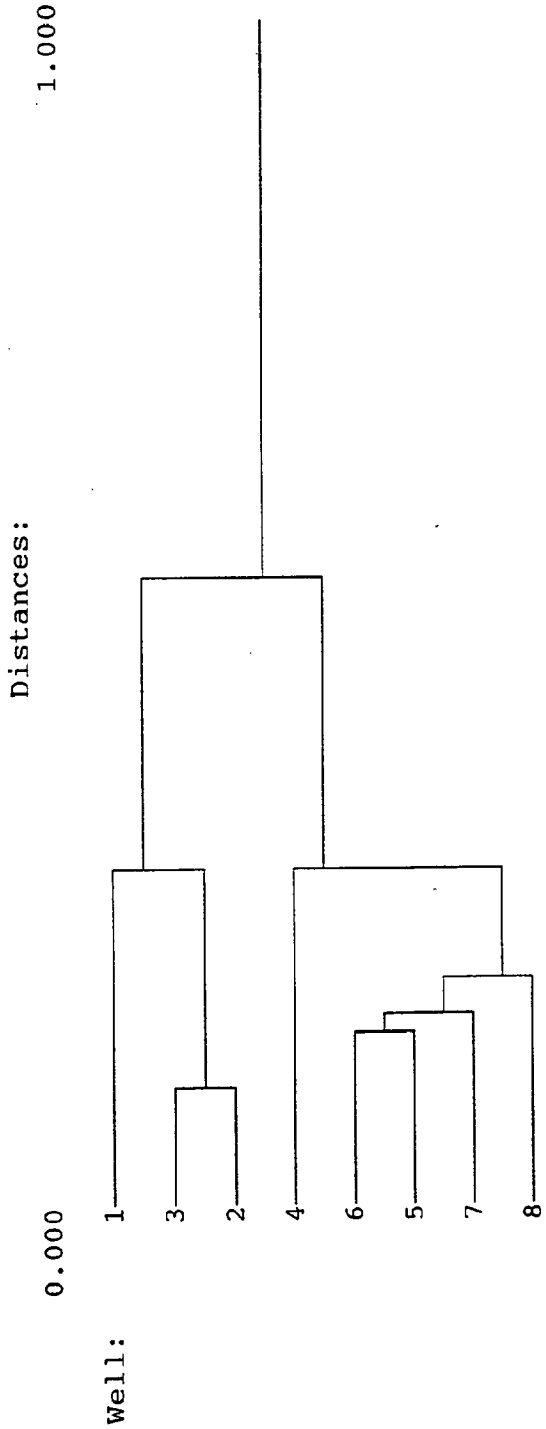
Appendix II.1 Water table depth at well locations along the transect at Algonac Prairie.

Date	Water Depth[a] (cm) at Well:							
	1	2	3	4	5	6	7	8
April 28	-106.0	-57.0	8.0	0.0	6.0	0.0	0.0	5.0
May 20	-116.0	-44.0	-35.0	-56.0	.	.	.	.
June 9	-148.0	-94.0	-48.0	-46.0	-5.0	-13.0	-9.0	-10.0
June 30	-138.0	-126.0	-91.0	-86.0	-73.0	-46.0	-53.0	-52.0
July 15	-137.0	-135.0	-91.0	.	-84.0	-78.0	-76.0	-65.0
July 28	-139.0	-137.0	-86.0	-96.0	-83.0	-71.0	-75.0	-55.0
August 11	-135.0	-147.0	-93.0	-99.0	-96.0	-66.0	-75.0	-52.0
August 25	-136.0	-139.0	-96.0	-100.0	-95.0	-74.0	-73.0	-59.0
September 9	-138.0	-144.0	-89.0	-99.0	-96.0	-73.0	-72.0	-47.0
October 6	<-143.0	<-147.0	<-100.0	-109.0	-98.0	-78.0	-76.0	-70.0
October 20	<-143.0	<-147.0	<-100.0	-105.0	-77.0	-54.0	-50.0	-55.0
November 3	<-143.0	<-147.0	<-100.0	-91.0	-72.0	-45.0	-42.0	-51.0
November 14	<-143.0	<-147.0	<-100.0	-96.0	-75.0	-47.0	-44.0	-54.0
December 1	<-143.0	<-147.0	<-100.0	-82.0	-60.0	-36.0	-40.0	0.0
December 15	<-143.0	<-147.0	<-100.0	-84.0	-60.0	-38.0	-40.0	0.0
December 29	<-143.0	-139.0	<-100.0	-88.0	-72.0	-58.0	-46.0	-2.0
Mean[b]	-138.6	-133.2	-85.4	-84.4	-68.3	-49.9	-49.9	-35.9

[a]Negative values represent depths below surface; positive values represent depth of standing water. The < sign indicates values falling below the basal reading for a well.

[b]Based on the 14 dates with complete observations.

Appendix II. 2. Nearest Neighbor Cluster Analysis of well locations at the Algonac Prairie.



[a]Based on 14 dates with complete observations

Appendix II. 3. TWINSPAN ordination of Algonac Prairie wells and plant species.

Species Group 000

#	Species		WELL #: 84567123 Ubiquity[a]	Group	Water Table[b]
8	AST	NOV	-333---1	000	-67.6
40	FRA	VIR	-313-1--	000	-77.1
2	AND	GER	-133----	000	-61.9
3	ANE	CAN	-2------	000	-84.4
6	AST	LAE	-31-----	000	-80.4
9	AST	UMB	---3----	000	-49.9
11	CHR	LEU	-221----	000	-71.1
12	CIR	DIS	----3---	000	-49.6
14	CIR	PAL	--133---	000	-105.8
15	COM	UMB	-1------	000	-84.4
18	COR	TRP	-21-----	000	-79.0
20	CX	AURE	-132----	000	-64.8
21	CX	BICK	-1--2---	000	-61.2
23	CX	CAPI	-2------	000	-84.4
24	CX	CRWE	-2--2---	000	-67.0
25	CX	GRAN	-3333---	000	-62.7
29	CX	STIP	----1---	000	-49.6
31	CX	VULP	----3---	000	-49.6
32	DAU	CAR	---13---	000	-49.7
33	DES	CAA	-1------	000	-84.4
34	EQU	ARV	-2333---	000	-60.0
39	FRA	AME	-31-----	000	-80.4
43	GEN	AND	-2------	000	-84.4
44	GEUM	SP	--232---	000	-55.1
46	HAL	DEF	----2---	000	-49.6
48	HYP	HIR	-1------	000	-84.4
49	HYP	KAL	-1------	000	-84.4
50	JUN	DUD	-2223---	000	-61.6
51	JUN	TEN	-3223---	000	-63.8
52	JUN	TOR	--311---	000	-60.9
53	KRI	BIF	-2------	000	-84.4
54	LES	CAP	-2------	000	-84.4
55	LIA	SPI	-3231---	000	-63.9
57	LIL	MIC	---1----	000	-49.9
60	LYS	QUA	-211----	000	-71.8
61	LYT	ALA	--11----	000	-59.1
62	MON	FIS	-2-2----	000	-67.2
64	PAN	IMP	-2------	000	-84.4
66	PAN	VIR	--111---	000	-55.9
67	PED	LAN	-2------	000	-84.4
68	PEN	DIG	-1------	000	-84.4
69	POA	COM	-3213---	000	-63.8
74	POP	TRE	-1------	000	-84.4
79	PRU	VUL	-3--3---	000	-64.5
80	PYC	VIR	-3332---	000	-64.7
88	SAN	MAR	--2-----	000	-68.3
91	SCI	CYP	----3---	000	-49.6
92	SIS	MON	-1--1---	000	-67.0
97	SOL	GRA	-121----	000	-67.7
98	SOL	OHI	-1331---	000	-60.7
99	SOL	RID	---33---	000	-49.7
101	SOR	NUT	-213----	000	-64.5
104	TAR	OFF	--11----	000	-59.1

	105	TRI	REP	-1-11---	000	-61.3
	106	VER	MIS	--333---	000	-55.9
	107	VER	VIR	-32-----	000	-79.0
Species Group 001	4	APO	SIB	11211--	001	-59.4
	26	CX	LASI	1-33----	001	-56.5
	59	LYC	AME	1--13---	001	-46.9
	7	AST	LAT	3-1-3---	001	-45.6
	30	CX	STRI	3--1----	001	-38.7
	71	POL	AMP	3---3---	001	-42.8
	103	SPI	ALB	11------	001	-60.2
	41	FRA	PEN	3-123--1	001	-49.6
Other	17	COR	FOE	131321-3	01	-71.5
	27	CX	LEPO	-21-2-1-	01	-78.2
	109	VIR	LEN	--1-2-1-	01	-75.2
	110	VIT	RIP	131----1	01	-73.8
	5	AST	ERI	-323--21	0	-82.0
	19	CRA	CRU	2-2113-1	0	-80.9
	96	SOL	ALT	-32----2	10	-80.1
	100	SOL	RUG	-3312-23	10	-79.9
	73	POL	SEN	-1---1-1	110	-102.8
Species Group 111	1	ACE	RUB	-----311	111	-128.8
	10	BRA	ERE	------2-	111	-133.2
	13	CIR	LUT	------33	111	-105.9
	16	COR	AME	-----31-	111	-137.5
	22	CX	BRUN	-------1	111	-85.4
	28	CX	PENS	-----3-1	111	-128.0
	35	EQU	HYE	-----3--	111	-138.6
	36	ERI	PHI	------1-	111	-133.2
	37	ERI	PUL	------1-	111	-133.2
	38	EUP	MAU	-------1	111	-85.4
	42	GAL	APA	-----33-	111	-136.3
	45	GLY	STR	------1-	111	-133.2
	47	HEL	DIV	------1-	111	-133.2
	56	LIG	VUL	-------1	111	-85.4
	58	LON	TAR	-----23-	111	-135.0
	63	OXA	ACE	-1---211	111	-116.0
	65	PAN	LAT	-----1--	111	-138.6
	70	POA	SAL	-----1--	111	-138.6
	72	POL	PUB	-----3-1	111	-128.0
	75	POT	SIM	-----313	111	-115.0
	77	PRU	SER	-----3-1	111	-128.0
	78	PRU	VIR	------11	111	-109.3
	85	RUB	ALL	-1---113	111	-102.1
	86	RUB	PUB	-----1-3	111	-96.0
	87	RUB	STR	-------3	111	-85.4
	89	SAS	ALB	-----23-	111	-135.0
	95	SMI	RAC	-----2--	111	-138.6
				00000111		
				01111		

[a]Values represent number of subplots at each well in which species was found.

[b]Species "preferred" water-table depth based on weighted average; see text for explanation.

Appendix II. 4. TWINSPAN ordination of plant species and prairie sites (plant species noted as 6-letter abbreviations, site names displayed vertically).

```
                    BBBKBBBJBBBHKVVBSJJSSS
                    EEENEEEARRRINOOEUAAUUU
                    RRRGRRRNAAASGLLRMNNMMM
                    GGGHGGGKDDDLHKKGPKKPPP
                    EEETEEEOLLLSTNSETOOTTT
                    RRRWRRRWYYYCRWEREWWEEE
                    456E2371123HD211R23RRR
                       T        G   3  125

 33 BIDCOR          1-1---1---1-----------  000000
 37 CALSEP          1-11--1---------------  000000
 38 CAMAPA          1-1-111---------------  000000
 45 CLAMAR          11-1-11-1-1-----------  000000
 89 GENCRI          1-1-111---------------  000000
106 IRIVIR          1111111-1-----1-------  000000
156 POLAMP          1111------------------  000000
217 TRIMAR          1----11---------------  000000
161 POTFRU          --1-111-1-1-----------  000001
  6 AGRPAR          ---1------------1-----  000010
 87 GALBOR          1-1---------1---1-----  000010
105 IMPCAP          11--------------1-----  000010
218 TYPANG          11-1-------1----1-----  000010
 82 EUPPER          1-1--11---11--1-1-----  000011
107 JUNBAL          --11--1------11-------  000011
132 LYCAME          1111--1-1-11--1-1-----  000011
187 SCIAME          111--------11---------  000011
 60 CXSTRI          11111111--------11----  00010
112 JUNEFF          1---11-1---------1----  00010
183 SALEXI          111---11------1--1----  00010
214 THEPAL          1---1-111-1-------1---  00010
 36 CALCAN          111111----11-11---1---  00011
 50 CORSTO          -111111-1---111-11----  00011
 83 EUTGRA          1111111111111111111---  00011
 96 HELGIG          ----111--1111---1----1  00011
 43 CIRDIS          --1--11-1-11111-1-1---  001000
 20 APOCAN          1-11--1-1-11111------1  001001
127 LIASPI          ----111-111111----1---  001001
134 LYSCIL          --1-111-1111111---1---  001001
202 SOLOHI          1----11-111111----1---  001001
203 SOLRID          ----1111111111----1---  001001
 53 CXAQUA          -11-------11-1--------  00101
 84 FRANIG          ---1--1---11--1-------  00101
 94 HELAUT          --1--11---11-11-------  00101
208 SPAPEC          1-111-----111111------  00101
 71 ELEOBT          ---1-------1--1-------  00110
109 JUNCAN          --11--111111111-1-----  00110
143 PANVIR          -----11----1111-------  00110
 15 ANECAN          ---------11-----------  001110
 88 GENAND          ---------111----1-----  001110
115 JUNTEN          -------1111--11-1-----  001110
229 VITAES          -----------1111-1-----  001110
 76 EQUHYE          -------1-11--1-111----  0100
224 VERMIS          -------1---1111-1----1  0100
 25 ASCSUL          -----------1--1---1---  010100
 26 ASCSYR          -----------1--1---1---  010100
139 MONFIS          --------1---1-----1---  010100
210 SPICER          ---------11-1---1-1--1  010100
213 THADAS          --------------1-11----  010100
129 LOBSPI          ------1-111---1--11---  010101
190 SCIPEN          --------111-----1-1---  010101
200 SOLCAN          --------111111111111--  010101
 29 ASTDUM          --------111---1-----1-  01011
227 VIRERI          --------1111-1----1---  01011
```

```
  1 ACERUB     1--11------1--1--11---  01100
 24 ASCINC     -------1-11-------1---  01100
160 POTANS     1-1---1-1111-11--11---  01100
  3 AGAPUR     1-1--1--111--11-1--1-1  011010
 12 ANDGER     ----111-11-11111--1111  011010
228 VIRNOV     ----111-1111-11-1-111-  011010
165 PYCVIR     ----111-1--1111--111--  011011
207 SORNUT     ----1111---11111-11-1-  011011
101 HYPKAL     ----111--------------1  0111
221 VACANG     -----11--------1----1-  0111
 86 FRAVIR     ----1---111-11-1-1-111  100
158 POPDEL     ------1--1-1--1-1--111  100
181 RUDHIR     -----1--1-11-111-11-11  100
 67 DAUCAR     -----------1--1--111--  10100
155 POACOM     --------11-1--11111111  10100
162 POTSIM     ---------------111-1--  10100
171 RHAFRA     -----------1-1---1--1-  10100
 13 ANDSCO     --------11-1-1---11111  10101
120 LACCAN     ---------11-----1-111-  10101
 16 ANECYL     --------1----------1--  10110
124 LESCAP     ---------1--1------111  10110
163 PRUSER     ----------1---------11  10110
 49 CORFOE     ----------1-------1-1-  10111
159 POPTRE     ----------1------1--1-  10111
177 RUBALL     --------1--------1-1--  10111
199 SOLALT     --11--1------1-----111  1100
 19 APOAND     ---1--------------1---  11010
141 ONOSEN     -------1--------111---  110110
189 SCICYP     -------1--------111---  110110
126 LIASCA     ----------------1--111  111000
 17 ANGVEN     -------------------11-  111001
 21 ARILON     --------------------11  111001
 22 ARINEC     -------------------111  111001
 66 DANSPI     -------------------111  111001
 93 GNAOBT     -------------------111  111001
172 RHUCOP     -------------------111  111001
  2 ACHMIL     -----------------1-11-  111010
 14 ANDVIR     -----------------1--11  111010
157 POLSAN     ------------------1111  111010
164 PTEAQU     ------------------111-  111010
174 RHYCAT     ------------------1-11  111010
185 SASALB     -----------------1-11-  111010
192 SCLTRI     ------------------1-11  111010
 51 CORTRP     ----------------111-11  111011
209 SPIALB     ----------------1-1-11  111011
  7 ALEFAR     -----------------1111-  11110
               00000000000000000011111
               00000000111111111100111
               00001111000000001
                       00000001
                       0001111
```

Appendix III

Element Ranking Criteria

Appendix III. 1. Global and State ranking critieria for plant, animal, and natural community occurrences, as established by The Nature Conservancy.

GLOBAL RANKS

- **G1** = critically imperiled globally because of extreme rarity (5 or fewer occurrences range-wide or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.
- **G2** = imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.
- **G3** = either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g. a single western state, a physiographic region in the East) or because of other factor(s) making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.
- **G4** = apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
- **G5** = demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
- **GH** = of historical occurrence throughout its range, i.e. formerly part of the established biota, with the expectation that it may be rediscovered (e.g. Bachman's Warbler).
- **GU** = possibly in peril range-wide, but status uncertain; need more information.
- **GX** = believed to be extinct throughout its range (e.g. Passenger Pigeon) with virtually no likelihood that it will be rediscovered.

STATE RANKS

- **S1** = critically imperiled in the state because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation in the state.
- **S2** = imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state.
- **S3** = rare or uncommon in state (on the order of 21 to 100 occurrences).
- **S4** = apparently secure in state, with many occurrences.
- **S5** = demonstrably secure in state and essentially ineradicable under present conditions.
- **SA** = accidental in state, including species (usually birds or butterflies) recorded once or twice or only at very great intervals, hundreds or even thousands of miles outside their usual range.
- **SE** = an exotic established in the state; may be native elsewhere in North America (e.g. house finch or catalpa in eastern states).
- **SH** = of historical occurrence in state and suspected to be still extant.
- **SN** = regularly occurring, usually migratory and typically nonbreeding species.
- **SR** = reported from state, but without persuasive documentation which would provide a basis for either accepting or rejecting the report.
- **SRF** = reported falsely (in error) from state but this error persisting in the literature.
- **SU** = possibly in peril in state, but status uncertain; need more information.
- **SX** = apparently extirpated from state.

Appendix III. 2. Element Occurrence Ranking Criteria for lakeplain prairies.

Lakeplain Prairie Complex: Lakeplain prairie systems have been lost and degraded via conversion to agriculture, residential and industrial development, alterations to 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 natural range of lakeplain prairie communities. Suppression of natural and cultural fires allow the community to succeed to shrub and forest communities.

Benchmark Quality Standard: At least 800 acres of prairie or oak opening must be contiguous and intact, A-ranked communities within a complex may contain less acreage. Alterations to hydrology must be minimal and some level of burning must have occurred during the past 20 years. No benchmark quality sites exist in Michigan but occur on Walpole Island, Ontario, Canada; in the Chicago region at Chiwaukee Prairie. The largest Michigan fragment is approximately 200 acres. Species diversity is relatively high even in small sites. Typically not less than 50 vascular plant species may be found.. Fragments that include only wet prairie or mesic prairie communities contain fewer vascular plant species than those that contain wet-mesic prairie or include a mix of types.

Element Occurrence Size-Class: Large: 800 or more acres; Moderate 100-800 acres; small 20-100 acres; very small less than 20 acres.

Boundary Mapping: Sites may contain only one community type but larger tracts typically include a mix of wet, wet-mesic, and mesic types. Preserve boundaries should attempt to address preservation of groundwater hydrology and sufficient buffers to facilitate prescribed burning.

Exemplary Michigan Occurrences: Bradleyville Road, Fish Point Wildlife Area, Tuscola County; Gieger-Haist Roads, Wildfowl Bay Wildlife Area, Huron County; St. Johns Marsh, St. Clair Flats Wildlife Area, St. Clair County; Algonac State Park, St. Clair County; Sibley Road Prairie, Brownstown Township, Wayne County; and Sumpter Township Prairie, Wayne County.

Lakeplain wet prairie: A-rank occurrence may have received only minimal historic disturbances. The site must have intact hydrology and have some evidence, either on site or documented, of periodic burning. A-rank includes at least 45 vascular plant species, including most of the type indicators.

Minimum Acres: A-rank, 200+ acres; B-rank 50-200 acres; C-rank 2-50 acres.

Boundary Mapping: Include small pockets of emergent marsh, sedge meadow, lakeplain wet-mesic prairie, lakeplain mesic prairie, and lakeplain oak opening. Preserve design should attempt to preserve groundwater hydrology and provide room for community migration during extended drought or flood.

Exemplary Occurrence: Berger Road, Fish Point Wildlife Area, Tuscola County; Gieger Road, Wildfowl Bay Wildlife Area, Huron County; St. Johns Marsh, St. Clair Flats Wildlife Area, St. Clair County.

Lakeplain wet-mesic prairie: A-ranked occurrence must have received only minimal historic disturbances. The site must have intact hydrology and have some evidence, either on site or documented, of periodic burning. A-rank includes at least 60 vascular plant species, including most of the type indicators (see description (MNFI no date)).

Minimum Acres: A-rank occurrence 250+ acres; B-rank 75-250 acres; C-rank 10-75 acres.

Boundary Mapping: May include small pockets of lakeplain wet prairie, lakeplain mesic prairie, lakeplain oak opening, old field, and small borrow pits. Preserve boundaries should address preservation of local ground water hydrology. Oak woodlands are the best natural buffers.

Exemplary Occurrences: Sibley Road Prairie, Brownstown Township, Wayne County; Bradleyville Road Prairie, Fish Point Wildlife Area, Huron County; Algonac State Park Prairie, Algonac State Park, St. Clair County.

Lakeplain mesic prairie: A-ranked occurrences have received only minimal historical disturbances. The site must have intact hydrology and have some evidence, either on site or documented, of periodic burning. A-rank includes at least 45 vascular plant species, including most of the type indicators.

Minimum Acres: A-rank occurrence is 50+ acres; B-rank 10-50 acres, C-rank 1-10 acres, D-rank 0.25-1.0 acre.

Boundary Mapping: This community will typically occur in conjunction with a lakeplain wet-mesic prairie and may be restricted to small sandy ridges and knolls within the complex. It may also form a transition zone between wet-mesic prairie and oak forest.

Exemplary Occurrences: Sumpter Township Prairie, Wayne County; Brest Road Prairie, Taylor City, Wayne County.

Appendix IV

Plant Lists and Floristic Assessment of Selected Lakeplain Prairies

Appendix IV. Selected Species Lists Representing Progessively Wetter to Drier Lakeplain Prairie Sites using Michigan's Florsitic Assessment Program (Herman et al. in prep).

Berger Road Prairie
Tuscola County, Akron Township
17 November 1994
MacKinnon
bergerrd.prn

FLORISTIC QUALITY DATA	NATIVE	95.5%	ADVENTIVE	4.5%
85 NATIVE SPECIES	5 Tree	5.6%	0 Tree	0.0%
89 Total Species	9 Shrub	10.1%	0 Shrub	0.0%
4.46 NATIVE MEAN C	0 Vine	0.0%	0 Vine	0.0%
4.26 W/Adventives	56 Forb	62.9%	2 Forb	2.2%
41.11 NATIVE FQI	8 Grass	9.0%	2 Grass	2.2%
40.17 W/Adventives	6 Sedge	6.7%	0 Sedge	0.0%
-2.3 NATIVE MEAN W	1 Fern	1.1%		
-2.3 W/Adventives				
AVG: FAC. WETLAND (-)				

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG	COMMON NAME
ACERUB	1	Acer rubrum	0	FAC	N Tree	red maple
AGAPUR	7	Agalinis purpurea	-3	FACW	N Forb	purple gerardia
AGRGIG	*	AGROSTIS GIGANTEA	0	fac	A Grass	redtop
ALLCAN	2	Allium canadense	3	FACU	N Forb	wild garlic
ANDGER	5	Andropogon gerardii	1	FAC-	N Grass	big bluestem grass;turkeyfoot
ANDSCO	5	Andropogon scoparius	3	FACU	N Grass	little bluestem grass
ANECAN	4	Anemone canadensis	-3	FACW	N Forb	Canada anemone
APOCAN	3	Apocynum cannabinum	0	FAC	N Forb	Indian hemp;hemp dogbane
APOSIB	3	Apocynum sibiricum	-1	FAC+	N Forb	clasping dogbane
ASTDUM	7	Aster dumosus	-1	FAC+	N Forb	bushy aster
BIDCER	3	Bidens cernua	-5	OBL	N Forb	nodding bur-marigold
BIDCOR	7	Bidens coronata	-5	OBL	N Forb	tall swamp-marigold
CALCAN	3	Calamagrostis canadensis	-5	OBL	N Grass	blue-joint grass
CALSEP	2	Calystegia sepium	0	FAC	N Forb	hedge bindweed
CAMAPA	7	Campanula aparinoides	-5	OBL	N Forb	marsh bellflower
CXAQUA	7	Carex aquatilis	-5	OBL	N Sedge	sedge
CXSTRI	4	Carex stricta	-5	OBL	N Sedge	sedge
CICMAC	4	Cicuta maculata	-5	OBL	N Forb	water hemlock
CIRDIS	4	Cirsium discolor	5	UPL	N Forb	pasture-thistle
CLAMAR	10	Cladium mariscoides	-4	facw+	N Sedge	twig-rush
COMUMB	5	Comandra umbellata	3	FACU	N Forb	bastard-toadflax
CORFOE	1	Cornus foemina	-2	FACW-	N Shrub	gray dogwood
CORSTO	2	Cornus stolonifera	-3	FACW	N Shrub	red-osier dogwood
ELEELL	6	Eleocharis elliptica	-3	FACW	N Sedge	golden-seeded spike rush
EPICOL	3	Epilobium coloratum	-5	OBL	N Forb	cinnamon willow-herb
ERIPHI	2	Erigeron philadelphicus	-3	FACW	N Forb	marsh fleabane
EUPPER	4	Eupatorium perfoliatum	-4	FACW+	N Forb	common boneset
EUTGRA	3	Euthamia graminifolia	-2	FACW-	N Forb	grass-leaved goldenrod
FRAVIR	2	Fragaria virginiana	1	FAC-	N Forb	wild strawberry
FRANIG	6	Fraxinus nigra	-4	FACW+	N Tree	black ash

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG	COMMON NAME
FRAPEN	2	Fraxinus pennsylvanica	-3	FACW	N Tree	red ash
GALBOR	3	Galium boreale	0	FAC	N Forb	northern bedstraw
GALTRD	6	Galium trifidum	-4	FACW+	N Forb	small bedstraw
GENCRI	8	Gentianopsis crinita	-4	FACW+	N Forb	fringed gentian
HELAUT	5	Helenium autumnale	-4	FACW+	N Forb	sneezeweed
HELGIG	5	Helianthus giganteus	-3	FACW	N Forb	tall sunflower
HYPKAL	10	Hypericum kalmianum	-2	FACW-	N Shrub	Kalm's St. John's-wort
IMPCAP	2	Impatiens capensis	-3	FACW	N Forb	spotted touch-me-not
IRIVIR	5	Iris virginica	-5	OBL	N Forb	southern blue flag
JUNALP	5	Juncus alpinus	-5	OBL	N Forb	rush
JUNBAL	4	Juncus balticus	-5	OBL	N Forb	rush
JUNCAN	6	Juncus canadensis	-5	OBL	N Forb	Canadian rush
JUNEFF	3	Juncus effusus	-5	OBL	N Forb	soft-stemmed rush
LATPA	7	Lathyrus palustris	-3	FACW	N Forb	marsh pea
LIASPI	8	Liatris spicata	0	FAC	N Forb	marsh blazing star
LOBSPI	4	Lobelia spicata	0	FAC	N Forb	pale spiked lobelia
LYCAME	2	Lycopus americanus	-5	OBL	N Forb	common water horehound
LYSCIL	4	Lysimachia ciliata	-3	FACW	N Forb	fringed loosestrife
LYSQUL	8	Lysimachia quadrifolia	-5	OBL	N Forb	whorled loosestrife
LYTALA	9	Lythrum alatum	-5	OBL	N Forb	winged loosestrife
MUHMEX	3	Muhlenbergia mexicana	-3	FACW	N Grass	leafy satin grass
PANVIR	4	Panicum virgatum	-1	FAC+	N Grass	switch grass
PHAARU	0	Phalaris arundinacea	-4	FACW+	N Grass	reed canary grass
PLALEU	10	Platanthera leucophaea <E>	-4	FACW+	N Forb	eastern prairie fringed orchid
POACOM	*	POA COMPRESSA	2	FACU+	A Grass	Canada bluegrass
POLAMP	6	Polygonum amphibium	-5	OBL	N Forb	water smartweed
POPDEL	1	Populus deltoides	-1	FAC+	N Tree	cottonwood
POPTRE	1	Populus tremuloides	0	FAC	N Tree	quaking aspen
POTANS	5	Potentilla anserina	-4	FACW+	N Forb	silverweed
POTFRU	10	Potentilla fruticosa	-3	FACW	N Shrub	shrubby cinquefoil
PYCVIR	5	Pycnanthemum virginianum	-4	FACW+	N Forb	common mountain mint
ROSPAL	5	Rosa palustris	-5	OBL	N Shrub	swamp rose
RUBHIS	4	Rubus hispidus	-3	FACW	N Shrub	swamp dewberry
RUDHIR	1	Rudbeckia hirta	3	FACU	N Forb	black-eyed Susan
RUMACL	*	RUMEX ACETOSELLA	0	FAC	A Forb	sheep or red sorrel
SALDIS	1	Salix discolor	-3	FACW	N Shrub	pussy willow
SALEXI	1	Salix exigua	-5	OBL	N Shrub	sandbar willow
SCIACU	5	Scirpus acutus	-5	OBL	N Sedge	hardstem bulrush
SCIAME	5	Scirpus americanus	-5	OBL	N Sedge	three-square;bulrush
SENAUR	5	Senecio aureus	-3	FACW	N Forb	golden ragwort
SENPLA	5	Senecio plattensis	4	FACU-	N Forb	prairie ragwort
SISMON	4	Sisyrinchium montanum	-1	FAC+	N Forb	mountain blue-eyed-grass
SMISTE	5	Smilacina stellata	1	FAC-	N Forb	starry false Solomon-seal
SOLALT	1	Solidago altissima	3	FACU	N Forb	tall goldenrod
SOLNEM	2	Solidago nemoralis	5	UPL	N Forb	old-field goldenrod
SOLOHI	8	Solidago ohioensis	-5	OBL	N Forb	Ohio goldenrod
SOLRID	6	Solidago riddellii	-5	OBL	N Forb	Riddell's goldenrod
SORNUT	6	Sorghastrum nutans	2	FACU+	N Grass	Indian grass
SPAPEC	5	Spartina pectinata	-4	FACW+	N Grass	cordgrass
SPICER	4	Spiranthes cernua	-2	FACW-	N Forb	nodding ladies'-tresses
STATEN	5	Stachys tenuifolia	-5	OBL	N Forb	smooth hedge nettle
TEUCAN	4	Teucrium canadense	-2	FACW-	N Forb	wood sage
THEPAL	2	Thelypteris palustris	-4	FACW+	N Fern	marsh fern
TRIMAR	8	Triglochin maritimum	-5	OBL	N Forb	common bog arrow-grass
TYPANG	*	TYPHA	-5	OBL	A Forb	narrow-leaved cat-tail

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG	COMMON NAME
		ANGUSTIFOLIA				
VACANG	4	Vaccinium angustifolium	3	FACU	N Shrub	blueberry
VERALT	4	Verbesina alternifolia	-3	FACW	N Forb	wingstem
VIRERI	3	Virgulus ericoides	4	FACU-	N Forb	heath aster
VIRNOV	3	Virgulus novae-angliae	-3	FACW	N Forb	New England aster

Thomas Road Prairie
Tuscola County, Akron Township
November 17, 1994
MacKinnon
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FLORISTIC QUALITY DATA		NATIVE		92.3%	ADVENTIVE		7.7%
84	NATIVE SPECIES	5	Tree	5.5%	0	Tree	0.0%
91	Total Species	8	Shrub	8.8%	1	Shrub	1.1%
4.64	NATIVE MEAN C	2	Vine	2.2%	0	Vine	0.0%
4.29	W/Adventives	42	Forb	46.2%	3	Forb	3.3%
42.55	NATIVE FQI	10	Grass	11.0%	3	Grass	3.3%
40.88	W/Adventives	14	Sedge	15.4%	0	Sedge	0.0%
-2.1	NATIVE MEAN W	3	Fern	3.3%			
-1.7	W/Adventives						
AVG:	FAC. WETLAND (-)						

ACRONYM	C	SCIENTIFIC NAME	W	.WETNESS	PHYSIOG.	COMMON NAME
AGAPUR	7	Agalinis purpurea	-3	FACW	N Forb	purple gerardia
AGRHYE	4	Agrostis hyemalis	1	FAC-	N Grass	ticklegrass
ANDGER	5	Andropogon gerardii	1	FAC-	N Grass	big bluestem grass; turkeyfoot
ANDSCO	5	Andropogon scoparius	3	FACU	N Grass	little bluestem grass
ANECYL	6	Anemone cylindrica	5	UPL	N Forb	thimbleweed
APIAME	3	Apios americana	-3	FACW	N Forb	groundnut;indian-potato
APOSIB	3	Apocynum sibiricum	-1	FAC+	N Forb	clasping dogbane
AROPRU	5	Aronia prunifolia	-3	FACW	N Shrub	black chokeberry
ARTCAR	*	ARTEMISIA CARRUTHII	5	upl	A Forb	Kansas mugwort
ASTLAT	2	Aster lateriflorus	-2	FACW-	N Forb	side-flowering aster
BIDCOR	7	Bidens coronata	-5	OBL	N Forb	tall swamp-marigold
BROCIL	6	Bromus ciliatus	-3	FACW	N Grass	fringed brome
BROINE	*	BROMUS INERMIS	5	UPL	A Grass	Hungarian brome;smooth brome
CALCAN	3	Calamagrostis canadensis	-5	OBL	N Grass	blue-joint grass
CALSEP	2	Calystegia sepium	0	FAC	N Forb	hedge bindweed
CXBUXB	10	Carex buxbaumii	-5	OBL	N Sedge	sedge
CXCOMO	5	Carex comosa	-5	OBL	N Sedge	sedge
CXHYST	2	Carex hystericina	-5	OBL	N Sedge	sedge
CXLACU	6	Carex lacustris	-5	OBL	N Sedge	sedge
CXLASI	10	Carex lasiocarpa	-5	OBL	N Sedge	sedge
CXMUHL	7	Carex muhlenbergii	5	UPL	N Sedge	sedge
CXPRAI	10	Carex prairea	-4	FACW+	N Sedge	sedge
CXSTRI	4	Carex stricta	-5	OBL	N Sedge	sedge
CASCOC	8	Castilleja coccinea	0	FAC	N Forb	Indian paintbrush
CHEALB	*	CHENOPODIUM ALBUM	1	FAC-	A Forb	lamb's quarters;"pigweed"
CICBUL	5	Cicuta bulbifera	-5	OBL	N Forb	water hemlock

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
CLAMAR	10	Cladium mariscoides	-5	OBL	N Sedge	twig-rush
COMUMB	5	Comandra umbellata	3	FACU	N Forb	bastard-toadflax
CORFOE	1	Cornus foemina	-2	FACW-	N Shrub	gray dogwood
CORSTO	2	Cornus stolonifera	-3	FACW	N Shrub	red-osier dogwood
ELAUMB	*	ELAEAGNUS UMBELLATA	3	facu	A Shrub	autumn-olive
ELEELL	6	Eleocharis elliptica	-3	FACW	N Sedge	golden-seeded spike rush
ELEERY	4	Eleocharis erythropoda	-5	OBL	N Sedge	spike-rush
ELEOBT	3	Eleocharis obtusa	-5	OBL	N Sedge	spike-rush
EQUARV	0	Equisetum arvense	0	FAC	N Fern	common or field horsetail
EQUHYE	2	Equisetum hyemale	-2	FACW-	N Fern	scouring rush
EREHIE	2	Erechtites hieracifolia	3	FACU	N Forb	fireweed
EUPPER	4	Eupatorium perfoliatum	-4	FACW+	N Forb	common boneset
EUTGRA	3	Euthamia graminifolia	-2	FACW-	N Forb	grass-leaved goldenrod
FRAVIR	2	Fragaria virginiana	1	FAC-	N Forb	wild strawberry
FRAPEN	2	Fraxinus pennsylvanica	-3	FACW	N Tree	red ash
GALBOR	3	Galium boreale	0	FAC	N Forb	northern bedstraw
HELGIG	5	Helianthus giganteus	-3	FACW	N Forb	tall sunflower
IRIVIR	5	Iris virginica	-5	OBL	N Forb	southern blue flag
JUNBIF	8	Juncus biflorus<SC>		-3	FACW N	forb two-flowered rush
JUNCAN	6	Juncus canadensis	-5	OBL	N Forb	Canadian rush
JUNEFF	3	Juncus effusus	-5	OBL	N Forb	soft-stemmed rush
LACCAN	2	Lactuca canadensis	2	FACU+	N Forb	tall lettuce
LATPAL	7	Lathyrus palustris	-3	FACW	N Forb	marsh pea
LIASPI	8	Liatris spicata	0	FAC	N Forb	marsh blazing star
LOBKAL	10	Lobelia kalmii	-5	OBL	N Forb	bog lobelia
LYCAME	2	Lycopus americanus	-5	OBL	N Forb	common water horehound
LYCUNI	2	Lycopus uniflorus	-5	OBL	N Forb	northern bugle weed
LYSQUL	8	Lysimachia quadrifolia	-5	OBL	N Forb	whorled or four-leaved loosestrife
LYSTER	6	Lysimachia terrestris	-5	OBL	N Forb	swamp candles
MONFIS	2	Monarda fistulosa	3	FACU	N Forb	wild bergamot
MUHGLO	10	Muhlenbergia glomerata	-4	FACW+	N Grass	marsh wild-timothy
PANVIR	4	Panicum virgatum	-1	FAC+	N Grass	switch grass
PHAARU	0	Phalaris arundinacea	-4	FACW+	N Grass	reed canary grass
PHLPRA	*	PHLEUM PRATENSE	3	FACU	A Grass	Timothy
POACOM	*	POA COMPRESSA	2	FACU+	A Grass	Canada bluegrass
POLAMP	6	Polygonum amphibium	-5	OBL	N Forb	water smartweed
POPTRE	1	Populus tremuloides	0	FAC	N Tree	quaking aspen
POTANS	5	Potentilla anserina	-4	FACW+	N Forb	silverweed
POTFRU	10	Potentilla fruticosa	-3	FACW	N Shrub	shrubby cinquefoil
POTSIM	2	Potentilla simplex	4	FACU-	N Forb	old-field or common cinquefoil
PRUPUM	8	Prunus pumila	5	UPL	N Shrub	sand cherry
PYCVIR	5	Pycnanthemum virginianum	-4	FACW+	N Forb	common mountain mint
QUEBIC	8	Quercus bicolor	-4	FACW+	N Tree	swamp white oak
QUEMAC	5	Quercus macrocarpa	1	FAC-	N Tree	bur oak
RHUTYP	2	Rhus typhina	5	UPL	N Tree	staghorn sumac
ROSPAL	5	Rosa palustris	-5	OBL	N Shrub	swamp rose
RUBFLA	1	Rubus flagellaris	4	FACU-	N Shrub	northern dewberry
SALPET	1	Salix petiolaris	-4	FACW+	N Shrub	slender or meadow willow
SCIACU	5	Scirpus acutus	-5	OBL	N Sedge	hardstem bulrush
SCIAME	5	Scirpus americanus	-5	OBL	N Sedge	three-square;bulrush
SENPAU	3	Senecio pauperculus	-1	FAC+	N Forb	balsam ragwort
SOLALT	1	Solidago altissima	3	FACU	N Forb	tall goldenrod
SOLOHI	8	Solidago ohioensis	-5	OBL	N Forb	ohio goldenrod
SOLRUG	3	Solidago rugosa	-1	FAC+	N Forb	rough goldenrod
SORNUT	6	Sorghastrum nutans	2	FACU+	N Grass	Indian grass
SPAPEC	5	Spartina pectinata	-4	FACW+	N Grass	cordgrass

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
TEUCAN	4	Teucrium canadense	-2	FACW-	N Forb	wood sage
THEPAL	2	Thelypteris palustris	-4	FACW+	N Fern	marsh fern
TOFGLU	10	Tofieldia glutinosa	-5	OBL	N Forb	false asphodel
TOXRAR	2	Toxicodendron radicans	-1	FAC+	N Vine	poison-ivy
TRIFRA	6	Triadenum fraseri	-5	OBL	N Forb	marsh St. John's-wort
TYPANG	*	TYPHA ANGUSTIFOLIA	-5	OBL	A Forb	narrow-leaved cat-tail
VIRERI	3	Virgulus ericoides	4	FACU-	N Forb	heath aster
VIRNOV	3	Virgulus novae-angliae	-3	FACW	N Forb	New England aster
VITRIP	3	Vitis riparia	-2	FACW-	N Vine	riverbank grape

Pipeline Prairie
Allegan County, Hamilton Township
November 17, 1994
MacKinnon
splpipel.doc

FLORISTIC QUALITY DATA		NATIVE		94.1%	ADVENTIVE		5.9%
64	NATIVE SPECIES	5	Tree	7.4%	0	Tree	0.0%
68	Total Species	10	Shrub	14.7%	0	Shrub	0.0%
5.70	NATIVE MEAN C0	0	Vine	0.0%	0	Vine	0.0%
5.37	W/Adventives	27	Forb	39.7%	3	Forb	4.4%
45.63	NATIVE FQI	9	Grass	13.2%	1	Grass	1.5%
44.26	W/Adventives	13	Sedge	19.1%	0	Sedge	0.0%
-1.4	NATIVE MEAN W	0	Fern	0.0%			
-1.1	W/Adventives						
AVG:	FACULTATIVE (+)						

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ALEFAR	10	Aletris farinosa	0	FAC	N Forb	colic root;stargrass
ANDGER	5	Andropogon gerardii	1	FAC-	N Grass	big bluestem grass;turkeyfoot
ANDSCO	5	Andropogon scoparius	3	FACU	N Grass	little bluestem grass
ANDVIR	4	Andropogon virginicus	1	FAC-	N Grass	broom-sedge
ARANUD	5	Aralia nudicaulis	3	FACU	N Forb	wild sarsaparilla
AROPRU	5	Aronia prunifolia	-3	FACW	N Shrub	black chokeberry
ASTDUM	7	Aster dumosus	-1	FAC+	N Forb	bushy aster
ASTLAE	5	Aster laevis	5	UPL	N Forb	smooth aster
ASTUMB	5	Aster umbellatus	-3	FACW	N Forb	tall flat-top white aster
BULCAP	5	Bulbostylis capillaris	2	FACU+	N Sedge	sedge
CALCAN	3	Calamagrostis canadensis	-5	OBL	N Grass	blue-joint grass
CXAQUA	7	Carex aquatilis	-5	OBL	N Sedge	sedge
CXBEBB	6	Carex bebbii	-5	OBL	N Sedge	sedge
CXLASI	10	Carex lasiocarpa	-5	OBL	N Sedge	sedge
CXLUPL	4	Carex lupulina	-5	OBL	N Sedge	sedge
CXSTRI	4	Carex stricta	-5	OBL	N Sedge	sedge
CORTRP	7	Coreopsis tripteris	0	FAC	N Forb	tall coreopsis
DIGSAN	*	DIGITARIA SANGUINALIS	3	FACU	A Grass	hairy crab grass
ECHTEN	10	Echinodorus tenellus<E>	-5	OBL	N Forb	dwarf burhead
ELEELL	6	Eleocharis elliptica	-3	FACW	N Sedge	golden-seeded spike rush
ELEENG	8	Eleocharis engelmannii <SC>	-3	FACW	N Sedge	Engelmann's spike-rush
ELETRI	10	Eleocharis tricostata<T>	-5	OBL	N Sedge	three-ribbed spike-rush
EUPPER	4	Eupatorium perfoliatum	-4	FACW+	N Forb	common boneset
EUTTEN	10	Euthamia tenuifolia	-3	facw	N Forb	coastal plain flat-topped goldenrod
FIMAUT	6	Fimbristylis autumnalis	-4	FACW+	N Sedge	sedge;fimbristylis
FRAVIR	2	Fragaria virginiana	1	FAC-	N	wild strawberry
GALPAR	*	GALINSOGA PARVIFLORA	5	upl	A Forb	quickweed
GAUPRO	5	Gaultheria procumbens	3	FACU	N Shrub	wintergreen
GAYBAC	7	Gaylussacia baccata	3	FACU	N Shrub	huckleberry

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
GENPUB	10	Gentiana puberulenta<E>	3	facu	N Forb	downy gentian
HYPMAJ	4	Hypericum majus	-3	FACW	N Forb	larger Canada St. John's-wort
JUNBIF	8	Juncus biflorus<SC>	-3	FACW	N Forb	two-flowered rush
JUNBRP	9	Juncus brachycarpus<T>	-3	FACW	N Forb	short-fruited rush
JUNDUD	1	Juncus dudleyi	0	FAC	N Forb	Dudley's rush
JUNSCI	9	Juncus scirpoides<T>	-4	FACW+	N Forb	round-headed rush
LIASPI	8	Liatris spicata	0	FAC	N Forb	marsh blazing star
LYCAME	2	Lycopus americanus	-5	OBL	N Forb	common water horehound
MOLVER	*	MOLLUGO VERTICILLATA	0	FAC	A Forb	carpet-weed
PANSPH	5	Panicum sphaerocarpon	3	FACU	N Grass	round-fruited panic grass
PANSPR	10	Panicum spretum	-5	UPL	N Grass	panic grass
PANVIR	4	Panicum virgatum	-1	FAC+	N Grass	switch grass
PINBAN	5	Pinus banksiana	3	facu	N Tree	jack pine
POLAMP	6	Polygonum amphibium	-5	OBL	N Forb	water smartweed
POPTRE	1	Populus tremuloides	0	FAC	N Tree	quaking aspen
POTSIM	2	Potentilla simplex	4	FACU-	N Forb	old-field or common cinquefoil
PYCVIR	5	Pycnanthemum virginianum	-4	FACW+	N Forb	common mountain mint
QUEALB	5	Quercus alba	3	FACU	N Tree	white oak
QUERUB	5	Quercus rubra	3	FACU	N Tree	red oak
QUEVEL	6	Quercus velutina	5	UPL	N Tree	black oak
RHYCAT	6	Rhynchospora capitellata	-5	OBL	N Sedge	beak-rush
ROTRAM	8	Rotala ramosior<SC>	-5	OBL	N Forb	tooth-cup
RUBFLA	1	Rubus flagellaris	4	FACU-	N Shrub	northern dewberry
RUBHIS	4	Rubus hispidus	-3	FACW	N Shrub	swamp dewberry
SALHUM	4	Salix humilis	3	FACU	N Shrub	upland or prairie willow
SALPET	1	Salix petiolaris	-4	FACW+	N Shrub	slender or meadow willow
SCICYP	5	Scirpus cyperinus	-5	OBL	N Sedge	wool-grass;bulrush
SCIHAL	10	Scirpus hallii<E>	-5	OBL	N Sedge	Hall's bulrush
SCUGAL	5	Scutellaria galericulata	-5	OBL	N Forb	common skullcap
SISALT	*	SISYMBRIUM ALTISSIMUM	3	FACU	A Forb	tumble mustard
SOLSPE	5	Solidago speciosa	5	UPL	N Forb	showy goldenrod
SORNUT	6	Sorghastrum nutans	2	FACU+	N Grass	Indian grass
SPAPEC	5	Spartina pectinata	-4	FACW+	N Grass	cordgrass
SPIALB	4	Spiraea alba	-4	FACW+	N Shrub	meadowsweet
SPITOM	5	Spiraea tomentosa	-3	FACW	N Shrub	hardhack;steeplebush
SPICER	4	Spiranthes cernua	-2	FACW-	N Forb	nodding ladies'-tresses
STAHYS	10	Stachys hyssopifolia	-4	FACW+	N Forb	hyssop hedge nettle
VACANG	4	Vaccinium angustifolium	3	FACU	N Shrub	blueberry
VIOLAN	8	Viola lanceolata	-5	OBL	N Forb	lance-leaved violet

King Road Prairie
Wayne County, Brownstown Township
17 November, 1994
MacKinnon
splkingr.doc

FLORISTIC QUALITY DATA		NATIVE			ADVENTIVE		
116	NATIVE SPECIES	10	Tree	7.8%	1	Tree	0.8%
128	Total Species	11	Shrub	8.6%	0	Shrub	0.0%
5.01	NATIVE MEAN C	2	Vine	1.6%	0	Vine	0.0%
4.54	W/Adventives	64	Forb	50.0%	8	Forb	6.3%
53.94	NATIVE FQI	14	Grass	10.9%	3	Grass	2.3%
51.35	W/Adventives	11	Sedge	8.6%	0	Sedge	0.0%
-0.5	NATIVE MEAN W	4	Fern	3.1%			
-0.3	W/Adventives						
AVG:	FACULTATIVE (+)						

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIO G.	COMMON NAME
ACERUB	1	Acer rubrum	0	FAC	N Tree	red maple
AGAPUR	7	Agalinis purpurea	-3	FACW	N Forb	purple gerardia
AGATEN	5	Agalinis tenuifolia	-3	FACW	N Forb	common gerardia
ALEFAR	10	Aletris farinosa	0	FAC	N Forb	colic root;stargrass
AMBART	0	Ambrosia artemisiifolia	3	FACU	N Forb	common ragweed
ANDGER	5	Andropogon gerardii	1	FAC-	N Grass	big bluestem grass; turkeyfoot
ANDSCO	5	Andropogon scoparius	3	FACU	N Grass	little bluestem grass
ANDVIR	4	Andropogon virginicus	1	FAC-	N Grass	broom-sedge
ANECAN	4	Anemone canadensis	-3	FACW	N Forb	canada anemone
ANGVEN	8	Angelica venenosa <SC>	3	facu	N forb	hairy Angelica
ANTNEG	3	Antennaria neglecta	5	upl	N Forb	cat's foot
APOCAN	3	Apocynum cannabinum	0	FAC	N Forb	Indian hemp; hemp dogbane
ARILON	6	Aristida longispica <T>	4	FACU-	N grass	three-awned grass
ARINEC	4	Aristida necopina	5	upl	N Grass	three-awned grass
ARIPUR	8	Aristida purpurascens	5	UPL	N Grass	three-awned grass
AROPRU	5	Aronia prunifolia	-3	FACW	N Shrub	black chokeberry
ASCINC	6	Asclepias incarnata	-5	OBL	N Forb	swamp milkweed
ASCSUL	9	Asclepias sullivantii <T>	5	UPL	N forb	Sullivant's milkweed
ASCSYR	1	Asclepias syriaca	5	UPL	N Forb	common milkweed
ASPOFF	*	ASPARAGUS OFFICINALIS	3	FACU	A Forb	asparagus
ASTLAN	2	Aster lanceolatus	-3	facw	N Forb	eastern lined aster
BAPTIN	10	Baptisia tinctoria	5	upl	N Forb	wild indigo
BROINE	*	BROMUS INERMIS	5	UPL	A Grass	Hungarian brome; smooth brome
CALCAN	3	Calamagrostis canadensis	-5	OBL	N Grass	blue-joint grass
CXGRAN	2	Carex granularis	-4	FACW+	N Sedge	sedge
CXSTIP	1	Carex stipata	-5	OBL	N Sedge	sedge
CICINT	*	CICHORIUM INTYBUS	5	UPL	A Forb	chicory
CIRDIS	4	Cirsium discolor	5	UPL	N Forb	pasture-thistle
CIRMUT	6	Cirsium muticum	-5	OBL	N Forb	swamp-thistle
CORTRP	7	Coreopsis tripteris	0	FAC	N Forb	tall coreopsis
CORAMO	2	Cornus amomum	-4	FACW+	N Shrub	silky or pale dogwood
CORSTO	2	Cornus stolonifera	-3	FACW	N Shrub	red-osier dogwood

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIO G.	COMMON NAME
CYPFIL	2	Cyperus filiculmis	4	FACU-	N Sedge	umbrella sedge
DAUCAR	*	DAUCUS CAROTA	5	UPL	A Forb	wild carrot;Queen-Anne's-lace
DESSES	8	Desmodium sessilifolium	5	UPL	N Forb	sessile-leaved tick-trefoil
ELEELL	6	Eleocharis elliptica	-3	FACW	N Sedge	golden-seeded spike rush
EQUHYE	2	Equisetum hyemale	-2	FACW-	N Fern	scouring rush
EUPMAM	4	Eupatorium maculatum	-5	OBL	N Forb	Joe-Pye weed
EUPPER	4	Eupatorium perfoliatum	-4	FACW+	N Forb	common boneset
EUTGRA	3	Euthamia graminifolia	-2	FACW-	N Forb	grass-leaved goldenrod
FIMAUT	6	Fimbristylis autumnalis	-4	FACW+	N Sedge	sedge;fimbristylis
FRAVIR	2	Fragaria virginiana	1	FAC-	N Forb	wild strawberry
GENCRI	8	Gentianopsis crinita	-4	FACW+	N Forb	fringed gentian
GENPRO	8	Gentianopsis procera	-5	OBL	N Forb	small fringed gentian
HELAUT	5	Helenium autumnale	-4	FACW+	N Forb	sneezeweed
HIELON	6	Hieracium longipilum	5	UPL	N Forb	long-bearded hawkweed
HIEPIA	*	HIERACIUM PILOSELLA	5	upl	A Forb	mouse-ear hawkweed
HYPCAN	6	Hypericum canadense	-3	FACW	N Forb	Canadian St. John's-wort
HYPKAL	10	Hypericum kalmianum	-2	FACW-	N Shrub	Kalm's St. John's-wort
HYPPRO	5	Hypericum prolificum	3	FACU	N Shrub	shrubby St.John's-wort
IRIVIR	5	Iris virginica	-5	OBL	N Forb	southern blue flag
JUNBIF	8	Juncus biflorus <SC>	-3	FACW	N forb	two-flowered rush
JUNBRP	9	Juncus brachycarpus <T>	-3	FACW	N forb	short-fruited rush
JUNCAN	6	Juncus canadensis	-5	OBL	N Forb	Canadian rush
JUNDUD	1	Juncus dudleyi	0	FAC	N Forb	Dudley's rush
JUNGRE	10	Juncus greenei	0	FAC	N Forb	Greene's rush
JUNVIR	3	Juniperus virginiana	3	FACU	N Tree	red-cedar
KRIBIF	5	Krigia biflora	3	FACU	N Forb	false dandelion
KRIVIR	4	Krigia virginica	5	UPL	N Forb	dwarf dandelion
LIACYL	5	Liatris cylindracea	5	UPL	N Forb	cylindrical blazing star
LIASCA	5	Liatris scariosa	5	upl	N Forb	northern blazing star
LIASPI	8	Liatris spicata	0	FAC	N Forb	marsh blazing star
LINMED	7	Linum medium	3	FACU	N Forb	small yellow flax
LOBKAL	10	Lobelia kalmii	-5	OBL	N Forb	bog lobelia
LOBSPI	4	Lobelia spicata	0	FAC	N Forb	pale spiked lobelia
LUDALT	8	Ludwigia alternifolia <T>	-5	OBL	N forb	seedbox
LYCAME	2	Lycopus americanus	-5	OBL	N Forb	common water horehound
LYTALA	9	Lythrum alatum	-5	OBL	N Forb	winged loosestrife
LYTSAL	*	LYTHRUM SALICARIA	-5	OBL	A Forb	purple loosestrife
MUHGLO	10	Muhlenbergia glomerata	-4	FACW+	N Grass	marsh wild-timothy
MUHUNI	8	Muhlenbergia uniflora	-5	OBL	N Grass	muhly grass
OENBIE	2	Oenothera biennis	3	FACU	N Forb	common evening-primrose
ONOSEN	2	Onoclea sensibilis	-3	FACW	N Fern	sensitive fern
OSMREG	5	Osmunda regalis	-5	OBL	N Fern	royal fern
PANLID	8	Panicum lindheimeri	-5	UPL	N Grass	panic grass
PANMER	7	Panicum meridionale	5	UPL	N Grass	mat panic grass
PANRIG	7	Panicum rigidulum	-3	FACW	N Grass	panic grass
PARQUI	5	Parthenocissus quinquefolia	1	FAC-	N Vine	Virginia creeper
PENHIR	5	Penstemon hirsutus	5	UPL	N Forb	hairy beard-tongue
PHAARU	0	Phalaris arundinacea	-4	FACW+	N Grass	reed canary grass
PHLPRA	*	PHLEUM PRATENSE	3	FACU	A Grass	Timothy
PLARUG	0	Plantago rugelii	0	FAC	N Forb	red-stalked plantain
PLAFLA	10	Platanthera flava	-3	FACW	N Forb	tubercled orchid
POACOM	*	POA COMPRESSA	2	FACU+	A Grass	Canada bluegrass
POLSAN	4	Polygala sanguinea	3	FACU	N Forb	field milkwort
POLRAM	7	Polygonum ramosissimum	1	FAC-	N Forb	bushy knotweed
POPDEL	1	Populus deltoides	-1	FAC+	N Tree	cottonwood
POPTRE	1	Populus tremuloides	0	FAC	N Tree	quaking aspen

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIO G.	COMMON NAME
POTSIM	2	Potentilla simplex	4	FACU-	N Forb	old-field or common cinquefoil
PROPAL	6	Proserpinaca palustris	-5	OBL	N Forb	mermaid-weed
PRUVUL	*	PRUNELLA VULGARIS	0	FAC	A Forb	lawn prunella
PRUAVI	*	PRUNUS AVIUM	5	upl	A Tree	sweet cherry
PRUSER	4	Prunus serotina	3	FACU	N Tree	wild black cherry
PYCVIR	5	Pycnanthemum virginianum	-4	FACW+	N Forb	common mountain mint
QUEPAL	8	Quercus palustris	-3	FACW	N Tree	pin oak
RHUGLA	2	Rhus glabra	5	UPL	N Tree	smooth sumac
RHUTYP	2	Rhus typhina	5	UPL	N Tree	staghorn sumac
RHYCAL	10	Rhynchospora capillacea	-5	OBL	N Sedge	beak-rush
RUBHIS	4	Rubus hispidus	-3	FACW	N Shrub	swamp dewberry
RUDHIR	1	Rudbeckia hirta	3	FACU	N Forb	black-eyed Susan
SALBEB	1	Salix bebbiana	-4	FACW+	N Shrub	Bebb's or beaked willow
SALHUM	4	Salix humilis	3	FACU	N Shrub	upland or prairie willow
SAPOFF	*	SAPONARIA OFFICINALIS	3	FACU	A Forb	bouncing bet; soapwort
SASALB	5	Sassafras albidum	3	FACU	N Tree	sassafras
SCICLI	10	Scirpus clintonii <T>	4-	FACU-	N sedge	Clinton's bulrush
SCICYP	5	Scirpus cyperinus	-5	OBL	N Sedge	wool-grass;bulrush
SCIPEN	3	Scirpus pendulus	-5	OBL	N Sedge	bulrush
SCISUB	8	Scirpus subterminalis	-5	OBL	N Sedge	bulrush
SCLTRI	10	Scleria triglomerata <SC>	0	FAC	N sedge	tall nut-rush
SIUSUA	5	Sium suave	-5	OBL	N Forb	water-parsnip
SOLJUN	3	Solidago juncea	5	UPL	N Forb	early goldenrod
SOLNEM	2	Solidago nemoralis	5	UPL	N Forb	old-field goldenrod
SOLRID	6	Solidago riddellii	-5	OBL	N Forb	Riddell's goldenrod
SOLRUG	3	Solidago rugosa	-1	FAC+	N Forb	rough goldenrod
SOLSPE	5	Solidago speciosa	5	UPL	N Forb	showy goldenrod
SORNUT	6	Sorghastrum nutans	2	FACU+	N Grass	Indian grass
SPIALB	4	Spiraea alba	-4	FACW+	N Shrub	meadowsweet
SPITOM	5	Spiraea tomentosa	-3	FACW	N Shrub	hardhack; steeplebush
SPICER	4	Spiranthes cernua	-2	FACW-	N Forb	nodding ladies'-tresses
THEPAL	2	Thelypteris palustris	-4	FACW+	N Fern	marsh fern
TYPANG	*	TYPHA ANGUSTIFOLIA	-5	OBL	A Forb	narrow-leaved cat-tail
ULMAME	1	Ulmus americana	-2	FACW-	N Tree	American elm
VACPAL	9	Vaccinium pallidum	5	upl	N Shrub	blueberry
VERHAS	4	Verbena hastata	-4	FACW+	N Forb	blue vervain
VERMIS	4	Vernonia missurica	-1	FAC+	N Forb	Missouri ironweed
VIRERI	3	Virgulus ericoides	4	FACU-	N Forb	heath aster
VITAES	6	Vitis aestivalis	3	FACU	N Vine	summer grape
XYRTOR	10	Xyris torta	-5	OBL	N Forb	yellow-eyed-grass

Brest Road Prairie
Wayne County, City of Taylor
17 November, 1994
MacKinnon
splbrest.doc

FLORISTIC QUALITY DATA		NATIVE			ADVENTIVE		
				91.4%			8.6%
74	NATIVE SPECIES	10	Tree	12.3%	1	Tree	1.2%
81	Total Species	7	Shrub	8.6%	1	Shrub	1.2%
4.59	NATIVE MEAN C	1	Vine	1.2%	0	Vine	0.0%
4.20	W/Adventives	41	Forb	50.6%	4	Forb	4.9%
39.52	NATIVE FQI	8	Grass	9.9%	1	Grass	1.2%
37.78	W/Adventives	5	Sedge	6.2%	0	Sedge	0.0%
-0.0	NATIVE MEAN W	2	Fern	2.5%			
0.2	W/Adventives						
AVG:	FACULTATIVE						

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
ACERUB	1	Acer rubrum	0	FAC	N Tree	red maple
ACESAI	2	Acer saccharinum	-3	FACW	N Tree	silver maple
ACHMIL	*	ACHILLEA MILLEFOLIUM	3	FACU	A Forb	yarrow
AGAPUR	7	Agalinis purpurea	-3	FACW	N Forb	purple gerardia
AGATEN	5	Agalinis tenuifolia	-3	FACW	N Forb	common gerardia
AGRPAR	4	Agrimonia parviflora	-1	FAC+	N Forb	swamp agrimony
ALEFAR	10	Aletris farinosa	0	FAC	N Forb	colic root;stargrass
ANDGER	5	Andropogon gerardii	1	FAC-	N Grass	big bluestem grass;turkeyfoot
ANDSCO	5	Andropogon scoparius	3	FACU	N Grass	little bluestem grass
ANDVIR	4	Andropogon virginicus	1	FAC-	N Grass	broom-sedge
ARILON	6	Aristida longispica <T>	4	FACU-	N Grass	three-awned grass
ARINEC	4	Aristida necopina	5	upl	N Grass	three-awned grass
ASCTUB	5	Asclepias tuberosa	5	UPL	N Forb	butterfly-weed
ASTDUM	7	Aster dumosus	-1	FAC+	N Forb	bushy aster
CXGRAN	2	Carex granularis	-4	FACW+	N Sedge	sedge
CICINT	*	CICHORIUM INTYBUS	5	UPL	A Forb	chicory
CIRDIS	4	Cirsium discolor	5	UPL	N Forb	pasture-thistle
CORTRP	7	Coreopsis tripteris	0	FAC	N Forb	tall coreopsis
CORFOE	1	Cornus foemina	-2	FACW-	N Shrub	gray dogwood
CORSTO	2	Cornus stolonifera	-3	FACW	N Shrub	red-osier dogwood
CYPFLA	5	Cyperus flavescens <SC>	-5	OBL	N Sedge	sedge
DANSPI	4	Danthonia spicata	5	UPL	N Grass	poverty grass; oatgrass
DAUCAR	*	DAUCUS CAROTA	5	UPL	A Forb	wild carrot; Queen-Anne's-lace
EQUFLU	7	Equisetum fluviatile	-5	OBL	N Fern	water horsetail
EQUHYE	2	Equisetum hyemale	-2	FACW-	N Fern	scouring rush
EUPALT	0	Eupatorium altissimum	3	FACU	N Forb	tall boneset
EUPPER	4	Eupatorium perfoliatum	-4	FACW+	N Forb	common boneset
FRAVIR	2	Fragaria virginiana	1	FAC-	N Forb	wild strawberry
GENCRI	8	Gentianopsis crinita	-4	FACW+	N Forb	fringed gentian
GNAOBT	2	Gnaphalium obtusifolium	5	UPL	N Forb	old-field balsam
HELDIV	5	Helianthus divaricatus	5	UPL	N Forb	woodland sunflower
HELGIG	5	Helianthus giganteus	-3	FACW	N Forb	tall sunflower

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOG.	COMMON NAME
HYPGEN	6	Hypericum gentianoides <SC>	3	FACU	N Forb	orange grass
HYPKAL	10	Hypericum kalmianum	-2	FACW-	N Shrub	Kalm's St. John's-wort
IRIVIR	5	Iris virginica	-5	OBL	N Forb	southern blue flag
JUNBIF	8	Juncus biflorus <SC>	-3	FACW	N Forb	two-flowered rush
JUNCAN	6	Juncus canadensis	-5	OBL	N Forb	Canadian rush
JUNTEN	1	Juncus tenuis	0	FAC	N Forb	roadside rush; path rush
JUNVIR	3	Juniperus virginiana	3	FACU	N Tree	red-cedar
LECMIN	9	Lechea minor <SC>	5	UPL	N Forb	small pinweed
LESCAP	5	Lespedeza capitata	3	FACU	N Forb	round-headed bush-clover
LIASPI	8	Liatris spicata	0	FAC	N Forb	marsh blazing star
LUDALT	8	Ludwigia alternifolia <T>	-5	OBL	N Forb	seedbox
LYSQUL	8	Lysimachia quadrifolia	-5	OBL	N Forb	whorled loosestrife
MONFIS	2	Monarda fistulosa	3	FACU	N Forb	wild bergamot
OENBIE	2	Oenothera biennis	3	FACU	N Forb	common evening-primrose
PASCIL	4	Paspalum ciliatifolium	5	UPL	N Grass	hairy lens grass
PENDIG	2	Penstemon digitalis	1	FAC-	N Forb	foxglove beard-tongue
PHLMAC	10	Phlox maculata <T>	-4	FACW+	N Forb	Sweet William phlox
PHYOPU	4	Physocarpus opulifolius	-2	FACW-	N Shrub	ninebark
PLALAN	*	PLANTAGO LANCEOLATA	0	FAC	A Forb	english plantain
PLAOCC	7	Platanus occidentalis	-3	FACW	N Tree	sycamore
POACOM	*	POA COMPRESSA	2	FACU+	A Grass	Canada bluegrass
POLPOL	9	Polygala polygama	4	FACU-	N Forb	racemed milkwort
POLSAN	4	Polygala sanguinea	3	FACU	N Forb	field milkwort
POPDEL	1	Populus deltoides	-1	FAC+	N Tree	cottonwood
POPTRE	1	Populus tremuloides	0	FAC	N Tree	quaking aspen
POTSIM	2	Potentilla simplex	4	FACU-	N Forb	old-field or common cinquefoil
PYCVIR	5	Pycnanthemum virginianum	-4	FACW+	N Forb	common mountain mint
QUEPAL	8	Quercus palustris	-3	FACW	N Tree	pin oak
QUEVEL	6	Quercus velutina	5	UPL	N Tree	black oak
RHAFRA	*	RHAMNUS FRANGULA	-1	FAC+	A Shrub	glossy buckthorn
RHYCAT	6	Rhynchospora capitellata	-5	OBL	N Sedge	beak-rush
ROBPSE	*	ROBINIA PSEUDOACACIA	4	FACU-	A Tree	black locust
RUDHIR	1	Rudbeckia hirta	3	FACU	N Forb	black-eyed Susan
SALEXI	1	Salix exigua	-5	OBL	N Shrub	sandbar willow
SASALB	5	Sassafras albidum	3	FACU	N Tree	sassafras
SCIATR	3	Scirpus atrovirens	-5	OBL	N Sedge	bulrush
SCLTRI	10	Scleria triglomerata<SC>	0	FAC	N Sedge	tall nut-rush
SOLALT	1	Solidago altissima	3	FACU	N Forb	tall goldenrod
SOLCAN	1	Solidago canadensis	3	FACU	N Forb	Canada goldenrod
SOLRUG	3	Solidago rugosa	-1	FAC+	N Forb	rough goldenrod
SORNUT	6	Sorghastrum nutans	2	FACU+	N Grass	Indian grass
SPITOM	5	Spiraea tomentosa	-3	FACW	N Shrub	steeplebush
ULMAME	1	Ulmus americana	-2	FACW-	N Tree	American elm
VACANG	4	Vaccinium angustifolium	3	FACU	N Shrub	blueberry
VERMIS	4	Vernonia missurica	-1	FAC+	N Forb	Missouri ironweed
VIOSAG	8	Viola sagittata	-2	FACW-	N Forb	arrow-leaved violet
VIRERI	3	Virgulus ericoides	4	FACU-	N Forb	heath aster
VIRNOV	3	Virgulus novae-angliae	-3	FACW	N Forb	New England aster
VITAES	6	Vitis aestivalis	3	FACU	N Vine	summer grape

Appendix V

Selected Rare Plant Abstracts

Asclepias hirtella (Pennell) Woodson — Tall green milkweed

Asclepiadaceae — Milkweed Family

State Threatened

Synonyms: Acerates hirtella Pennell; Asclepias floridana Lam.; Acerates f. (Lam.) A.S. Hitchc.

Taxonomy: This species was included by some early authors (Gray, Britton & brown) with A. longifolia and A. floridana. Woodson, (1954) however, separated them on the basis of range and distinctness in the field; modern treatments follow Woodson's interpretation.

Total range: This milkweed ranges from Virginia north to southern Ontario and Michigan and west to southern Minnesota, northern Iowa, Oklahoma and Arkansas. It is considered threatened in Minnesota and rare in Ontario and Louisiana (S1 rank).

State distribution: Tall green milkweed has been found in prairies of southwestern and southeastern Michigan and Saginaw Bay. Of 19 Michigan stations for this species, twelve have been discovered or confirmed extant since 1980. Tuscola and Muskegon County records date from the turn of the century. Most colonies consist of only one or a few plants and/or grow in very small, vulnerable habitats. At least two occurrences have been extirpated.

Recognition: This stout, erect (4-10 dm) plant produces long (1-2 dm), **narrow (.6-1 cm), mostly alternate leaves** which are **stiffly hairy.** The green to slightly purple-tinged flowers are borne in **spherical umbels of 30-100** from the leaf axils. Aclepias viridiflora in contrast, has broader, short-hairy, mostly opposite leaves, and is often partly leaning or reclining. Asclepias hirtella is also our only milkweed whose **flowers lack a "horn"**, a slender, curved structure that emerges from within the corolla hood.

Habitat: Tall green milkweed has been found in both lakeplain wet-mesic prairies (Saginaw Bay) and in mesic sand prairies. In southwest Michigan it grows in mesic to dryish sandy loam with Baptisia leucantha (white false indigo), Andropogon scoparius (little bluestem), A. gerardii (big bluestem) and Carex bicknellii (Bicknell's sedge). In the lakeplain prairies along Saginaw Bay, it is found in mesic to wet-mesic prairie on moist, alkaline clay or fine sandy loam with Sorghastrum nutans (Indian grass), and Andropogon gerardii (big bluestem), Calamagrostis canadensis (bluejoint), and Pycnanthemum virginianum (mountain mint). In Monroe County, it grows in mesic to dry-mesic prairie on Gilford sandy loam (pH 5.4) dominated by Andropogon scoparius.

Biology: This perennial blooms primarily from mid-July to Mid-August in Michigan. Several species of bees and wasps (and one beetle) effect pollination of A. hirtella and other milkweeds by picking up pollinia (pollen sacs) on their claws or leg bristles while gathering nectar and quite precisely depositing them into slots leading to the stigmatic surfaces of flowers visited subsequently (Woodson, 1954). Attached to milkweed seeds are long silky hairs which aid in wind dispersal as well as buoyancy in water (Woodson, 1954).

Conservation/management: Conservation of remaining native prairie remnants is needed to ensure this species' survival in Michigan. Though much of its habitat was destroyed by the plowing of prairies

around 1900 (it was reported once abundant in Tuscola County by Davis, 1901), this species is most threatened nowadays by succession and by bulldozing and herbiciding of prairie remnants, especially along roads. Proper management of its habitat would require periodic burning, and maintanence of the water table; degraded sites may require shrub or tree clearing. One plant was found in 1980 on a Michigan Nature Association preserve, and it also occurs in two State Game Areas.

Comments: The seed floss ("fluff") of plants in this genus was used by American colonists as pillow stuffing, and was extensively collected by school children during World War II for use in stuffing life-preservers (Woodson, 1954).

Selected references:

Woodson, R. E. 1954. The North American species of Asclepias (L.). Ann. Missouri Bot. Gard. 41(1): 1-171.

Asclepias sullivantii Engelm. — Sullivant's milkweed

Asclepiadaceae — Milkweed family

State Threatened

Other common names: Smooth milkweed, prairie milkweed.

Total range: This prairie species is concentrated in the Midwest, ranging north to Minnesota, east to southern Ontario and Ohio, west to Nebraska, Kansas, and south to Oklahoma. It is considered rare in Minnesota (S1 rank), Wisconsin (S1-2), and Ontario, and is known only from historical records in North Dakota.

State distribution: Sullivant's milkweed is known from about fifteen sites in Monroe, Lenawee, and St. Clair counties. Although it was reported by Davis (1906) to be "very abundant" in the lakeplain prairies of Tuscola County, extensive surveys there in recent years have failed to discover a single surviving colony. A Berrien County report (Kohring, pers. comm.) remains unconfirmed. of Michigan's colonies consist of small numbers of individuals persisting and/or occupy highly disturbed sites.

Recognition: Stems of A. sullivantii, which arise from deep, fleshy rhizomes, reach 4-11 dm in height. This species strongly resembles common milkweed, A. syriaca (also a native species but mistakenly considered exotic), both having broadly **ovate, opposite leaves, milky sap,** and dense, **globose clusters of flowers** borne from upper leaf axils. However, mature leaves of A. sullivantii are distinguished by their **reddish midvein, slightly undulate margins, sharp tips, and lack of hair**. In contrast, the common milkweed has blunt-tipped leaves which are densely pubescent beneath when mature). The flowers of A. sullivantii are also larger and **pale pink to nearly white** in color, whereas those of A. syriaca are pink to dark purple (rarely white) and tend to be much more numerous in very dense inflorescences.

Habitat: Michigan colonies of this plant occur primarily in disturbed habitats such as old-fields with secondary prairies, and moist, grassy rights-of-way. At one St. Clair county locality, Andropogon scoparius (little bluestem) and Hypericum kalmianum (shrubby cinquefoil) dominate a secondary prairie with Scleria triglomerata (tall nut-rush), Calopogon tuberosus (grass pink), Baptisia tinctoria (yellow wild indigo), Polygala sanguinea (milkwort), Aletris farinosa (colic root), and Aster dumosus. The only known Mighigan site where Sullivant's milkweed grows in an undisturbed habitat is a small lakeplain wet prairie remnant of the St. Clair River delta, dominated by Andropogon gerardii (big bluestem), A. scoparius, and Panicum virgatum (swithchgrass). (Hayes, 1964) Common associates at several sites include Spartina pectinata (prairie slough grass), and Pycnanthemum virginianum (mountain mint). Soils are typically moist sandy clay or sandy loam.

Elsewhere in its range, A. sullivantii is primarily a plant of moist prairies. In the Chicago region, it grows with such species as Andropogon gerardii, Aster ericoides (heath aster), Eryngium yuccifolium (rattlesnake master), Ratibida pinnata (yellow coneflower), Silphium laciniatum (compass plant), and Spartina pectinata (Swink and Wilhelm 1979).

Biology: This species is a perennial from deep, fleshy rhizomes, and vegetative reproduction is common. Flowers are produced by mid-July with fruits maturing through August. As in other species of Asclepias, the flowers are highly modified for insect pollination. Sullivant's milkweed easily hybridizes with the common milkweed, these two species having been isolated in pre-settlement times by habitat specificity. However, the highly disturbed condition of remaining prairie remnants has allowed the weedy common milkweed to colonize, bringing these two taxa into contact. One Michigan population of over 100 A. sullivantii stems has now been genetically degraded through hybridization and introgression with the common milkeed.

Conservation/management: Small populations which persist in degraded, disturbed, and/or marginal habitats are difficult to protectively manage. Also, the low numbers of individuals present at these sites may not be enough to maintain viable populations. Possible hybridization with A. syriaca may further genetically erode and diminish poorly insulated populations in disturbed habitats. However, small surviving colonies may be valuable as a source of stock for establishment or enhancement of sustainable populations.

Michigan's most viable colonies lie on State Park and Game Area lands in St. Clair County. One smaller population inhabits a small remnant of excellent quality prairie being voluntarily protected under the Nature Conservancy's Natural Areas Registry. Prescribed burning is probably the best way to favorably manage habitat for this species. Applications of herbicides should be avoided along rights-of-way where this milkweed grows.

Comments: This species of milkweed has been reputed to have a particulary high content of rubber in its milky latex, and has been investigated for usefulness in rubber production (Fox, 1944).

Selected references:

Fox, W. S. 1944. Botanical field notes--summer of 1943. Canad. Field-Nat. 58: 10-11.

Hayes, B. N. 1964. An ecological study of a wet prairie on Harsens Island, Michigan. Mich. Bot. 3: 71-82.

Woodson, R. E., Jr. 1954. The North American species of Asclepias L. Ann. Miss. Bot. Gard. 41: 1-208.

Cacalia plantaginea (Raf.) Shinners — Prairie Indian plantain

Asteraceae — Aster Family

State Threatened

Other common names: Tuberous Indian plantain.

Synonyms: Cacalia tuberosa Nutt.

Total range: The prairie Indian plantain ranges from Alabama and eastern Texas north to Nebraska, Minnesota, and southern Ontario. It is considered rare in Ohio (S2 rank), Wisconsin (S2), Minnesota, South Dakota, and Ontario.

State distribution: This species is confined largely to a few counties of southwestern Michigan, where it has been found at some 25 localities, most still extant. Several populations are known in Lenawee County as well. On Saginaw Bay, it has been reduced to just two known populations, both rather small. Vigorous local populations are disjunct on the shores of Lake Huron in Presque Isle County and on Bois Blanc Island (Mackinac County). A Macomb County records dates from 1843, the vicinity of its collection having been long since converted to agriculture.

Recognition: Stems of C. plantaginea, which may range from 6-18 dm in height, are smooth, finely grooved, and stout, arising from **short, tuberous-like, fleshy roots**. Its thick, elliptical, alternate leaves are **long-stalked** toward the stem base, with **conspicuous longitudinal nerves that converge at the tip**. Upward the leaves become reduced and stalkless. **Whitish flowers** are borne terminally in relatively **flat-topped, branched clusters of** perhaps 20 or more narrowly cylindric heads, each with 5 tubular disc flowers and no ray flowers. The related C. atriplicifolia bears a very similar inflorescence but is easily distinguished by its broadly ovate, coarsely-toothed leaves with pale undersurfaces.

Habitat: This plant occurs in three similar habitats in the state. Southern Michigan populations inhabit high quality prairie fens on the margins of major morainal areas with rich organic soils saturated by seepage of calcareous groundwater. Predominant species in these fens include Carex stricta, Andropogon gerardii (big bluestem), Sorghastrum nutans (Indian grass), Potentilla fruticosa (shrubby cinquefoil), Eleocharis rostellata (beaked spike-rush), Calamagrostis canadensis (bluejoint), and/or Spartina pectinata (prairie cordgrass). Common forbs are Solidago ohioensis (Ohio goldenrod), Lobelia kalmii (Kalm's lobelia), and Lysimachia quadriflora (fringed loosestrife).

The wet and wet-mesic prairies of the Saginaw Bay lakeplain provided significant habitat for this species prior to European settlement, however only two small populations are now known to remain. At these localities, moist, calcareous loamy sands support diverse communities dominated by Spartina and Calamagrostis canadensis in wetter areas, and Sorghastrum and Andropogon in mesic portions. Pycnanthemum virginianum (mountain mint) is a common associate in these communities.

Prairie Indian plantain also grows in marly swales near the shores of Lake Huron with Calamagrostis canadensis (bluejoint) and ... It exists in similar habitats on the Bruce Peninsula of Ontario (Stebbins, 1935). Throughout its range, this species primarily inhabits wet prairies, preferring fens only toward the northern and eastern portions of its distribution.

Biology: This perennial has fleshy roots that are not, contrary to one of its names, tuberous (Shinners, 1950). It flowers in July and its fruits ripen during August.

Conservation/management: Two southwestern Michigan populations of prairie Indian plantain--one large and one very small--lie in specially designated tracts within State Game Areas, and another is in a State Recreation Area. Both northern disjunct localities are also on state land. Three large southern populations are in fens owned by The Nature Conservancy, and one is partly owned by the Michigan Nature Association. Several large populations lie on private lands.

The fen habitat of this plant is vulnerable to hydrologic disturbances, and requires fire to prevent encroachment of shrubs, which shade out this and other herbaceous species.

Selected references:

Pippen, R. W. 1978. Cacalia in "North American Flora," Series II, Part 10, pgs. 151-159. N.Y. Botanical Garden, Bronx.

Pippen, R. W. & K. A. Chapman. 19--. Comparison of morphological characters between regional habitats of Cacalia plantaginea (Asteraceae). in ...

Shinners, L. H. 1950. The Texas species of Cacalia (Compositae). Field and Lab. 18: 79-83.

Cypripedium candidum Willd. White lady-slipper

Orchidaceae Orchid Family

State Threatened

Other common names: Small white lady's-slipper.

Total range: This principally upper Midwestern species ranges eastward to New Jersey and New York, extending west through southern Michigan to Minnesota, the eastern Dakotas, and southern Manitoba and Sakatchewan. To the south it ranges to Nebraska, Missouri, and Kentucky. It is considered rare in Iowa (S1), Illinois (S3), Indiana (S2), Kentucky (S1), Minnesota (S3), North Dakota (S2S3), New York (S1), Ohio (S1), South Dakota (S1), Wisconsin, and Manitoba, extirpated in Pennsylvania and Saskatchewan, and is known only from historical records in Missouri and New Jersey.

State distribution: White lady-slipper is restricted to southern Michigan, occurring primarily within a narrow band from Berrien and Kalamazoo counties in the southwest to southeastern Michigan, where it is concentrated in Livingston, Oakland, Washtenaw, and Jackson counties. Two localities in the thumb region constitute the northernmost occurrence in the state. At least one-third of approximately 70 recorded localities have extant populations, a few consisting of several hundred individuals.

Recognition: Although Cypripedium candidum produces solitary stems, mature plants commonly form **small, dense, clonal clumps**. This relatively diminutive lady's-slipper averages about 20 cm in height, each stem producing several strongly-ribbed, sheathing leaves that are densely short-hairy. Stems are usually terminated by a single flower (occasionally there may be two) characterized by its **ivory-white pouch** (the lip or lower petal) which may be faintly streaked with purple veins toward the bottom and slightly purple-spotted around the pouch opening. The lateral petals, which are similar the sepals, are pale yellow-green and **spirally twisted**.

Cypripedium candidum is likely to be confused only with hybrids between it and the two well-known varieties of yellow lady's-slipper, C. calceolus var. pubescens, and C. calceolus var. parviflorum, which produce C. Xfavillianum and C. Xandrewsii, respectively. Cypripedium Xfavillianum can be distinguished by its larger size and very pale yellow lip, whereas C. Xandrewsii, which produces a very similar white lip, can be distinguished by the dark, strongly spiralling petals and sepals characteristic of var. parviflorum.

Habitat: In Michigan, small white lady-slipper occurs primarily in prairie fens and other marly, alkaline sites usually associated with groundwater seepage areas in ice disintegration terrain. These graminoid-dominated peatlands are commonly found adjacent to lake and stream systems. Cypripedium candidum also occurs in wet prairie in southwestern Michigan (also its habitat in the thumb region), which is similar to its typical habitat--tallgrass prairie--outside Michigan. Case (1987) also reports that it has been found in damp depressions in limestone barrens in Kentucky. Typical prairie fen soils in Michigan are Houghton mucks, often forming deep organic deposits. Common associates of white lady's-slipper include Andropogon gerardii (big bluestem), Sorghastrum nutans (Indian grass), Potentilla fruticosa (shrubby cinquefoil), Carex stricta (sedge), Betula pumila (bog birch), Thelypteris palustris (marsh fern), Valeriana uliginosa and V. ciliata

(valerian), Sporobolus heterolepis (prairie dropseed), Muhlenbergia richardsonis (mat muhly), Solidago ohioensis (Ohio goldenrod), S. riddellii (Riddell's goldenrod), Pycnanthemum virginianum (mountain mint), Rhamnus alnifolia (alder-leaved buckthorn), Hierochloe odorata (sweet grass), and numerous other species typical of southern Michigan fens, including several additional listed taxa.

Biology: Flowering occurs in late June to early July. Case (1987) and Luer (1975) both report that this perennial species develops rapidly, often blooming before the leaves have fully flushed and unwrapped the stems. Curtis (1943) estimated that at least 12 years or more are necessary for maturation following germination, and observed that clones are formed through the production of small plants from adventitious buds on two to three-year old roots. Curtis (1954) also documented the marked variation in flower and fruit production from year to year, and found no correlation between average flower and fruit production and the relative abundance of this species in the vegetation in comparison to other lady-slipper species. In a pollination study in southern Ontario, Catling and Knerer (1980) found small bees (halictine and andrenid bees) to be the principal pollinators. These bees were dependent on the availability of a variety of other flowering species whose blooming period coincided with Cypripedium candidum.

Conservation/management: Exemplary occurrences are protected and managed by several conservation organizations, including The Nature Conservancy and the Michigan Nature Association, but many sites have been severely disturbed or destroyed through agricultural activities, peat or marl mining, land drainage, and other human activities. Prevention of hydrological changes is a necessary prerequisite for maintaining viable fen habitat. Exotic species threaten many fen sites, the most notable pests being Rhamnus frangula (glossy-leaved buckthorn) and Lythrum salicaria (purple loosestrife). Careful fire management has been recommended for both shrub control and the healthy maintenance of populations (Bowles, 1983). Kohring (1981) observed the favorable response of a population following a planned burn in a railroad right-of-way, noting that the number of blooming plants tripled and plant vigor increased.

Selected references:

Bowles, M. L. 1983. The tallgrass prairie orchids Platanthera leucophaea (Nutt.) Lindl. and Cypripedium candidum Muhl. ex Willd.: Some aspects of their status, biology, and ecology, and implications toward management. Nat. Areas Jour. 3: 14-37.

Case, F. W., Jr. 1987. Orchids of the Western Great Lakes Region. Cranbrook Inst. Sci. Bull. 48. Bloomfield Hills, Mich. Second edition. 251 pp.

Catling, P. M. & G. Knerer. 1980. Pollination of the small white lady's-slipper (Cypripedium candidum) in Lambton county, southern Ontario. Canadian Field-Naturalist 94: 435-438.

Curtis, J. T. 1943. Germination and seedling development in five species of Cypripedium L. Amer. J. Bot. 30: 199-206.

Luer, C. A. 1975. The native orchids of the United States and Canada, excluding Florida. New York Bot. Gard. 361pp.

Fimbristylis puberula (Michx.) Vahl — Hairy fimbry

Cyperaceae — Sedge Family

State Extirpated

Other common names: Chestnut sedge

Synonyms: Fimbristylis caroliniana (Lam.) Fern; F. drummondii (Torr. and Hook.) Boeckl.; F. spadicea (L.) Vahl.

Taxonomy: This plant has in the past been assigned to several species (see above). Kral (1971) distinguished F. puberula from F. caroliniana, and included our plants in var. puberula of the former species.

Total range: Hairy fimbry occurs primarily on the southeastern coastal plain (Texas to New Jersey) and in the eastern Great Plains (Texas to Nebraska and Missouri). It occurs occasionally inland in the southeastern U.S and in the southern Great Lakes region, and is considered rare in Wisconsin (S1 rank), Kentucky (S1), Tennessee (S1), New Jersey (S2), Pennsylvania (S1), Virginia (S1?), and Ontario. It is known only from historical records in New York.

State distribution: This species is represented in the Michigan flora by a 1904 collection from Harsen's Island, St. Clair County, where it was noted as abundant, and an 1838 collection by the First Geological Survey from Cass County.

Recognition: Shoots of this perennial, which arise solitarily or as tufts from hard knotty rhizomes, are 2-7 dm or more in height and have **stiffly erect, linear basal leaves** that are 1-3 mm wide and have inrolled margins. The stems terminate in a single open to compact inflorescence that is **umbel-like** and bears several ovoid to ellipsoid spikelets on slender stalks that are much longer than the subtending leaf-like bracts. The tiny obovate achenes are **white to dark brown, 2-sided and ca. 1.5 mm long, with neither a persistent tubercle at the summit, nor bristles below**.

The more common and generally much shorter F. autumnalis, a widespread species of many wetland habitats, has 3-sided, smaller achenes (0.7 mm long), much smaller anthers (0.3 mm versus 1.5 mm in F. puberula) and is an annual. Small plants of Psilocarya scirpoides (bald-rush) are similar in overall aspect, but can be distinguished by their leafy stems and by the achenes, which have a tubercle at the base.

Habitat: Hairy fimbry was collected in St. Clair County on "prairie-like" ground, probably referring to the moist lakeplain prairie which now persists only in small remnants there. It typically inhabits moist savannas and meadows on the Coastal Plain, and mid- to tall-grass prairie in its central North American range. In the Chicago region, it grows in moist, sandy prairies near Lake Michigan with Andropogon gerardii (big bluestem), Aster azureus (sky blue aster), A. ericoides (heath aster), Dodecatheon meadia (shooting star), Gentiana puberula (downy gentian), Hypoxis hirsuta (yellow-eyed-grass), Potentilla arguta (prairie cinquefoil), Scleria triglomerata (nut-rush), and Sisyrinchum albidum (blue-eyed grass).

Biology: F. puberula is a perennial with thick rhizomes that are considered to be advantageous for survival in fire-controlled ecosystems and savannas (Kral, 1971). Fertile Michigan collections were made on July 10 and August 20.

Conservation/management: No Michigan populations of this sedge are currently known; however, it should be sought in remnant prairie habitats on Harsen's and Dickinson Islands and in the vicinity of Algonac. This species still grows in the mesic savannas that persist on Walpole Island (Ontario) as a result of fire management. This species' prairie habitat should be managed with prescribed burning.

Selected references:

Kral, R. 1971. A treatment of *Abildgaardia, Bulbostylis*, and *Fimbristylis* for North America. Sida 4: 57-227.

Soper, J. H. 1962. Some genera of restricted range in the Carolinian flora of Canada. Trans. Roy. Can. Inst. 34(1): 3-56.

Platanthera ciliaris (L.) Lindley — Yellow-fringed orchid

Orchidaceae — Orchid Family

State Threatened

Other common names: Orange-fringed orchid

Synonyms: Habenaria ciliaris R. Br.; Blephariglottis ciliaris Rydb.

Taxonomy: Long known as H. ciliaris, this taxon, along with several other species of Habenaria, is increasingly referred to the genus Platanthera.

Total range: Primarily a species of the eastern United States, yellow-fringed orchid ranges from Ohio and Michigan to Vermont and Massachusetts, south along the Atlantic Coastal Plain to Florida, west to eastern Texas, Arkansas, and Missouri. It is considered rare in Indiana (S1 rank), Illinois (S1), Missouri (S1), New York (S1), Oklahoma (S1), Connecticut (S2), New Jersey (S2), Ohio (S2), Maryland (S3), Virginia (S3S4), and Ontario, is known only from historical records in Massachusetts and Rhode Island, and is thought to be extirpated from New Hampshire.

State distribution: This orchid ranges widely in southern Michigan, occuring mostly within the southern three tiers of counties and extending as far north as Bay, Kent, and St. Clair Counties. Five colonies of one hundred plants or more have been observed in Allegan, Berrien, and Calhoun Counties, five others are reported to have 25-100 plants, and one less than ten plants. Field surveys by Michigan Natural Features Inventory staff have failed to relocate extant populations at several historical collection localities, and at least four which were collected from areas now heavily developed or urbanized are certainly extirpated.

Recognition: This relatively stout, robust orchid species, varyies in height from 20-100 cm. The shoots are **leafy**, the basal leaves (which sheath the stem) oblong-lanceolate in shape, 7-30 cm in length, with a long, pointed tip. Upwards the widely-spaced leaves become much reduced, linear, and bract-like. The stem is terminated by a **densely flowered, 4-20 cm long raceme of strikingly orange to yellow-orange flowers**, each flower with an unlobed, **prominently fringed lower lip**, the fringes up to 1 cm in length and more than one-half the length of the lip's mail portion. At its base, the lower fringed petal is prolonged into **a slender, curved, 2-3 cm nectar spur**. Relatively inconspicuous are the narrow, 4-9 mm long upper petals, which bear a small fringe at their tips.

P. blephariglottis, white fringed-orchid, is a wide-ranging and very similar species that may grow with P. ciliaris and might be confused with it, mainly by virtue of the hybrids known to occur among these species. P. blephariblottis flowers, however, are pure white and the fringe hairs of the lower lip are about one-half as long (or less) as the undivided portion of the lip. Hybrids (P. Xbicolor) are not particularly uncommon when these species are found together, and can usually be identified by the intermediacy of their flower color and fringe length. Case (1987) notes at least three stations where these hybrids are more common than the parent species, observing that within these sites a wide spectrum of genetic combination for color occurs.

Habitat: Yellow-fringed orchid tolerates a variety of habitat conditions throughout its range but is more restricted in Michigan (Case, 1987). In southern Michigan it is frequently found on the open mat of Sphagnum bogs where its associates include Chamaedaphne calyculata (leatherleaf), Sarracenia

purpurea (pitcher-plant), Rhynchospora alba, (beak-rush), Eriophorum virginicum (cotton-grass), Vaccinium macrocarpon (cranberry), Carex oligosperma (sedge), Xyris difformis (yellow-eyed-grass), Pogonia ophioglossoides (rose pogonia), Cypripedium acaule (pink lady's-slipper), P. blephariglottis, and other typical acid bog plants. Larch is also a common associate, but P. ciliaris usually occurs in openings within the larch zone of bogs, tolerating some light shading and becoming diminished or absent in heavily shaded areas.

This orchid also occurs in damp sandy meadows or in acid soils adjacent to marshes (Case, 1987). Several old records from southeastern counties appear to be from moist sands (similar to habitat in adjacent Ohio), but no extant populations are known from such habitats in the state. Elsewhere in its range it can occur in a variety of habitats, including bogs, meadows, floodplains, and seepage areas, particularly sites with damp, acid sandy soil.

Biology: This perennial species arises from fleshy rootstocks which produce buds that will become the following season's growth. Hence damage to a plant in a given year will affect the vigor and size of the next year's plant (Case, 1987).

This orchid flowers from late July through mid-August. The primary pollinators are swallowtail butterflies. In a study of the pollination ecology of a P. ciliaris population in a southwestern Michigan bog, Smith and Snow (1976) found the spicebush swallowtail (Papilio troilus) to be the main pollinator, and also observed that individual plants growing in semi-open conditions set 50% fewer fruits (capsules) when compared to individuals growing in the open, non-shaded habitats. P. blephariglottis, which occurred at the study site, along with hybrids, was found to be pollinated primarily by night-flying moths.

Conservation/management: Urbanization, residential (especially lakeside) development and drainage of wetlands have spelled the demise of this species at many locations. Habitat succession and resultant shading by woody species (probably due to fire suppression and/or hydrologic changes) continues to degrade and destroy (Case, 1987) populations. About half of one large colony lies within a Michigan Nature Association preserve; one large and one small colony are on State Game Areas, and another of moderate size at least partially within a nature park owned by the City of Portage. No populations are in habitats wholly within protective ownership.

Selected references:

Case, F. W. 1987. Orchids of the Western Great Lakes Region. Cranbrook Inst. Sci. Bull. 48. Revised edition. 251 pp.

Correll, D. S. 1950. Native orchids of North America. Chronica Botanica, Waltham, Mass. 399 pp.

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G. R. Smith and G. E. Snow. 1976. Pollination ecology of Platanthera (Habenaria) ciliaris and P. blephariblottis (Orchidaceae). Bot. Gaz. 137(2): 133-140.

Platanthera leucophaea (Nutt.) Lindley — Eastern prairie fringed orchid

Orchidaceae — Orchid Family

State Endangered
Federal Endangered

Other common names: White fringed-orchid, prairie white fringed-orchid.

Synonyms: Habenaria leucophaea (Nutt.) A. Gray

Taxonomy: Formerly included within the genus Habenaria by Correll (1950), this species, in addition to several other Michigan taxa, is widely recognized as appropriately belonging to Platanthera (Case, 1987). Western populations of what had once been considered P. leucophaea, comprising most populations west of the Mississippi River, have been distinguished by Sheviak and Bowles (1986) as P. praeclara, based on significant differences in morphology, pollination mechanism, and geographic distribution.

Total range: Centered about the Great Lakes, P. leucophaea occurs east to Virginia and along the St. Lawrence drainage to Maine, ranging west into the plains to the Dakotas and Iowa, and south in the Mississippi drainage to Missouri and Oklahoma. Now near extinction throughout much of its range, most populations are concentrated in the southern Great Lakes region, occurring primarily in southern Wisconsin, Illinois, Ohio, and southern Lower Michigan. This species is considered rare in Illinois (S2-rank), Iowa (S2), Maine (S1), Misouri (S1), Ohio (S1), Oklahoma S1), Virginia (S1), Wisconsin (S1), and Ontario, extirpated in Indiana, New Jersey, and Pennsylvania, is known only from historical records in New York and South Dakota.

State distribution: Platanthera leucophaea was once known from more than 20 counties, primarily in southern Lower Michigan, with one anomalous disjunct locality documented in Cheboygan County. Extensive habitat modification and destruction has caused this species to severely decline. It is now extant in fewer than 10 counties, persisting mostly in the remnant lakeplain prairies of Saginaw Bay and western Lake Erie. The relatively high numbers of plants observed in 1984 declined markedly following years of high lake levels and drought. An exhaustive 1990 inventory of this species' remaining strongholds in Michigan found approximately 1100 plants total, with few populations supporting large numbers of plants in good quality, viable habitat.

Recognition: Prairie fringed-orchid is a tall, striking plant. It produces single stems that range from approximately 20 cm to 1 m or more in height, bearing long, narrow, sharp-pointed leaves that become progressively reduced upward. The leaves are strongly sheathing, becoming bract-like beneath the inflorescence. The stems are terminated by relatively **wide, showy racemes of up to 40 or more creamy white, stalked flowers**. Each flower has a long (2-5 cm), slender, **to about margins**, forming a loose bonnet arching over the column.

Platanthera blephariglottis and P. lacera are superficially similar species that can be easily distinguished. Platanthera blephariglottis, which occurs only in sphagnum bogs, bears white flowers with fringed lower lips that are tongue-shaped and undivided. Platanthera lacera is a more common, widespread species of a variety of habitats; it bears white to greenish-white flowers with three-parted lower lips deeply divided into slender, thread-like segments, and upper petals that are linear.

Habitat: Platanthera leucophaea occurs in two distinct habitats in Michigan--wet prairies and bogs. It thrives best in the lakeplain wet or wet-mesic prairies that border Saginaw Bay and Lake Erie. These communities have relatively alkaline, lacustrine soils, and are dominated by Carex aquatilis, C. stricta, and Calamagrostis canadensis. Common associates include Andropogon scoparius (little bluestem) and A. gerardii (big bluestem), Spartina pectinata (prairie slough grass), Potentilla fruticosa (shrubby cinquefoil), Liatris spicata (blazing star), Cornus stolonifera and C. amomum (dogwoods), Pycnanthemum virginianum (mountain mint), Gentiana crinita (fringed gentian), Solidago spp. (goldenrods), Cladium mariscoides (twig-rush), Juncus spp. (rushes), and Scirpus spp. (bulrushes). Prairie fringed-orchid frequently persists in degraded prairie remnants, and can colonize ditches, railroad rights-of-way, and fallow agricultural fields.

Open or semi-open bog mats of Sphagnum and Carex, with slightly acidic, neutral, or somewhat alkaline lake water also support small populations of this orchid. Associates in these sites include Thelypteris palustris (marsh fern), Sarracenia purpurea (pitcher plant), Drosera rotundifolia (sundew), Typha (cattail), Potentilla fruticosa (shrubby cinquefoil), Larix laricina (tamarack), Betula pumila (bog birch), and Toxicodendron vernix (poison sumac). Farther west, prairie fringed orchids occur in mesic and wet mesic black soil prairies, or rich, wet, sandy prairies, while to the east of Michigan, occurrences are generally restricted to bogs or sandy or peaty lakeshores.

Biology: Unlike many other Platanthera species, P. leucophaea is long-lived, with individuals documented to live more than 30 years (Case, 1987). According to Case (1987), this perennial produces a bud on one of its roots that develops a new set of roots or tubers, becoming next season's new plant. The development and viability of this bud is highly dependent on the vigor of the old plant. In Michigan, flowering occurs during late June and early July. Case reports that the white blossoms produce a heavy fragrance at dusk and attract many moths, including the large Sphinx moth. Sphinx moths are probably co-adapted pollinators, since their tongues are long enough to reach the nectar which lies deep in the spur of the flowers (Marlin Bowles, pers. comm.). Capsules mature in September, releasing hundreds of thousands of airborne seeds. Plants do not flower every year, frequently producing only a single leaf above ground (Bowles, pers. comm) and possibly even becoming dormant when conditions are unsuitable. Fire is thought to help break dormancy and stimulate flowering (Sheviak, 1974; Bowles, pers. comm.), although its role in Michigan Platanthera sites is highly uncertain.

Conservation/management: Competitive encroachment by native shrubs, especially dogwoods and willows, and pernicious exotics such as Lythrum salicaria (purple loosestrife) pose one of the greatest threats to Michigan's remaining prairie fringed orchids. The large-scale destruction of its lakeplain prairie habitat, primarily through ditching and diking, and the conversion of areas for agricultural use, in addition to other land settlement activities, have rendered this species particularly vulnerable to extinction. In its last remaining viable sites, prairie fringed-orchid is best protected by maintaining the natural hydrological cycles of the lakeplain wet prairies. Protection can only be adequately afforded when sufficient refugia are available during periods of high lake levels. Unfortunately, few natural areas are left that provide the necessary landward habitat. Where refugia are available, this species is able to seed inland during high water cycles, advancing shoreward as lake levels recede (Case, 1987, page 20). This natural fluctuation along the lakeshores maintains the necessary open, wet prairie habitat, preventing closure and shading by competitive woody plants.

In sites where active management may be required, shrub removal is of primary importance. Although fire is frequently recommended as a management tool (Bowles, 1983), its role in Michigan's prairie fringed-orchid habitat is highly uncertain. Case (pers. comm.) recommends great caution with the consideration of fire management, noting that the orchid's subterranean buds can be easily damaged during spring or fall burns. At present, fire should be employed only as a very

selective experimental tool, to be used in testing alongside other approaches, such as mechanical brush removal and soil disking.

Lastly, one of the greatest recognized threats to this elegant species is poaching and trampling by orchid enthusiasts, photographers, and others. At least one Michigan colony has been obliterated by poachers, and thus great caution must be taken with regard to remaining sites. Case (1987) considers this species to be possibly the most "severely endangered orchid of our region".

Comments: According to an early report, P. leucophaea once grew so abundantly near the bath houses on Belle Isle Park, Detroit, that visitors there gathered it in bouquets (Foerste, 1882). Unfortunately, this is a scenario unlikely to be witnessed again.

Selected references:

Bowles, M. L. 1983. The tallgrass prairie orchids Platanthera leucophaea (Nutt.) Lindl. and Cypripedium candidum Muhl. ex Willd.: Some aspects of their status, biology, and ecology, and implications toward management. Nat. Areas Jour. 3: 14-37.

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Sheviak, C. J. & M. L. Bowles. 1986. The prairie fringed orchids: A pollinator-isolated species pair. Rhodora 88: 267-290.

Appendix VI

Locations of Insect Surveys

Apppendix VI. Location and dates of lakeplain prairie insect surveys, May-September, 1994.

Site Name	County	Township-Range	Section	Sweep netting dates	Black lighting dates
Bradleyville Road	Tuscola	T14N-R7E	14 NWNW	June 2, 23; July 23; Sept. 21	
Thomas Road	Tuscola	T15N-R8E	16 NESW	June 2, 23; July 24; Aug. 24; Sept. 22	June 30; July 24; Aug. 24; Sept. 22
Berger Road	Tuscola	T15N-R8E	13 SWNW 14 NESE	Aug. 10; Sept. 13; Sept. 30	Sept. 30
Sebewaing Railroad	Tuscola	T15N-R8E	12 NESE	Aug. 10; Sept. 13	
Geiger Road	Tuscola	T16N-R9E	21 SESE	Aug. 10; Sept. 13	
St. John's Marsh	St. Clair	T2N-R16E	6 NW	Sept. 14	
Algonac South Drain	St. Clair	T3N-R16E	34 NENE	June 3, 22; July 28; Aug. 24, 29; Sept. 19	June 22; July 28; Aug. 29; Sept. 19
Bangor Road	Bay	T14N-R5E	4 NW	Aug. 10; Sept. 23	
Algonac-Jankow Rd.	St. Clair	T3N-R16E	34 SE	Aug. 24,29; Sept. 19	
Sumptor Township	Wayne	T4S-R8E	27 SE	Aug. 12,24; Sept. 2	
Sumptor Borrow Pits	Wayne	T4S-R8E	31 NWNE	Sept. 2	
Sterns Road	Wayne	T8S-R6E	26 NENE	Sept. 14	
King Road	Wayne	T4S-R10E	17 NE	Aug. 12; Sept. 2	
Petersburg SGA	Monroe	T7S-R6E	15 SENE 14NENW	Sept. 2	
Pipeline Prairie East	Allegan	T3N-R13W	7 NESW	Aug. 22; Sept. 21	
36th Street Prairie	Allegan	T3N-R14W	12 SESE	June 26; July 23; Aug. 22; Sept. 21	June 26; July 23; Aug. 22; Sept. 21

Appendix VI

Locations of King Rail Surveys

Appendix VII. Locations of lakeplain prairies and other wetland habitats surveyed for king rails in 1994.

Location	Community Type
Southeastern Michigan	
St. Clair Delta (St. Clair County):	
St. Johns Marsh (T3N R16E Sec. 31, T2N R16E Sec. 6)	lakeplain wet prairie
Dickinson Island (T2N R15E Sec. 12, 13)	lakeplain wet prairie, Great Lakes marsh
Harsen's Island (T2N R16E Sec. 7-9, 16-21, 29, 30)	emergent marsh
Saginaw Bay	
Berger Road (Tuscola County, T15N R8E Sec. 13, 14)	lakeplain prairie, Great Lakes marsh
Fish Point (Tuscola County, T15N R8E Sec. 9, 10, 15, 16, 22)	lakeplain prairie, emergent marsh
Nayanquing Point (Bay County, T16N R4E Sec. 13, 24)	emergent marsh
Tobico Marsh (Bay County, T15N R4E Sec. 12, 13, 24, 25)	emergent marsh
Vanderbilt Park (Tuscola County, T14N R7E Sec. 21)	emergent marsh
Wigwam Bay (Arenac County, T18N R6E Sec. 5, T19N R6E Sec. 32)	emergent marsh
Wildfowl Bay (Huron County, T16N R9E Sec. 9)	emergent marsh

Appendix VIII

Insect Species Recorded from Coastal Lakeplain Prairie

Appendix VIII. A list of the insect species recorded from nine Michigan coastal lakeplain prairies.

BR=Bradleyville Road, TH=Thomas Road, BE=Berger Road, SR=Sebewaing Railroad, GR=Geiger Road, SJ=St. John's Marsh, AS=Algonac South Drain, AJ=Algonac-Jankow Road, BP=Bangor Prairie.

SPECIES	BR	TH	BE	SR	GR	SJ	AS	BP	AJ
ORTHOPTERA									
Family Tetrigidae									
Tettigidea lateralis (Say)							X		
Nemotettix cristatus (Scudder)							X		
Tetrix arenosa Burmeister							X		
Tetrix sublata (Linnaeus)		X							
Family Acrididae									
Chortophaga viridifasciata (DeGeer)		X					X		
Spharagemon collare (Scudder)		X							
Melanoplus borealis (Feiber)							X		
Melanoplus bivittatus (Say)							X		
Melanoplus femurrubrum (DeGeer)							X		
Orphulella speciosa (Scudder)							X		
Chorthippus curtipennis (Harris)		X					X		
Family Tettigoniidae									
Neoconocephalus ensiger (Harris)		X					X		
Scudderia curvicauda (DeGeer)							X		
Orchilium vulgare Harris							X		
Orchilium gladiator Brunner							X		
Mantidae									
Mantis religiosa Linnaeus							X		
HEMIPTERA									
Family Pentatomidae									
Acrosternum hilare (Say)						X	X		X
Banasa calva (Say)									
Coenus delius (Say)							X		X
Cosmopepla linteriana Kirkaldy								X	
Euschistus tristigmus (Say)	X						X		
Euschistus servus (Say)							X		
Euschistus variolarius (P. de B.)		X							
Homaemus aenifrons (Say)			X						
Mormidea lugens (F.)	X								X
Podisus maculiventris (Say)		X							
Thyanta custator accerra McAtee			X				X		
HOMOPTERA									
Family Acanoloniidae									
Acanalonia bivatta (Say)	X	X		X			X	X	X
Family Cercopidae									
** *Prosapia ignipectus* (Fitch)		X					X		X
Aphrophora quadrinotata Say							X		X
Clastoptera proteus Fitch	X	X							
Clastoptera hyperici Gibson	X				X			X	

Appendix VIII Continued.

SPECIES	BR	TH	BE	SR	GR	SJ	AS	BP	AJ
Lepyronia quadrangularis (Say)						X	X		X
Neophilaenus lineatus (Linnaeus)	X	X	X			X	X	X	X
Philaenus spumarius (Linnaeus)	X	X	X	X	X	X	X	X	X
Family Issidae									
Bruchomorpha occulata Newman							X	X	
Family Dictyopharidae									
Phylloscelis atra Germar	X						X	X	
Scolopes sulcipes (Say)	X		X	X		X	X	X	X
Family Cicadellidae									
Acertagallia sp.	X	X	X				X	X	
Amplicephalus inimicus (VanDuzee)							X	X	
Aphrodes sp.								X	X
Athysanus argentatus Fabricius	X	X	X	X	X		X	X	X
Balclutha sp.	X	X			X		X		X
**Chlorotettix* sp.	X	X	X	X	X	X	X	X	X
Cicadula cyperacea (Osborn)		X							
Cicadula saliens (Van Duzee)	X						X	X	X
Cicadula smithi (Van Duzee)	X	X							
Cloanthanus sp.							X	X	X
Colladonus clitellarius (Say)		X							
Doratura stylata (Boh.)		X							
Dorydiella kansana Beamer	X	X			X	X			
Elymana sp.	X	X					X		X
Empoasca sp.							X	X	X
Eurythroneura sp.			X					X	
Fitchana vitellina (Fitch)	X	X							
* *Flexamia* sp.						X	X		
* *Graminella* sp.		X	X				X		X
Graphocephalus coccinea Forster					X		X		X
Gypona melonata Spang.	X	X	X				X		
Gyponana sp.	X	X	X					X	
**Hecalus* sp.		X	X		X				X
Helochara communis Fitch								X	
Idiodonus kennicotti (Uhler)		X	X				X		
Idiocerus sp.		X							
Jikaradia olitoria (Say)	X								
* *Laevicephalus* sp.	X	X	X		X	X	X	X	X
Latalus sp.		X	X			X			X
Limotettix sp.		X							
* *Lonatura* sp.									X
Macropsis sp.	X	X							X
Macrosteles sp.	X	X	X	X	X		X	X	X
Neohecalus sp.	X	X		X		X	X		X
Neokolla hieroglyphica (Say)	X					X	X	X	X
Norvellina seminuda (Say)		X	X						
Notus sp.							X		
Parablocratus sp.							X		
Paraphlepsius sp.		X	X			X	X		X
Penthimia americana Fitch	X								

Appendix VIII Continued.

SPECIES	BR	TH	BE	SR	GR	SJ	AS	BP	AJ
Ponana sp.		X							
Scaphoideus sp.	X				X		X	X	
Scaphytopius sp.	X	X		X	X	X	X	X	X
Scleroracus uhleri (Ball)								X	X
Sorhoanus orientalis (DeL. & Dav.)		X							
Stirellus bicolor (Van Duzee)							X		X
Stirellus obtutus (Van Duzee)						X	X		X
Stirellus sp.						X	X		X
Tylozgus bifida (Say)	X	X			X		X	X	X
Xestocephalus pulicarius Van Duzee		X			X				
Family Membracidae									
Campylenchia latipes (Say)	X	X	X	X	X	X	X	X	X
Acutalis tartarea (Say)	X	X		X			X		
LEPIDOPTERA									
Family Cossidae									
Acossus centerensis (Litner)		X							
Family Lasiocampidae									
Tolype velleda (Stoll)							X		
Family Sphingidae									
Amphion floridensis B.P. Clark		X							
Eumorpha pandorus (Hubner)		X							
Family Notodontidae									
Natata gibbosa (J.E. Smith)		X							
Symmerista leucitys Franclemont							X		
Family Arctiidae									
Hypoprepia fucosa Hubner							X		
Ctenucha virginica (Esper)		X					X		
Haploa confusa (Lyman)		X							
Pyrrharctia isabella (J.E. Smith)		X							
Phragmatobia fuliginosa (Linneaus)		X							
Halysidota tessellaris (J.E. Smith)		X							
Cycnia tenera Hubner							X		
Family Lymantriidae									
Lymantria dispar (Linnaeus)		X							
Orgyia leucostigma (J.E. Smith)			X						
Family Noctuidae									
Plathypena scabra (Fabricius)		X							
Catocala habilis Grote							X		
Catocala parta Guenee							X		
Catocala concumbens Walker							X		
Catocala crataegi Saunders							X		
Catocala mira Grote							X		
Catocala amica (Hubner)							X		
Plusia venusta Walker		X							
Autographa precationis (Guenee)							X		
Lithacodia carneola (Guenee)		X							

Appendix VIII Continued.

SPECIES	BR	TH	BE	SR	GR	SJ	AS	BP	AJ
Lithacodia synochitis (Grote & Robinson)		X							
Eudryas grata (Fabricius)		X							
Apamea amputatrix (Fitch)		X							
Amphipoea interoceana (Smith)		X					X		
Phlogophora iris Guenee		X							
Archanara oblonga (Grote)		X							
Spodoptera frugiperda (J.E. Smith)			X				X		
Lacinipolia renigera (Stephens)		X							
Pseudaletia unipuncta (Haworth)		X					X		
Leucania multilinea Walker		X							
Feltia jaculifera (Guenee)							X		
Feltia herilis (Grote)		X							
Peridroma saucia (Hubner)		X							
Xestia dolosa Franclemont		X							
Protolampra brunneicollis (Grote)							X		
Cryptocala acadiensis (Bethune)							X		
Helicoverpa zea (Boddie)		X							
***Papaipema sciata* Bird							X		
Papaipema limpida (Guenee)							X		
Papaipema rigida (Grote)							X		
Papaipema arctivorens Hampton							X		
Papaipema furcata (Smith)		X					X		
Papaipema impecuniosa (Grote)			X						
Papaipema baptisiae (Bird)			X						
Papaipema unimoda (Smith)		X							
Eupsilia morrisoni (Grote)			X						
Perigea xanthioides Guenee							X		
Family Geometridae									
Euchlaena serrata (Drury)		X							
Ennomos magnaris Guenee							X		
Sicya macularia (Harris)							X		
Heliomata cycladata G. & R.							X		
Hyppa xylinoides (Guenee)							X		
Family Tortricidae									
Argyrotaenia alisellana (Robinson)							X		
Pandemis limitata (Robinson)		X							
Archips purpurana (Clemens)		X							
Choristoneura fumiferana (Clemens)							X		
Archips argyrospila (Walker)							X		
Argyrotaenia quadrifasciana (Fernald)							X		
Family Yponomeutidae									
Atteva punctella (Cramer)		X					X		
Yponomeuta multipunctella Clemens		X	X						

Appendix VIII Continued.

SPECIES	BR	TH	BE	SR	GR	SJ	AS	BP	AJ
Family Pyralidae									
Parapoynx badiusalis (Walker)		X							
Desmia funeralis (Hubner)		X							
Polygrammodes flavidalis (Guenee)							X		

* Six genera that contain host specific species.
** Two special concern species

Appendix IX

Insect Species Recorded from Inland Lakeplain Prairies

Appendix IX. A list of the insect species recorded from six Michigan inland lakeplain prairies.

ST=Sumptor Township, SR=Sterns Road, KR=King Road, PE=Petersburg, PI=Pipeline Prairie East, 36=36th Street Prairie.

SPECIES	ST	SR	KR	PE	PI	36
ORTHOPTERA						
Family Tetrigidae						
Tetigidea lateralis (Say)			X			
Nemotettix cristatus (Scudder)	X					
Family Acrididae						
Dissoteira carolina (Linnaeus)	X					
Melanoplus bivittatus (Say)	X					
Melanoplus keeleri luridus (Dodge)						X
Melanoplus femmurrubrum (DeGeer)	X	X		X	X	X
Melanoplus islandicus Blatchley				X		
Dichromorpha viridis (Scudder)				X		
Pseudopomala brachyptera Scudder			X			
Family Tettigoniidae						
Neoconocephalus ensiger (Harris)	X					
Scudderia curvicauda (DeGeer)			X			X
Family Mantidae						
Mantis religiosa L.				X		
HEMIPTERA						
Family Pentatomidae						
Acrosternum hilare (Say)		X				X
Coenus delius (Say)				X	X	
Cosmopepla linteriana Kirkaldy					X	
Eurygaster alternata (Say)						X
Euschistus ictericus (L.)						X
Euschistus politus					X	X
Euschistus servus (Say)	X			X		X
Euschistus tristigmus (Say)						X
Euschistus variolarius (P. de B.)				X		X
Holcostethus limbolarius (Stal)						X
Homaemus aenifrons (Say)	X		X	X		
Mormidea lugens (Fabricius)	X		X			X
Neottiglossa undata (Say)					X	
Family Cydnidae						
Sehirus cinctus (P. de B.)						X
HOMOPTERA						
Family Acanoloniidae						
Acanalonia bivatta (Say)	X		X	X		X
Family Issidae						
Bruchomorpha dorsata Fitch				X		
Bruchomorpha occulata Newman	X			X		
Family Dictyopharidae						
Phylloscelis atra Germar			X			
Phylloscelis pallescens Germar			X			
Scolopes sulcipes (Say)	X		X	X		

Appendix IX Continued.

SPECIES	ST	SR	KR	PE	PI	36
Family Cercopidae						
Aphrophora cribrata (Walker)						X
Aphrophora saratogensis (Fitch)						X
Clastoptera proteus Fitch						X
Lepyronia quadrangularis (Say)	X	X	X	X		
Neophilaenus lineatus (Linnaeus)	X					X
**Philaenarcys killa* Hamilton						X
Philaenus spumarius (Linnaeus)	X		X	X	X	X
Family Cicadellidae						
Acertagallia sp.	X		X	X	X	
Amplicephalus inimicus	X					
Aphrodes sp.				X		
Athysanus argentatus Fabricius					X	X
Aulacizes irrorata (Fabricius)		X		X	X	X
Balclutha sp.					X	X
Bandara johnsoni (Van Duzee)					X	
**Chlorotettix* sp.	X	X	X	X	X	X
Cicadula cyperacea (Osborn)						X
Cicadula saliens (Van Duzee)					X	X
Cicadula smithi (Van Duzee)						X
Cicadula sp.	X					
Cloanthanus sp.	X	X		X	X	X
Driotura grammaroides (Van Duzee)			X			
Elymana sp.						X
Empoasca sp.	X			X		X
Eurythroneura sp.				X	X	X
Eurythroneura nigra Gill.					X	
Fitchana vitellina (Fitch)						X
* *Flexamia* sp.		X				
* *Graminella* sp.				X	X	X
Graphocephalus coccinea (Forster)	X			X		
Gyponana sp.	X			X		X
* *Hecalus* sp.	X		X	X		X
Helochara communis Fitch					X	
Idiocerus sp.						X
Idiodonus kennicotti (Uhler)			X		X	
Jikradia olitura (Say)						X
* *Laevicephalus* sp.	X		X	X	X	X
Latalus sp.	X					
Macropsis sp.					X	X
Macrosteles sp.	X		X	X		X
Neohecalus sp.						X
Neokolla hieroglyphica (Say)	X			X	X	X
Notus sp.	X					X
Paraphlepsius sp.	X		X	X		X
Penthimia americana Fitch						X
Scaphoideus sp.			X			X
Scaphytopius sp.	X		X	X		X
Stirellus bicolor (Van Duzee)				X		

Appendix IX Continued.

SPECIES	ST	SR	KR	PE	PI	36
Stirellus obtutus (Van Duzee)				X		
Stragania sp.				X		
Tylozgus bifida (Say)					X	
LEPIDOPTERA						
Family Saturniidae						
Dryocampa rubicunda (Fabricius)						X
Anisota virginiensis (Drury)						X
Family Sphingidae						
Paonias myops (J.E. Smith)						X
Darapsa pholus (Cramer)						X
Family Notodontidae						
Nadata gibbosa (J.E. Smith)						X
Notodonta scitipennis Walker						X
Family Arctiidae						
Crambidia lithosiodes Dyar						X
Haploa lecontei (Guerin-Menetries)						X
Pyrrharctia isabella (J.E. Smith)						X
Ecpantheria scribonia (Stoll)						X
Halysidota tessellaris (J.E. Smith)						X
Ctenucha virginica (Esper)						X
Cisseps fulvicollis (Hubner)						X
Dasychira obliquata (Grote & Robertson)						X
Family Noctuidae						
Catocala ilia (Cramer)						X
Catocala relicta Walker						X
Catocala concumbens Walker						X
Catocala amica (Hubner)						X
Pseudoplusia includens (Walker)						X
Syngrapha sp.						X
Cerma cerintha (Treitschke)						X
Lithacodia carneola (Guenee)						X
Acronicta afflicta (Grote)						X
Acronicta ovata (Grote)						X
Polygrammate hebracicum Hubner						X
Nephelodes minians Guenee						X
Lacinipolia renigera (Stephens)						X
Agrotis ipsilon (Hufnegel)						X
Feltia herilis (Grote)						X
Papaipema ptersii Bird						X
Papaipema lysimachiae Bird						X
Papaipema baptisiae (Bird)						X
Enargia infumata (Grote)						X
Family Geometridae						
Biston betularia cognata (Guenee)						X
Campaea perlata (Guenee)						X
Eubaphe mendica (Walker)						X

Appendix IX Continued.

SPECIES	ST	SR	KR	PE	PI	36
Dysstroma hersiliata (Guenee)						X
Euchlaena nadusaria (Walker)						X
Family Limacodidae						
Euclea delphinii (Boisduval)						X
Family Tortricidae						
Olethreutes fasciatana (Clemens)						X
Argyrotaenia alisellana (Robinson)						X
Choristoneura fumiferana (Clemens)						X
Archips argyrospila (Walker)						X
Family Yponomeutidae						
Atteva punctella (Cramer)						X
Family Thyrididae						
Thyris maculata Harris						X
Family Pyralidae						
Crambus leachellus (Zincken)						X

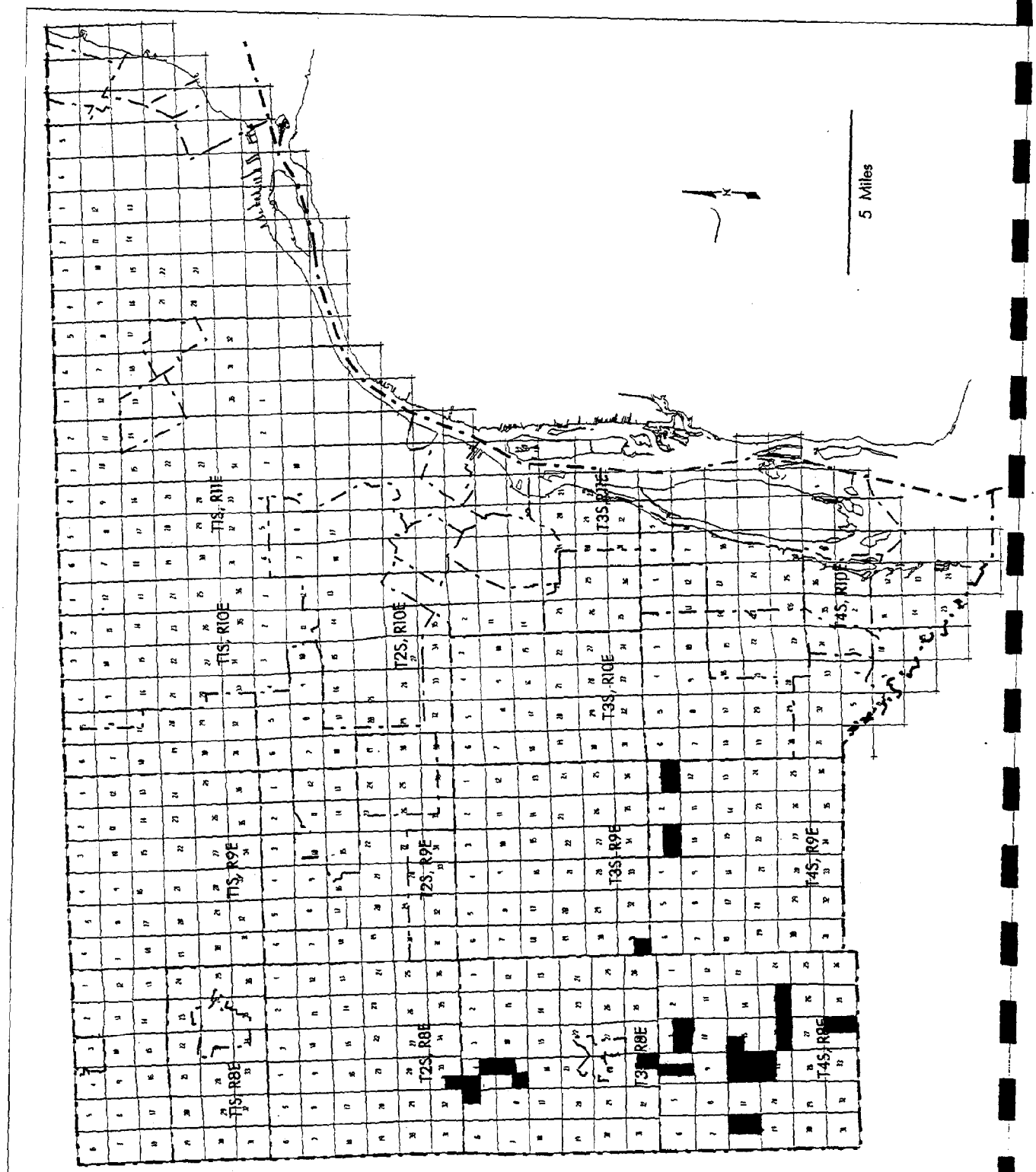
* Six genera that contain host specific species.

APPENDIX X

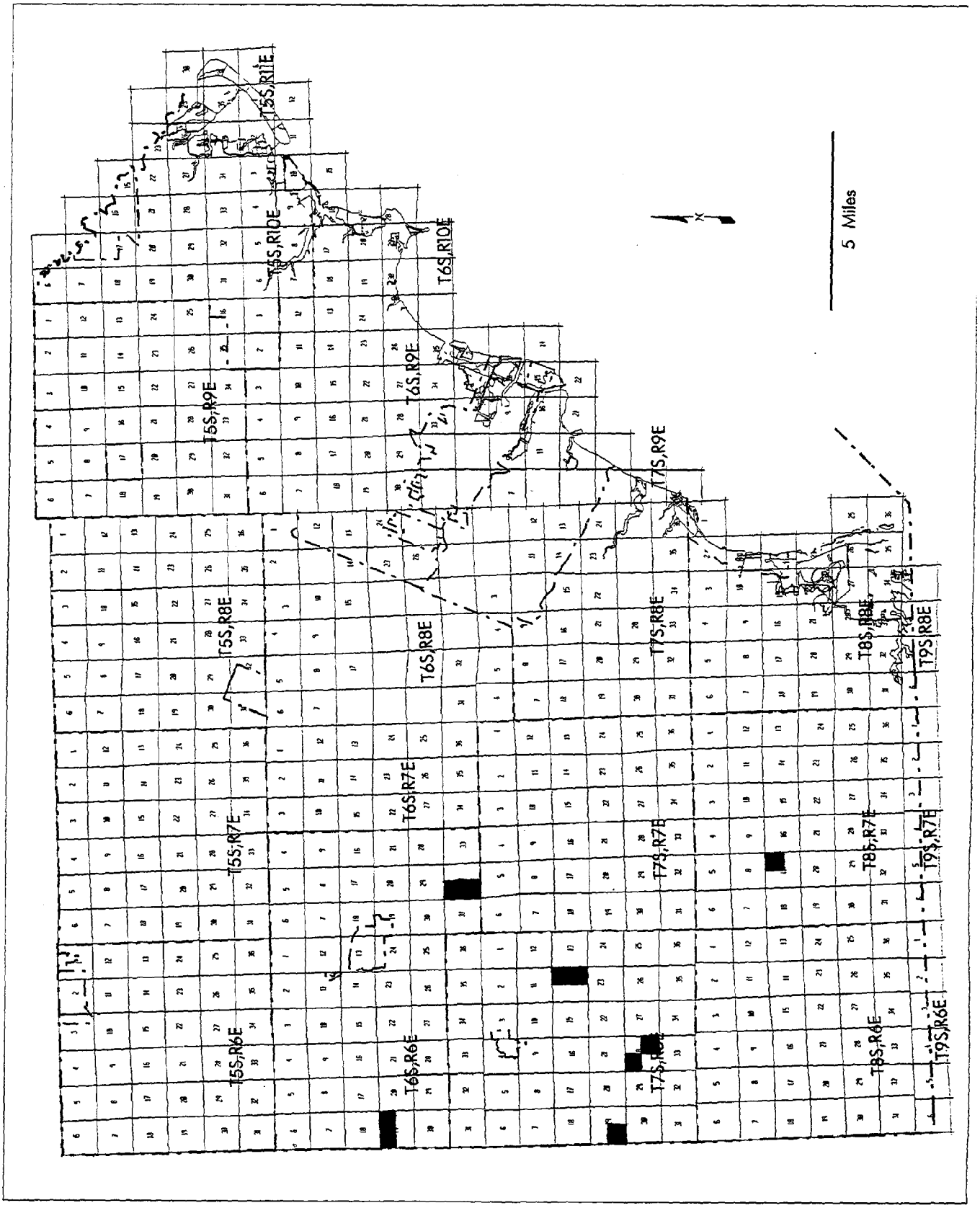
POTENTIAL LAKEPLAIN PRAIRIE SITES

During the season's field work it was not possible to visit all potential lakeplain prairie sites. Although we believe that over 90% of the viable sites have been identified, a few areas have not been explored. Some of these areas have been identified as potential prairie locations during the interpretation of aerial photographs and some represent site leads from literature and personal communications. Over 700 landowners of potential prairie sites were identified during the aerial photography review. Because of the large number, some of the lower potential sites were shelved, no letters requesting access to the property were sent and no attempts were made to visit the sites. Of the letters that were sent out only 30% responded. Because of lack of response, or responses denying access, some sites could not be visited. Many sites contained multiple owners so that even when one land owner denied access to their property we could still visit a portion of the area of interest and assess the presence or absence of a lakeplain prairie community.

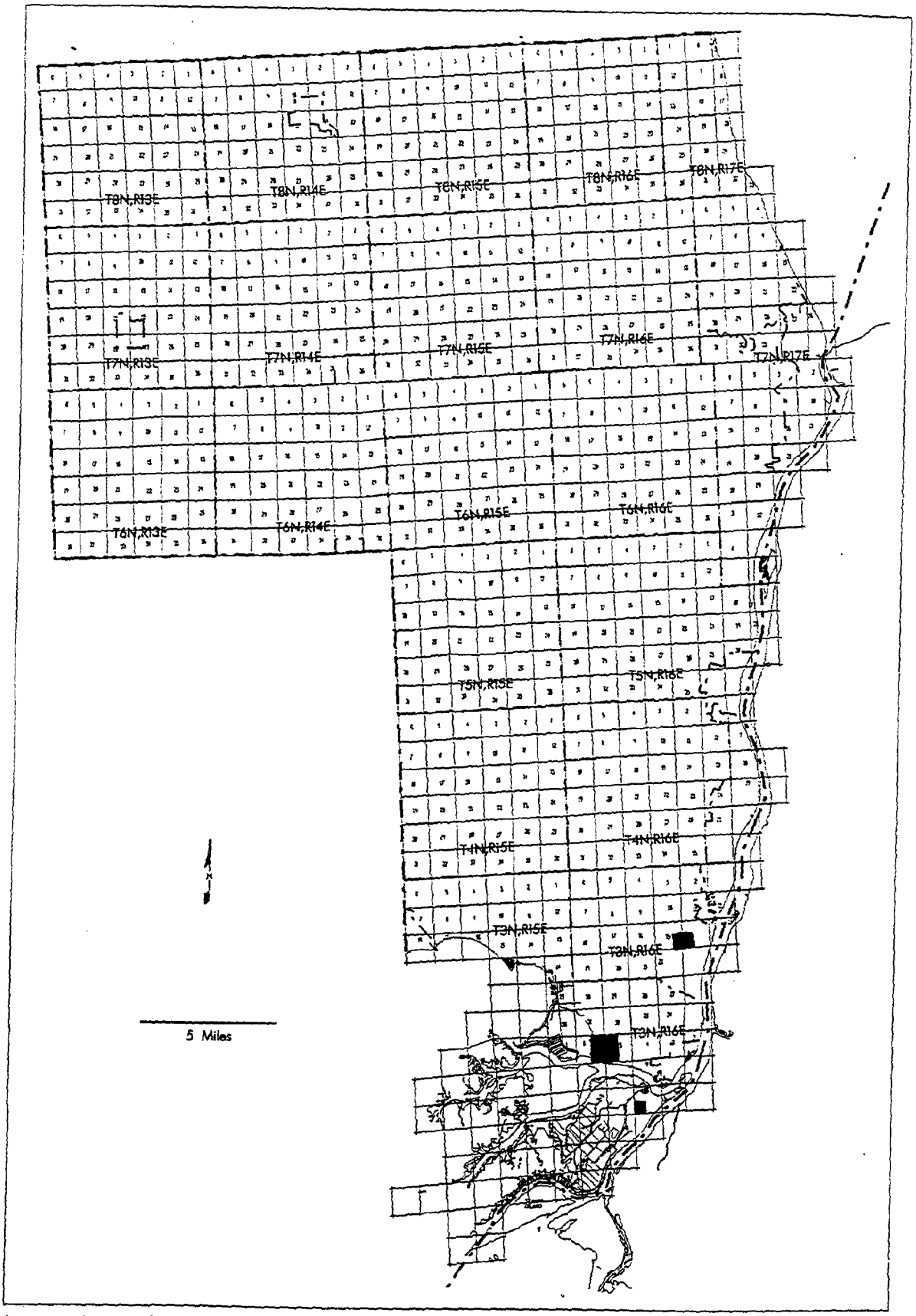
The following maps indicate areas that have some potential for supporting lakeplain prairies but have not been visited. A quarter section area that includes a possible prairie remnant has been shaded. A shaded fragment does not mean that the entire quarter section is potentially prairie.



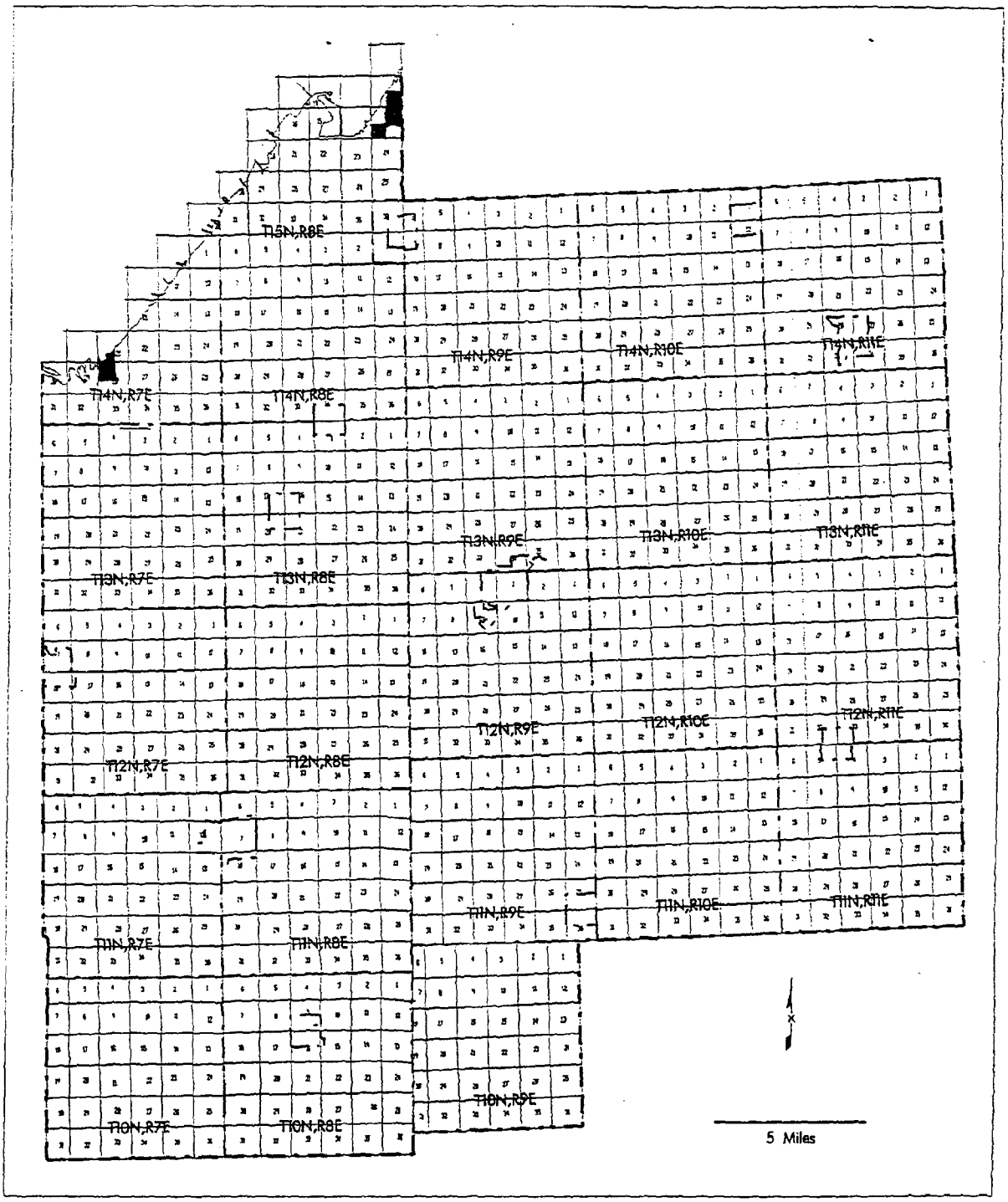
Potential Lakeplain Prairie Sites—Wayne Co.



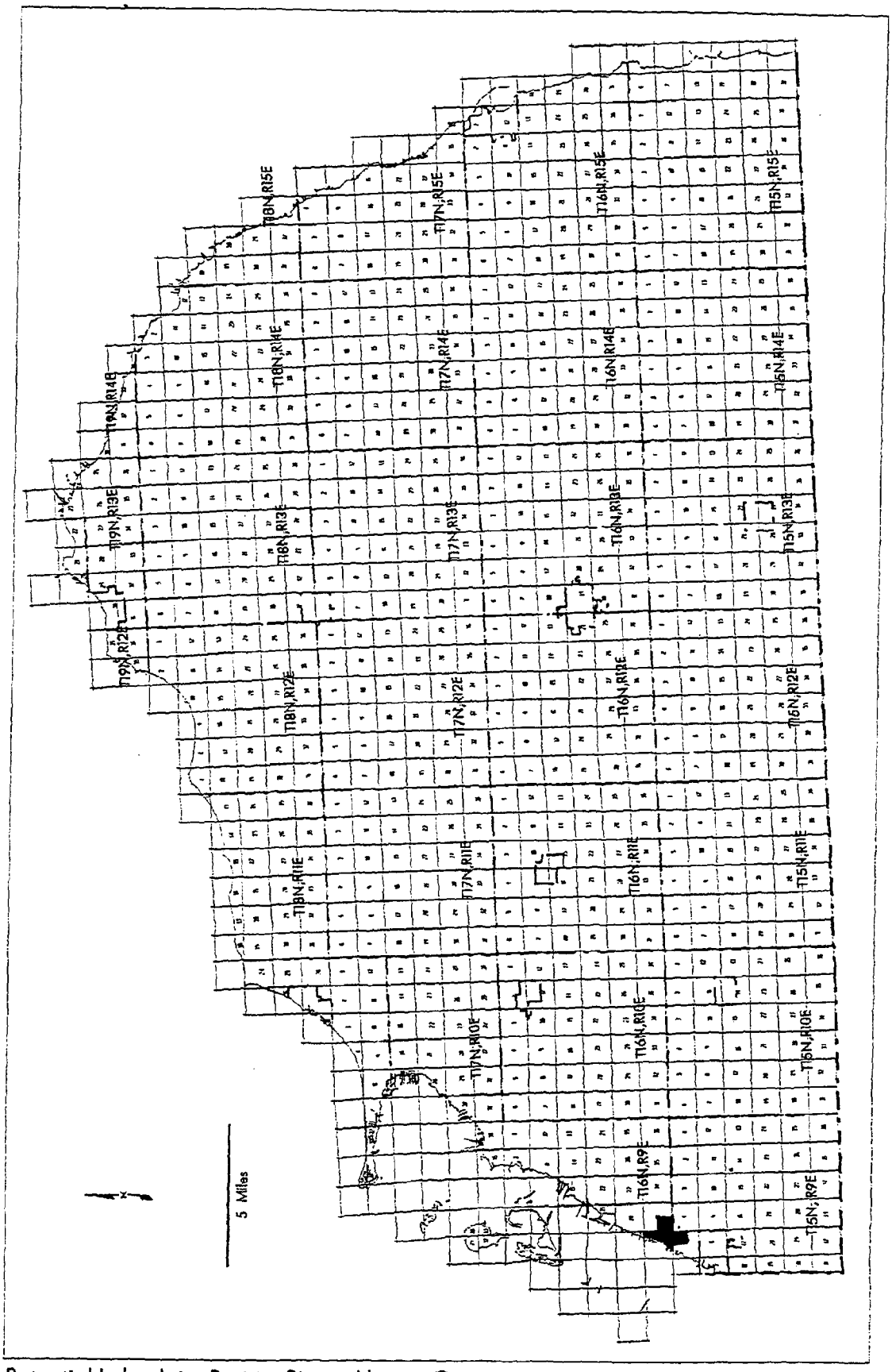
Potential Lakeplain Prairie Sites—Monroe Co.



Potential Lakeplain Prairie Sites—St. Clair Co.



Potential Lakeplain Prairie Sites—Tuscola Co.



Potential Lakeplain Prairie Sites—Huron Co.