

Lakeplain Prairie Restoration Concepts for Fish Point State Wildlife Area



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Cover Photo: Fish Point SWA exists as a narrow band of natural cover between expansive agricultural operations and Saginaw Bay. This photo captures its landscape context, the problems with invasive Phragmites, as well as the complex mosaic of natural communities within the State Wildlife Area. October 2017. Photos throughout the document by Jesse M. Lincoln.

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INTRODUCTION

Ongoing survey efforts of state game areas have improved knowledge about the location and integrity of a variety of important natural areas. High-quality ecosystems provide a myriad of benefits to both game and non-game species and protecting existing systems is more feasible than intensive restoration of degraded systems or the creation of a new ecosystem. At Fish Point State Wildlife Area (SWA) there is an important opportunity to restore and improve multiple natural communities, including critical wetlands and rare grasslands.

During 2017, the Department of Natural Resources (DNR) and Michigan Natural Features Inventory (MNFI) conducted the Stage 1 survey of Fish Point State Wildlife Area as part of the DNR's Michigan Forest Inventory (MiFI). This is part of a long-term effort by the DNR Wildlife Division (WLD) to document and sustainably manage areas of high conservation significance on state lands. The MNFI scientists collected basic stand data and

helped identify exemplary natural community Element Occurrences (EOs).

Information collected during the MiFI surveys was used to develop project sites for ecosystem restoration. Sites with largest zones of remnant lakeplain prairie were prioritized and potential actions to address threats to these systems are outlined below. These potential project areas primarily focus on lakeplain wet or wet-mesic prairie with additional elements of lakeplain oak openings or savanna considered in some areas. These habitats are unique and utilized by many wildlife species – including numerous featured species (i.e., wood ducks, white-tailed deer, wild turkeys, and pheasants).

The purpose of this project is to develop a landscape-level plan to restore prairies and savannas to improve ecological functioning and enhance ecosystem services, especially wildlife-based recreation. The objectives are to:



Figure 1. Compartment boundaries and land cover and in and around Fish Point SWA.

1) Collaborate with staff at Fish Point SWA to identify and prioritize lakeplain prairies for ecosystem management; 2) Provide management recommendations for each project area to improve wildlife habitat and expand existing native lakeplain prairie and savanna systems; and 3) Develop a process for identifying and managing restoration opportunities to maximize benefits for game, non-game, and rare species in the context of improving ecosystem integrity.

Natural Community Descriptions

The natural communities of this region have been shaped by many factors, including changes in lake level, historic

fire, conversion to agriculture, hydrological alterations, invasive species, and decades of fire suppression. This section describes the natural communities within Fish Point SWA included in potential project areas. The community types are Great Lakes marsh, lakeplain wet and wet-mesic prairie, and lakeplain oak openings. Much of the landscape has been altered over the past two centuries and the once widespread ecosystems have become infrequent and degraded but still locally persist in a functioning state within Fish Point SWA (Albert 1995).

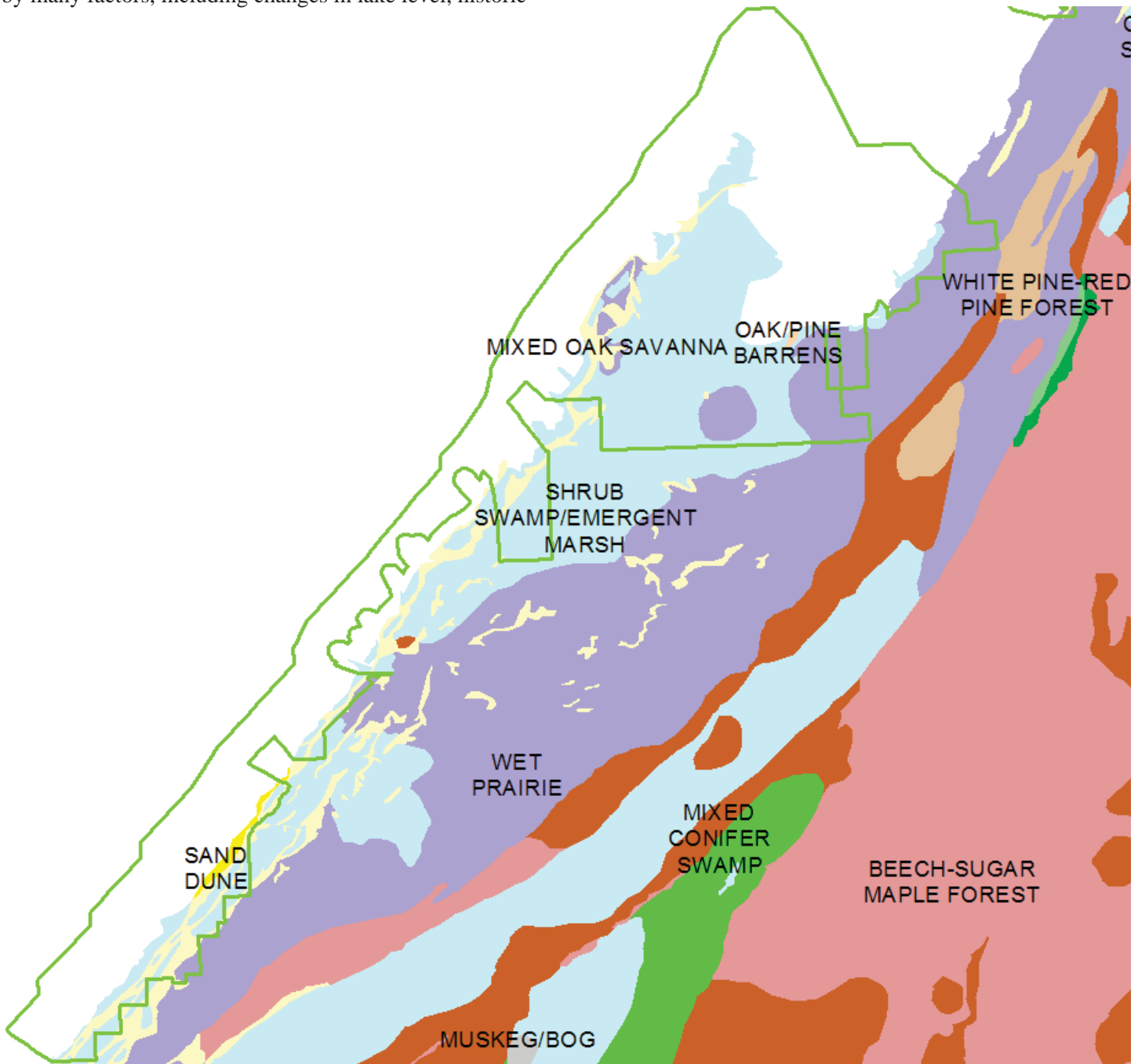
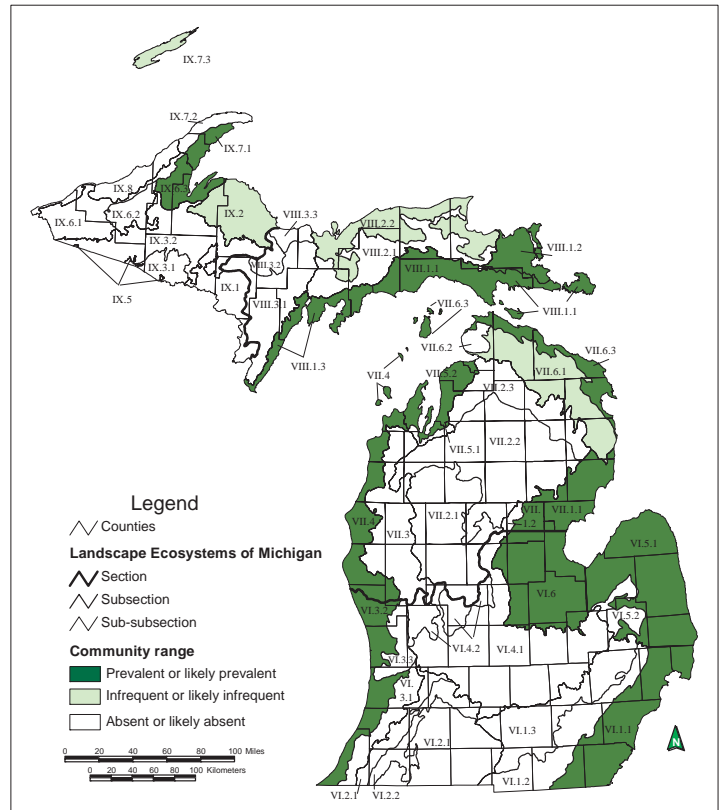


Figure 2. Circa 1800 vegetation cover of Fish Point SWA (Comer 1997).

Great Lakes Marsh

Historically, much of the area's shoreline would have been a gradual transition from lakeplain wet prairie to Great Lakes marsh and then to open water. Great Lakes marsh is an herbaceous wetland community occurring statewide along the shoreline of the Great Lakes and their major connecting rivers. Vegetative patterns are strongly influenced by water level fluctuations and geomorphology, but generally include the following zones: a deep marsh with submerged plants; an emergent marsh of mostly narrow-leaved species; and a sedge-dominated wet meadow periodically inundated by storms and high lake levels. Great Lakes marsh provides important habitat for migrating and breeding waterfowl, shore birds, and marsh birds, spawning fish, and small- and medium-sized mammals. Water level fluctuations greatly influence vegetation patterning and occur over three temporal scales: short-term fluctuations (seiche) caused by persistent winds and/or differences in barometric pressure; seasonal fluctuations reflecting the annual hydrologic cycle in the Great Lakes basin; and inter-annual fluctuations as a result of variable precipitation and evaporation within their drainage basins. Inter-annual fluctuations of 3.5 to 6.5 feet (1.3 to 2.5 m) result in changes in water current, wave action, turbidity, nutrient content or availability, alkalinity, and temperature.



Map 1. Statewide distribution of Great Lakes marsh.



Photo 1. A dense stand of Phragmites persists along the shoreline of Fish Point SWA. Much of the Great Lakes marsh along Saginaw Bay has been overtaken by the invasive Phragmites. Native vegetation characteristic of this community type persists in small pockets and between the stems of Phragmites, making treatment complex task.

There are three distinct zones within most Great Lakes marshes: wet meadow, emergent marsh, and submergent marsh. The wet meadow zone typically has shallow, saturated organic soils, but in some years can be flooded throughout the growing season. Grasses and sedges typically dominate the wet meadow zone, along with numerous other herbaceous genera. During dry periods, shrubs and tree seedlings commonly establish. The emergent marsh zone is flooded with shallow water throughout the growing season in most years, but can be dry when Great Lakes water levels are low. Dominant plants in the emergent marsh zone include bulrushes

(*Scirpus* spp. and *Schoenoplectus* spp.), spike-rushes (*Eleocharis* spp.), rushes (*Juncus* spp.), and cat-tails (*Typha* spp.), in addition to submergent and floating plants. The submergent zone has deep water and few or no emergent species. Dominant plants in the submergent marsh zone include numerous floating or submergent species (Kost et al. 2007, Cohen et al. 2015). Many Great Lakes marshes in Saginaw Bay have been seriously degraded by the invasion of exotic *Phragmites*.



Photo 2. Aerial imagery showing a north view of the mosaic of natural community types at Fish Point SWA within a landscape dominated by agriculture and hydrologic alterations. From top left to bottom right: Saginaw Bay, Great Lakes marsh (dominated by *Phragmites*), fire-suppressed oak openings, and lakeplain prairie.

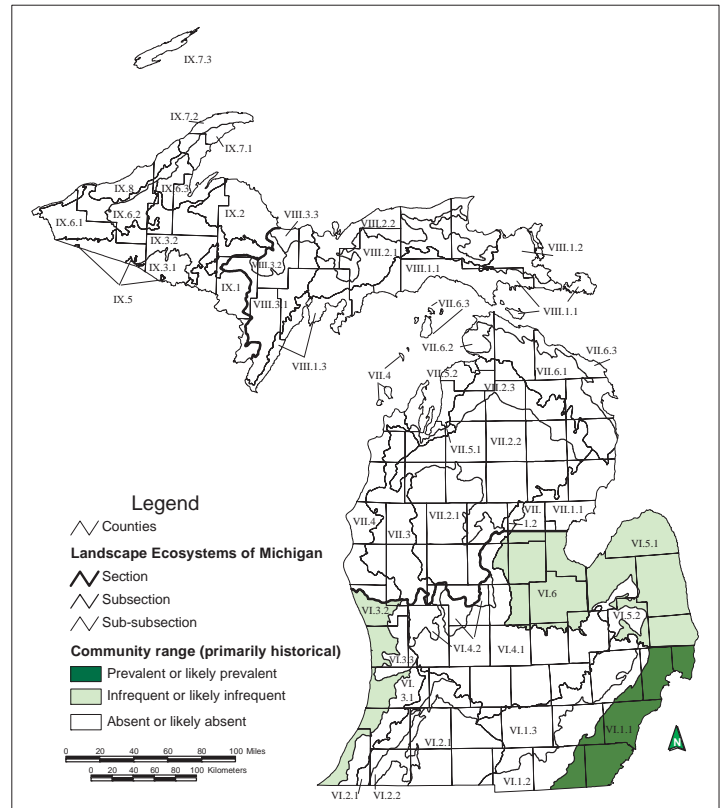
Lakeplain Prairie

Lakeplain prairie historically covered about 21% of the area now occupied by Fish Point SWA. Today only 6% of the historic prairie remains, the majority converted to agriculture or lost to Phragmites.

Lakeplain prairie is a native lowland grassland that occurs on level, seasonally inundated glacial lakeplains in the southern Lower Peninsula. Lakeplain wet prairie is found along and near the shoreline of Lake Huron in Saginaw Bay, within the St. Clair River Delta, and near Lake Erie. The community develops on slightly acidic to moderately alkaline sands, sandy loams, or silty clays. Natural processes that influence species composition and community structure include seasonal flooding, cyclic changes in Great Lakes' water levels, flooding by beaver, and fire. Lakeplain wet prairie is dominated by grasses, sedges, rushes, and a diversity of forbs. Dominant species typically include blue-joint (*Calamagrostis canadensis*), cordgrass (*Spartina pectinata*), sedges (*Carex aquatilis*, *C. pellita*, *C. stricta*, *C. prairea*, *C. buxbaumii*, and *C. tetanica*), Baltic rush (*Juncus balticus*), twig-rush (*Cladium mariscoides*), and switch grass (*Panicum virgatum*). Today, lakeplain wet prairie is nearly extirpated from Michigan due to changes in land use, colonization by shrubs and trees, and competition from invasive plants (Kost et al. 2007, Cohen et al. 2015).

Lakeplain wet-mesic prairie develop under very similar conditions as lakeplain wet prairie but occur under slightly drier conditions (e.g., moist versus saturated). This subtle hydrologic difference allows a different plant community to develop, with prairie grasses, sedges, and a diversity of forbs dominating the community. Dominant species typically include big bluestem (*Andropogon gerardii*), cordgrass, switch grass, little bluestem (*Schizachyrium scoparium*), Indian grass (*Sorghastrum nutans*), common mountain mint (*Pycnanthemum virginianum*), tall coreopsis (*Coreopsis tripteris*), and marsh blazing star (*Liatris spicata*). Similar to lakeplain wet prairie, lakeplain wet-mesic prairie is nearly extirpated from Michigan due to land use changes, shrub and tree encroachment, and invasive plant colonization (Kost et al. 2007, Cohen et al. 2014).

These two prairie communities are similar and often hard to differentiate. Further distinction will not be made and they will be referred to as lakeplain prairie as the distinction is not practical in the context of this document and the recommendations therein. These are critically imperiled ecosystems and less than 1% of the former extent remains in Michigan.



Map 2. Statewide distribution of lakeplain wet and wet-mesic prairie.



Photo 3. A population of the federally threatened prairie fringed orchid (*Platanthera leucophaea*) estimated to have good long-term viability has been documented in the lakeplain prairies at Fish Point SWA as recently as 2017.

Lakeplain Oak Openings

Within Saginaw Bay, changes in lake levels during the end of the last ice age led to the deposition of sands forming dry ridges running parallel to the lakeshore. Historically, alternating bands of wetland and upland formed a complex mosaic of prairie and savanna that transitioned into inundated marshes in wetter areas and savanna systems and deciduous forest at the drier end. Oak openings historically covered 13% of Fish Point SWA and has since been converted to closed canopy forest as a result of fire suppression.

The lakeplain oak openings are a fire-dependent savanna community, dominated by oaks and characterized by a graminoid-dominated ground layer of species associated with both lakeplain prairie and forest communities. Lakeplain oak openings occur within the southern Lower Peninsula on glacial lakeplains on sand ridges, level sandplains, or adjacent depressions. Open conditions were historically maintained by frequent fire, and in depressions, by seasonal flooding. Lakeplain oak openings persist when fire, hydrology, and/or drought prevent canopy closure. The character of lakeplain oak openings can differ dramatically, primarily as the result of varying fire intensity and frequency, which are influenced by climatic conditions, soil

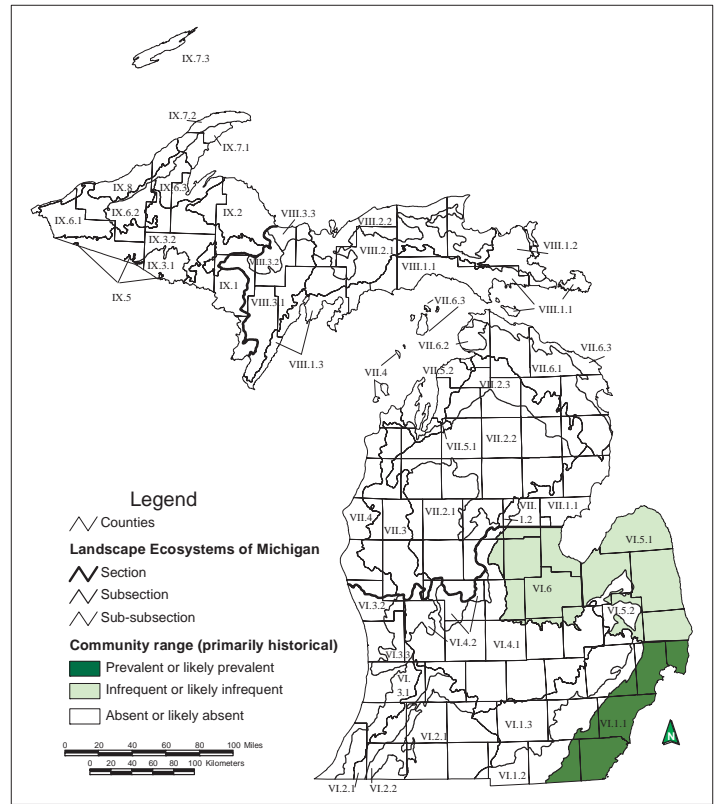
texture, topography, and landscape context (i.e., proximity to water bodies and fire-resistant or fire-conducting plant communities). Infrequent, high-intensity fires kill mature oaks and produce openings with abundant scrubby oak sprouts (i.e., oak grubs). Park-like openings, with widely spaced trees and an open grass understory, are maintained by frequent, low-intensity fires, which occur often enough to restrict maturation of oak grubs. Frequent, low-intensity fires also maintain high grass and forb diversity by deterring the encroachment of woody vegetation and limiting single species dominance. Presently, the prevalent catalyst of fires is lightning strike, but historically Native Americans played an integral role in the fire regime, accidentally and/or intentionally setting fire to savanna and prairie ecosystems. Seasonally high water levels play an important role in maintaining the open condition of lakeplain oak openings in low laying areas.

Dominant canopy species of droughty sand ridges are black oak (*Quercus velutina*) and white oak (*Q. alba*). Bur oak (*Quercus macrocarpa*), pin oak (*Q. palustris*), and swamp white oak (*Q. bicolor*) are prevalent on flat, poorly drained areas. Canopy and subcanopy associates of ridges include hickory species (*Carya* spp.), green ash (*Fraxinus pennsylvanica*), and sassafras (*Sassafras*



Photo 4. The lakeplain oak openings of the region have converted to closed-canopy oak forest as a result of fire suppression. Often the only indication of the historic composition is the presence of large, open-grown bur oaks like the one pictured. Photo by Aaron Kortenhoven 2017.

albidum). Canopy associates of swales include green ash, silver maple (*Acer saccharinum*), red maple (*A. rubrum*), and cottonwood (*Populus deltoides*). The ground layer historically consisted of species typical of lakeplain wet-mesic prairie. Ground flora of sandy ridges is characterized by big bluestem (*Andropogon gerardii*), bluejoint grass (*Calamagrostis canadensis*), Pennsylvania sedge (*Carex pensylvanica*), blazing star (*Liatris* spp.), little bluestem (*Schizachyrium scoparium*), and Indian grass (*Sorghastrum nutans*). Shrubs of sandy ridges include serviceberries (*Amelanchier* spp.), bearberry (*Arctostaphylos uva-ursi*), New Jersey tea (*Ceanothus americanus*), gray dogwood (*Cornus foemina*), American hazelnut (*Corylus americana*), hawthorns (*Crataegus* spp.), huckleberry (*Gaylussacia baccata*), cherries (*Prunus* spp.), sumacs (*Rhus* spp.), dewberry (*Rubus flagellaris*), and blueberries (*Vaccinium* spp.). Common ground flora in swales includes bluejoint grass, tussock sedge (*Carex stricta*), sedge (*C. aquatilis*), twig-rush (*Cladium mariscoides*), switch grass (*Panicum virgatum*), Virginia mountain mint (*Pycnanthemum virginianum*), and cordgrass (*Spartina pectinata*). Prevalent shrubs in swales include black chokeberry (*Aronia prunifolia*), buttonbush (*Cephalanthus occidentalis*), dogwoods (*Cornus* spp.), winterberry (*Ilex verticillata*), shrubby cinquefoil (*Dasiphora fruticosa*), and willows (*Salix* spp.) (Kost et al. 2007, Cohen et al. 2015).



Map 3. Statewide distribution of lakeplain oak openings.



Photo 5. Decades of fire suppression makes recognizing areas that were historically lakeplain oak openings difficult to recognize. The dense subcanopy and increased shade suppresses characteristic herbaceous vegetation.

PROJECT AREAS

Four project areas have been identified and prioritized based on relative quality of the prairie remnants in the area. Additional factors considered were: ease of treatments, presence of rare taxa, existing features for burn breaks, and additional communities that would benefit from management actions. Together, the project areas comprise 510 acres and would represent one of the largest prairie restoration projects in the state.

The recommendations outlined below are aimed at improving existing high-quality habitats that have not been totally invaded and restoration efforts have increased chance of achieving goals. These prairie systems are some of the rarest ecosystems in the region and require active management to prevent further degradation. Many are in relatively good condition and the proposed projects could have positive impacts on a sizeable proportion of the State's remaining lakeplain prairie systems.

Lakeplain prairies are one of the rarest and most imperiled natural communities in our region. Their scarcity and the fragmented nature of the remaining examples highlight the needs for restoration efforts. Additionally, promoting ecological integrity of the prairies benefits turkey, pheasant, and white-tailed deer. Including the forested areas in the project areas will help restore the savanna structure to the oak openings systems which is particularly beneficial to turkey and deer. This approach will also protect the oak resource that provides a critical food source for wildlife. Using prescribed fire in these upland systems with the explicit goal of reducing the canopy will decrease competition among remaining trees, promote greater oak regeneration, and increase the native herbaceous component of the ground layer; thereby improving habitat for wildlife and promoting the ecological integrity of the oak openings.

The restoration work required for these systems is complex and requires a nuanced and adaptable approach with a long-term vision of promoting ecosystem integrity. The main management recommendations are to reintroduce fire as a critical disturbance factor and control invasive species within the lakeplain prairie remnants and in the surrounding landscape using prescribed fire, mechanical removal, and herbicide application. A sustained and concentrated effort to implement fire and control invasive species in the highest quality prairie remnants is recommended. In

addition, varying the seasonality of the prescribed fire to reduce woody encroachment of glossy buckthorn as well as native shrubs (e.g., dogwoods, willows, etc.) that are increasing due to fire suppression. Conducting burns in late spring after leafout or during the growing season is recommended because energy reserves are already partially depleted, and resprouting vigor is low, particularly for clonal species.

Treatment of Phragmites should be focused in zones of high-quality lakeplain prairie, particularly at the perimeter and any pockets within. This is labor-intensive but will be a continual activity for the foreseeable future. The timing of application and the specific herbicide used should be determined by a licensed professional with experience working in lakeplain prairies. Avoidance of non-target species is critical to prevent lasting collateral damage to the natural community of restoration interest. Reduction of woody encroachment at the transition zone from prairie to forest is also important and may be achieved through winter mowing with a wet blade. It is critical to do this when the ground is frozen to avoid disturbing the soil and to limit the potential impacts to non-target vegetation. Shrubs are also susceptible to cut-stem application of herbicide during winter months.

If resources cannot be dedicated to all project areas for a prolonged period, then managers should consider focusing on one or two areas and dedicating resources at these sites for several seasons to achieve sustainable results. The proposed project areas are introduced in order of priority, but the implementation of the work will depend on the discretion of the managers. Keeping detailed records of the treatments and monitoring the project areas before and after implementation are critical to determine the success of the work and to make adjustments as priorities change and new threats emerge.

Fish Point SWA is an ecologically unique place with opportunities to conserve some of Michigan's rarest natural heritage. Lakeplain prairie is a globally imperiled natural community with less than 1% of their historic extent remaining. There are 15 remnants of lakeplain wet prairie and 25 remnants of lakeplain wet-mesic prairie remaining in the state. These projects are designed to protect these places and the wildlife that utilizes them.

Project Area 1: Berger Rd Prairie

Stands: 98, 99, 101, and 102. Total project area is about 215 acres.

With 85 acres of high-quality prairie, this is largest prairie remnant in Fish Point SWA and one of the highest quality prairie complexes in the Saginaw Bay region. This remnant also supports several rare plants, including the federally threatened prairie fringed orchid (Table 1). We recommend returning fire to the system, treating *Phragmites* at the edges of the high-quality habitat, and preventing ORVs from further degrading the system. The use of prescribed fire is paramount and regular burns should be planned and the seasonality of those burns varied to maximize biodiversity and mimic the historic fire regime. Reed canary grass is also a major concern and is in small patches throughout the system, particularly in Stand 101. Prairie fringed orchid has been documented here as recently as 2017 and needs to be factored into management plans. The orchid responds positively to prescribed fire, but herbicide application must be carefully planned to avoid impacting this species.

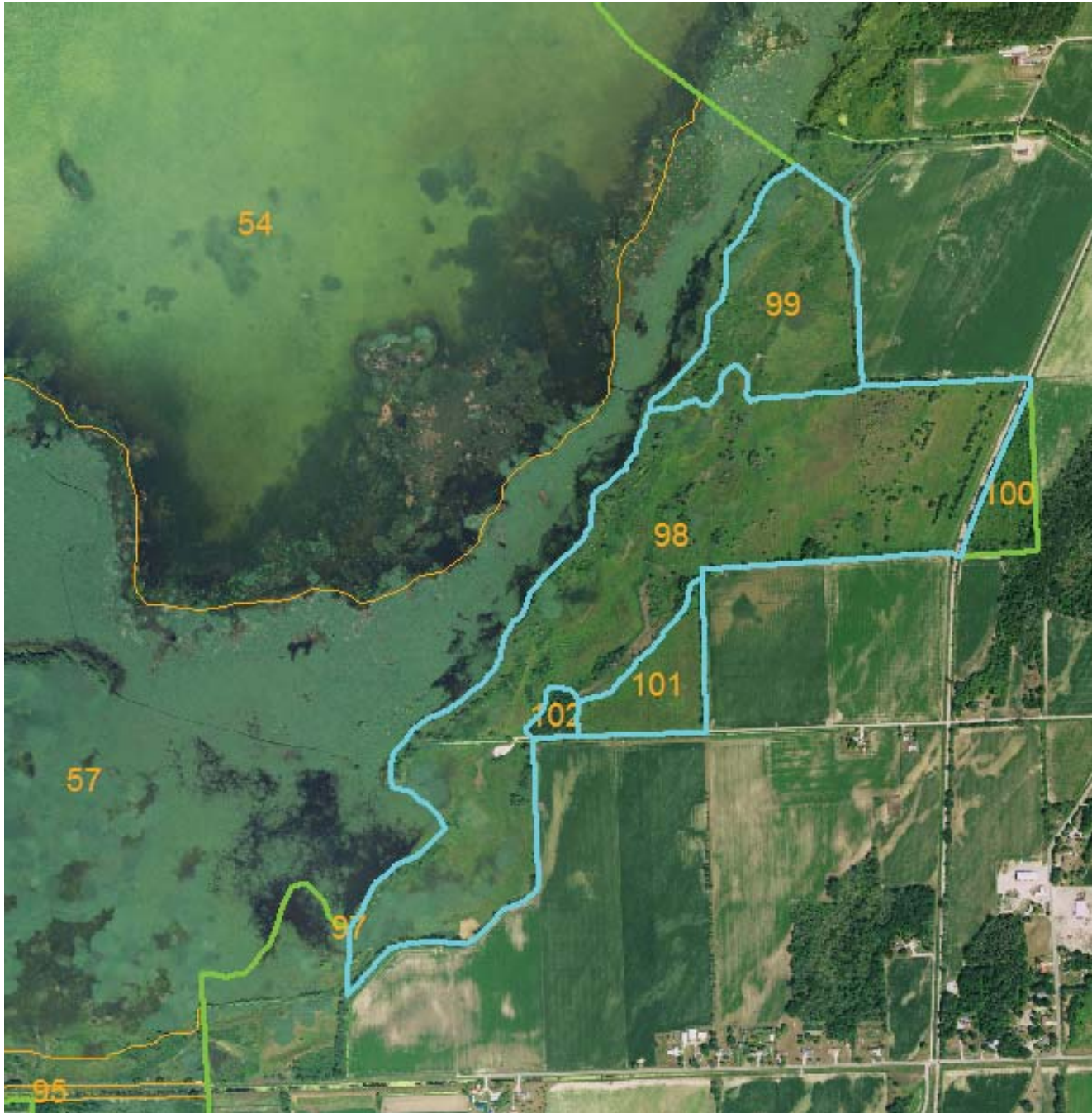


Figure 3. Berger Rd Prairie project area is highlighted in blue. The highest quality prairie is in Stand 98, north of Berger Rd and extends into Stand 99. Stand 57 is degraded Great Lakes marsh and is totally dominated by *Phragmites*.

The most intact prairie areas are north of Berger Rd but additional habitat occurs south of the road and is facing significant encroachment from Phragmites. Actions to push the Phragmites back from the highest quality areas needs to be prioritized, which would be most effective in concert with prescribed fire. Stand 101 seems to have been impacted from hydrologic alteration and past tilling and has a lower species diversity overall but is still dominated by native vegetation. Therefore, Stand 101 should not be a top priority area for restoration activities but should still be included in the larger project. There are existing features that would function as burn breaks at the edges of the property (i.e., ditches, shoreline, roads) such that the entire area could be burned without the developing many additional burn breaks. The inclusion of small forested upland areas will establish variable age classes of aspen and promote potential grouse habitat. Expansion and maintenance of the grassland complex will also benefit pheasants, turkey, and deer.

Table 1. Element occurrences at Berger Rd Prairie. EO Rank abbreviations are as follows: B, good estimated viability; C, fair estimated viability; D, poor estimated viability. Ranks are as follows: S1, critically imperiled in the state because of extreme rarity or vulnerability; S2, imperiled because of rarity or a factor making it vulnerable to extirpation.

Common Name	Scientific Name	EO ID	EO Rank	Year First Observed	Year Last Observed	Global Rank	State Rank
Natural Communities							
Lakeplain wet prairie		260	C	1981	2015	G2	S1
Lakeplain wet-mesic prairie		2053	C	1981	2015	G1	S1
Plants							
Tall green milkweed	<i>Asclepias hirtella</i>	8429	D	1908	2017	G5	S2
Sullivant's milkweed	<i>Asclepias sullivantii</i>	21233	B	2017	2017	G5	S2
Prairie fringed orchid	<i>Platanthera leucophaea</i>	378	B	1981	2017	G2/G3	S1



Photo 6. Berger Rd Prairie (Stand 98 is pictured) is 84 acres of C-ranked prairie and an important example of the community type in the Saginaw Bay region. Phragmites is one of the primary concerns and is clearly visible on the left side of the image. An additional concern is ORV activity which seems to be more prevalent in recent years.

Project Area 2: Dickerson-King Prairie

Stands: Prairie remnants in Stands 19, 20, 43, and 130. Forested areas for lake plain oak openings restoration in Stands 10 (north of Dickerson Rd) and 40. Total project area is about 110 acres.

This project area has high-quality lakeplain prairie remnants that were ditched but not tilled. This site was selected because of the ease of access from Dickerson Rd, the size and quality of the prairie remnant, the potential for lakeplain oak openings restoration, and existence of features that function as burn breaks. As with other project areas, prescribed fire and control of non-native Phragmites and other invasive species are top priorities. Several additional invasive species, glossy and common buckthorn, purple loosestrife, narrow leaf cat-tail, and reed canary grass, are present and need to be a part of a comprehensive plan for invasive species control. Both native Phragmites and cat-tail are found throughout the system and should be surveyed for and avoided when implementing invasive species control efforts. Similarly, this site has populations of rare plants - white lady slipper orchid and tall green milkweed - and these species should be surveyed for and avoided during herbicide treatments.

Reducing the density of shrubs at the interface of forested upland and prairie is important for ensuring fire carries from one habitat to the other during prescribed burns. Shrub removal can be accomplished by mowing with a wet blade in winter months when the ground is frozen. Winter mowing with a wet blade should also be focused in Stand 19 which has characteristic lakeplain prairie vegetation and is highly recoverable to a prairie state. The transition zone between prairie and forested upland should also be targeted for shrub removal before a burn to maximize the impacts of burning.



Figure 4. Dickerson-King Prairie project area is highlighted in blue.

The inclusion of private property that separates Stands 20 and 43 complicates the management approach in this project area. The vegetation on the private property appears to be high-quality and should be included in the management actions. The land owner appears to use the land for hunting and may be receptive to participation in management activities due to the benefits to wildlife conferred by prescribed burns and invasive species removal. Potential burn breaks exist and additional fire line development would be minimal. Burning should be conducted at regular intervals of 2 to 5 years with the seasonality varied to maximize biodiversity. Additional goals of burning are to reduce the understory species in the uplands of Stands 10 and 40. Ideally, the fire intensity would cause some mortality of canopy constituents in these stands to increase light penetration to the ground and stimulate oak regeneration. The improvement of the oak resource should be a primary objective here and can be achieved by reducing competition from subcanopy species and gradual thinning of the canopy through a progressive burn plan.

Table 2. Element occurrences at Dickerson-King Prairie. EO Rank abbreviations are as follows: A, excellent estimated viability, BC, good to fair estimated viability; CD, fair to poor. Ranks are as follows: S1, critically imperiled in the state because of extreme rarity or vulnerability; S2, imperiled because of rarity or a factor making it vulnerable to extirpation.

Common Name	Scientific Name	EO ID	EO Rank	Year First Observed	Year Last Observed	Global Rank	State Rank
Natural Communities							
Lakeplain wet prairie		12438	CD	1990	2015	G2	S1
Plants							
Tall green milkweed	<i>Asclepias hirtella</i>	11460	A	1991	1993	G5	S2
White lady slipper	<i>Cypripedium candidum</i>	2521	BC	1908	2017	G4	S2



Photo 7. The white lady slipper (*Cypripedium candidum*) is a state threatened orchid with a population in the lakeplain prairie at the Dickerson-King Project site. The population was estimated to be of good to fair viability but requires open habitat and therefore benefits from management with prescribed fire.

Project Area 3: Carson-King Prairie

Stands: Prairie remnants are in Stands 27 and 138. Degraded prairie remnants for inclusion are in Stands 23, 26, 28, 32, and 135. Forested stands for oak openings restoration in Stands 24, 25, and 33; all work is south of the boat launch access road. Total project area is about 150 acres.

This is a large project area containing relatively large zones of intact lakeplain prairie that appear to have been degraded by ditching. Much of Stands 23, 26, 28, 32, and 135 have characteristic prairie vegetation intermixed with dense shrubs, Phragmites, and trees. Ash caused by emerald ash borer in many of the lowland areas seems to have temporarily stalled the conversion from prairie to swamp. Proposed restoration work in this zone would be complex, large in scale, and would again focus on return of prescribed fire, control of invasive species, and reduction of woody encroachment.

Table 3. Element occurrences at Carson-King Prairie. These EOs are identical to those at Dickerson-King Project area with the exception of a leafhopper. The leafhopper is designated as S3, or rare in the state, and though the population was documented, there is not enough information to determine its rank; thus an EO Rank of E.

Common Name	Scientific Name	EO ID	EO Rank	Year First Observed	Year Last Observed	Global Rank	State Rank
Natural Communities							
Lakeplain wet prairie		12438	CD	1990	2015	G2	S1
Plants							
Tall green milkweed	<i>Asclepias hirtella</i>	11460	A	1991	1993	G5	S2
White lady slipper	<i>Cypripedium candidum</i>	2521	BC	1908	2017	G4	S2
Animals							
Leafhopper	<i>Dorydiella kansana</i>	14423	E	1994	1995	NR	S3



Figure 5. Carson-King Prairie project area is highlighted in blue. The highest quality prairie remnants are in Stands 27 and 138. Stand 24 is one of the best opportunities for lakeplain oak openings restoration within Fish Point SWA. Access to the entirety of the project area would likely be difficult without trail development and bridges.

We recommend immediate actions focus on return of fire and reduction of invasive species in and around Stands 138 and 27, as these are the highest quality prairie remnants. Expanding these prairie zones and connecting them to adjacent uplands during prescribed burns should be relatively easy to accomplish through mowing zones of shrub with a wet blade in the winter prior to a burn. Stand 23 has an abundance of prairie vegetation and winter mowing, prescribed fire, and treatment of invasive species should be prioritized in this stand early in the restoration process. Connecting Stand 138 to 24 can be accomplished by focusing winter mowing in portions of Stand 32. Similarly, Stand 27 can be connected to Stand 24 by focusing winter mowing in the portions of Stand 26 that separate the two; doing so would facilitate fire carrying between prairie and savanna systems, thus and making fire a more effective tool in landscape restoration. There are deep ditches throughout the entire project area, so winter mowing may be difficult in some places. Brush saws and application of herbicide to cut stumps may be required in places with uneven terrain.

Expanding and protecting Stands 27 and 138 are the highest priorities in this project area. Access to Stand 27 is presently limited do to ditches and distance from roads and access will need to be improved for restoration of this site and ensuring that this stand is included in prescribed burns. Although Stands 26, 28, 32, and 135 have characteristic prairie vegetation locally, they should not be the primary focus for restoration efforts beyond being included in prescribed burns, at least until the priority areas in Stands 27 and 138 have received attention and the invasive species are being treated and monitored.

This project area has the most potential for restoring lakeplain oak openings which historically occurred throughout Stands 24 and 25. Restoration of the lakeplain prairie and oak openings would provide benefits to wildlife and new recreational opportunities. This project is very complex in terms of management actions and prioritization and therefore would require concerted monitoring efforts over a large area using an adaptive management approach. Establishing new permanent burn breaks will also be difficult as there is extensive private property to the east. Finally, portable bridges may be needed to negotiate deep ditches particularly in the southern portion of the project area as well as a ditch that bisects Stands 24, 135, and 32.



Photo 8. The high-quality prairie habitat in Stand 138 (foreground) is separated from the forested uplands in Stand 24 (background) by a dense shrub thicket in Stand 32. This shrub zone is suppressing prairie vegetation and will act as a barrier preventing prescribed fire from carrying from one area to the other. Winter mowing with a wet blade is therefore a potential management action that will help expand prairie habitat and restore lakeplain oak openings.

Project Area 4: Bradford-Black Prairie Project Area

Stands: 10 (southern half), 127, and 129. Total project area is about 35 acres.

This is the lowest priority project area identified in this document. The prairie remnant in Stand 129 was likely tilled but revegetated primarily with characteristic prairie species. It is surrounded by a dense thicket of glossy buckthorn, which is also invading the core prairie remnant. There is also limited access to the project area due to a deep ditch between Bradford Rd and the prairie area. We recommend the following actions to foster restoration of lakeplain prairie within this project area: the return of fire to the systems; treatment of Phragmites and other invasive species; and long-term monitoring of the project area. Glossy buckthorn will be a pernicious pest and will require significant resources in the early phases of restoration. Additionally, the use of a portable bridge to span the ditch along Bradford Rd will be necessary to save time and improve accessibility.

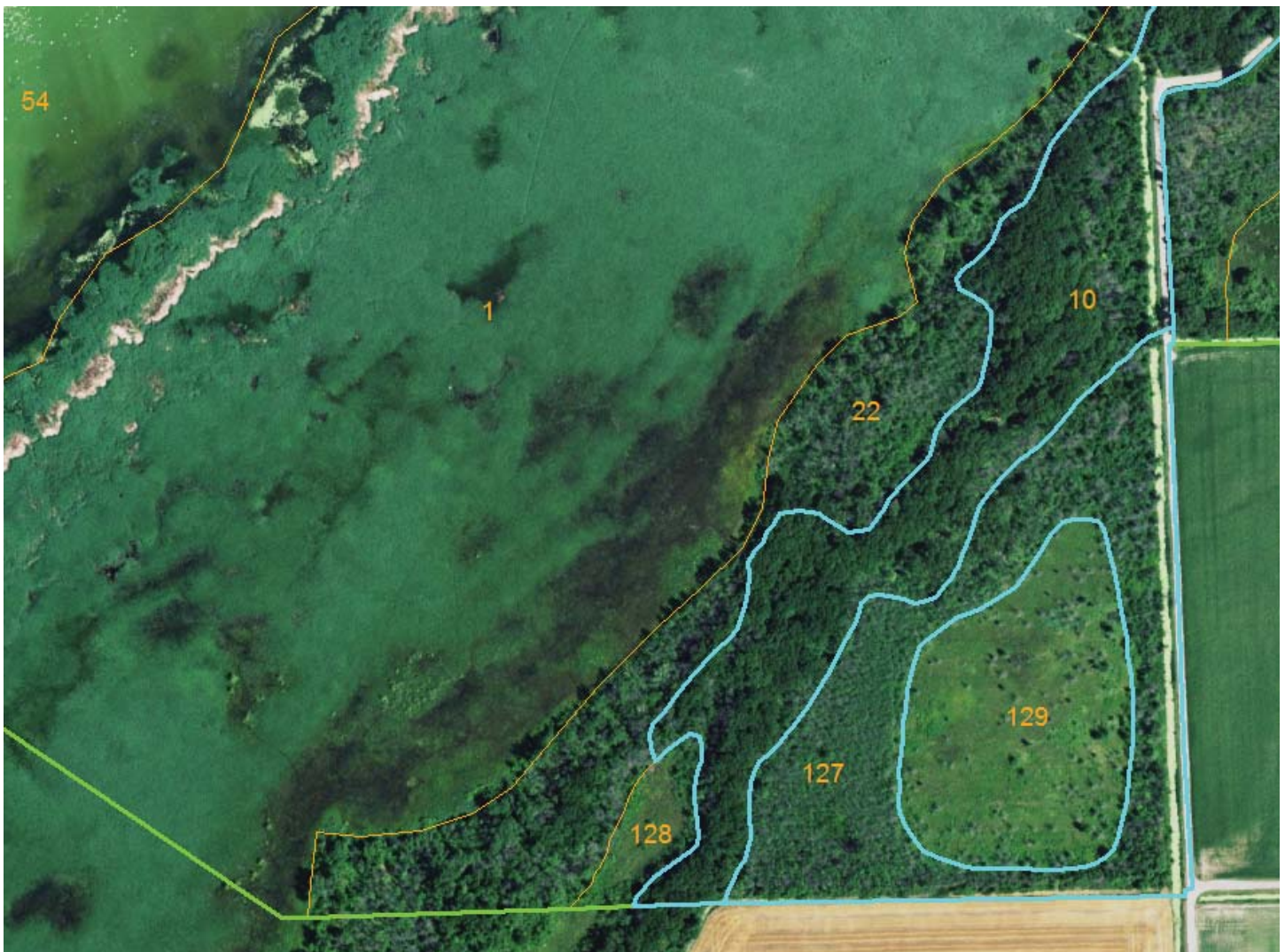


Figure 6. Bradford-Black Prairie project area is highlighted in blue. The prairie remnant is in Stand 129 and there is potential for lakeplain oak openings restoration in Stand 10. Access is limited and temporary bridges may need to be included to span the ditch along Bradford Rd in order to facilitate access.

Despite the drawbacks of this project site, there is a relatively extensive patch of remnant prairie with good plant diversity and the federally endangered prairie fringed orchid was historically observed at this site. Originally observed in 1961 and not documented since 2000, the population was estimated to have good viability during the most recent survey. However, the habitat was rapidly declining as a result of invasion by dogwood and buckthorn and further survey efforts are warranted to determine if the species is still present.

Stand 10 has potential for creation of savanna structure and Stands 10 and 129 could be connected with relatively straightforward – though extensive – shrub control in Stand 127. Glossy buckthorn is currently suppressing existing prairie vegetation in Stand 127. Removal of buckthorn could promote a rebound of prairie vegetation, particularly if shrub removal is coordinated with prescribed fire. Connecting Stands 10 and 129 would also facilitate transfer of fire from upland to lowland systems, making the prescribed burning process easier.



Photo 9. Stand 129 is dominated by characteristic prairie vegetation, though pockets of invasive Phragmites, reed canary grass, and narrow leaf cat-tail persist throughout. Glossy buckthorn shown in the background of this photo as the dark green shrub band between the prairie and adjacent forest is totally dominating Stand 127 and found within the prairie in Stand 129. Despite the challenges, this area remains a viable project area for prairie restoration.

CONCLUSIONS

Within Michigan, both lakeplain wet prairie and lakeplain wet-mesic prairie are classified as critically imperiled. Statewide there are only 15 documented occurrences of lakeplain wet prairie and 25 occurrences of lakeplain wet-mesic prairie. Globally, lakeplain wet prairie is imperiled and lakeplain wet-mesic prairie is critically imperiled. In addition, lakeplain prairie ecosystems provide habitat for both game and non-game species.

Numerous rare species that depend on lakeplain ecosystems have been documented within Fish Point SWA. Element occurrence records are known from within the wildlife area for the following rare species: bald eagle (*Haliaeetus leucocephalus*, state special concern), Forster's tern (*Sterna forsteri*, state threatened), yellow-headed blackbird (*Xanthocephalus xanthocephalus*, state special concern), American bittern (*Botaurus lentiginosus*, state special concern), marsh wren (*Cistothorus palustris*, state special concern), leafhopper (*Flexamia reflexa*, state special concern), prairie fringed orchid (*Platanthera leucophaea*, federally endangered), prairie Indian plantain (*Arnoglossum plantaginea*, state special concern), white lady slipper (*Cypripedium candidum*, state threatened),

tall green milkweed (*Asclepias hirtella*, state endangered), and Sullivant's milkweed (*Asclepias sullivantii*, state threatened).

Given the rarity of these ecosystems and the critical habitat they provide, occurrences of lakeplain wet and wet-mesic prairie are priorities for conservation. With the rapid spread of Phragmites and glossy buckthorn, the pockets of remnant lakeplain wet prairie and lakeplain wet-mesic prairie are shrinking. To maintain these community types at Fish Point SWA, we suggest controlling the spread of invasive species and eliminating clusters of invasive species from the highest quality lakeplain prairie remnants and returning fire to the landscape.

We recommend using prescribed fire, mechanical removal, and herbicide application to achieve desired outcomes. Finally, monitoring of all management activities is recommended to facilitate adaptive management. By gauging the efficacy of natural community restoration to meet the goals of reducing invasive species populations, adjustments to management strategies can be made if desired outcomes are not achieved.



Photo 10. The prairie systems in the Saginaw Bay area are unique and emblematic of the region and provide important habitat for a myriad of wildlife and rare species.

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