Rare Species and Natural Features Assessment of "Hartman Tract" at Shiawassee Basin Preserve

Davisburg, Springfield Township, Oakland County, Michigan

Prepared for Springfield Charter Township

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Michigan Natural Features Inventory

Lansing, Michigan

Submitted: December 20, 2018

MNFI Report 2018-20

Funding for this project was provided through a service agreement between Springfield Township, Oakland County, Michigan and Michigan Natural Features Inventory.

Suggested Citation:

Penskar, M.R. and M.A. Sanders. 2108. Rare Species and Natural Features Assessment of "Hartman Tract" at Shiawassee Basin Preserve, Davisburg, Springfield Township, Oakland County, Michigan. Prepared for Springfield Charter Township. Michigan Natural Features Inventory, Report No. 2018-20, Lansing, MI. 25 pp. + appendices.

Cover photograph: Upper slope edge of wet-mesic prairie located in the west tract of the Hartman property, Davisburg, Springfield Township, Oakland County, Michigan. Photograph by M.R. Penskar.

Note: All photographs by M.R. Penskar.

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INTRODUCTION

In June 2018 Michigan Natural Features Inventory (MNFI) contracted with Springfield Township, via the township Natural Resources Manager, Michael Losey, for conducting a floristic and natural community assessment of two recently acquired land parcels of a collective 55 acres in size known as the Hartman Tract (T04N R08E Sections 17 and 18) (Figure 1). Site assessments such as these have been conducted previously elsewhere in the township, such as those that enabled the preparation of the *Ecological Management Plan and Visitor Access Recommendations for River Run Preserve* (Losey 2015). However, in order to prepare similar but more highly detailed, site-specific recommendations desired for the Hartman Tract, MNFI was employed to conduct methodical floristic and natural community surveys. Specifically, this inventory was conducted to accomplish several goals, including: 1) verifying and better identifying natural community boundaries, 2) delineating potentially new natural community types within the tract, 3) seeking additional listed (i.e. rare) plant species within the survey area, 4) more fully characterizing and corroborating natural community assessments and quality through the compilation of detailed flora lists for each observed natural community, and 5) providing a series of brief recommendations to consider in the future management of the natural communities within the Hartman Tract. This report summarizes MNFI survey efforts and was prepared to both inform and help guide long-term planning, restoration efforts, and ongoing stewardship activities currently taking place in several adjacent areas within Springfield Township.

METHODS

Floristic Surveys

Prior to conducting field surveys, the MNFI statewide natural features database (Michigan Natural Features Inventory 2018) was queried, in conjunction with aerial imagery, to assess the specific survey areas within the context of the local landscape and identify all currently tracked natural features and their spatial extent, condition, and quality. Following examination of the MNFI statewide database, a series of aerial photos depicting these natural features was printed out and later carried for reference and review during all field surveys conducted (Figure 2). In addition to these materials, the MNFI Rare Species Explorer (MNFI 2018) was queried for a list of all rare plant species known to be associated with prairie fens as an additional field reference (See FQA in Appendix). Two important information sources consulted throughout this project were the Field Manual of the Michigan Flora (Voss and Reznicek 2012) and the MICHIGAN FLORA ONLINE (2011). Both of these sources were used in innumerable ways but particularly for keying and determining specimens, studying species distributions and habitat types, and searching the collections database of the U-M Herbarium (MICH) for Oakland County to ascertain the significance of several species observed and collected during our inventories.

Floristic surveys were initiated on June 29, 2018 by conducting standard meander-searches periodically throughout each natural community area. The meander-search technique was employed to optimize the characterization of each site's habitat diversity and also increase the likelihood of encountering any rare species or their potential habitats. The vascular plant flora identified for each natural community site surveyed was methodically tallied on a field form, and then subsequently entered into the online Universal Floristic Quality Assessment (FQA) Calculator (Freyman et al. 2016, https://universalfqa.org/) utilizing the FQA list for Michigan (Slaughter et al. 2015). Following the initial floristic tallies of the natural communities surveyed, the output of the developing FQA list for each site surveyed was then carried in the field on subsequent visits for reference, such that only newly encountered species were

recorded. Small specimens of species that could not be easily identified in the field were typically collected during each survey foray, and later keyed and determined at the University of Michigan Herbarium (MICH). Photos other than those obtained for natural community characterization purposes were taken of selected species to illustrate showy, unusual, or rare and indicator species as needed. After being initiated on June 29th, site surveys were successively conducted on July 19th, July 26th, August 20th, September 11th, September 19th, and October 12th.

Natural Community Surveys

Natural community surveys were conducted while performing the same methodical meander-searches used to compile flora lists and characterize each site's habitat diversity. Natural communities were largely assessed by documenting the vegetation present and noting plant species dominance and abundance, vegetation boundaries and zonation, and examining, as needed, soil types and other noteworthy aspects of a site, including characteristic microtopographic features such as tip-up mounds in upland sites and hummocks, springs, and marl pond seepages in the fens. Representative photos of most community types surveyed were acquired during field surveys, and a Garmin Montana model 650t GPS unit was employed to record survey tracks for most meander-searches carried out in addition to taking point locations where needed (Figure 2). Special emphasis was placed on taking photos of the landscape position of communities and selected features to help depict forest structure and composition, disturbance processes, specimen trees, features such as stump-sprouting and other aspects of plant habit (growth form), noteworthy invasive plants, slope position, and microtopography. We also made note of landscape position, context, slope, and aspect as necessary to assist in the interpretation of natural community structure, intactness, and quality. A list of the vascular plant flora for each community type within each of the two Hartman land tracts was compiled and summarized using the Universal Floristic Quality Assessment (FQA) Calculator as cited above. As described above, the several metrics generated by the floristic quality assessment are useful in characterizing the relative quality and condition of a natural community in comparison to examples of these types elsewhere in Michigan (Slaughter et al. 2015). After being initiated on June 29, site surveys were then conducted on the dates so noted above.

Survey Sites

In collaboration with M. Losey, Natural Resources Manager for Springfield Township, several discrete survey sites were delineated *a priori* to identify the specific focus areas for this inventory. Of the two land parcels that comprise the Hartman tract, hereafter identified as the "East Tract" and the "West Tract", the survey sites consisted of a total of seven areas (Figure 3). Within the East Tract, the survey sites consisted of: 1) the prairie fen abutting the south side of Davis Lake and 2) a small, disturbed, successional patch forest between the railroad tracks and the fen. Within the West Tract, the survey sites were comprised of: 3) the relatively large, dry-mesic southern forest on the south-facing slope at the north edge of the tract, 4) a small wetland depression within the dry-mesic southern forest, 5) the prairie fen surrounding a small, pothole lake contiguous with additional areas of fen extending past a small stream south to the railroad tracks, 6) a relatively large patch forest on the south edge of the tract abutting the railroad tracks, and 7) a small, newly discovered example of a rare wet-mesic prairie formed in the transition zone between prairie fen and upland forest southeast of the pothole lake north of the stream channel.

FINDINGS

Landscape Context and Pre-European Settlement Vegetation

The Hartman Tract occurs near the upper western edge of the Jackson Interlobate sub-subsection, according to the three-state, hierarchical ecosystem classification developed by Albert (1995). The Interlobate is a large, distinctive, and wide-ranging component of the southeastern Michigan landscape, occurring at the southern border of Lapeer County and arcing southwest down to the edge of Calhoun, Hillsdale, and Lenawee counties (see map in Albert 1995). The landscape setting of the Hartman Tract is typical of the glacial interlobate region covering approximately 50% of Oakland County, comprising a pattern of poorly drained outwash channels and plains near low or marked hills formed by coarse-textured deposits of glacial end moraines and ice-contact features. Ice-contact features are landforms such as kames or eskers, which are created in the steep valleys and other concavities of a retreating, deteriorating ice sheet through the deposition of unstratified to semi-stratified coarse sands and gravels from glacial meltwaters. The steep, south-facing slope at the northern edge of the Hartman Tract is likely a large ice-contact feature, as evidenced by its very sandy soils, with the prairie fen areas from above Long Lake to Davis Lake and beyond consisting of an extensive drainage valley likely formed on a localized outwash channel or outwash plain.

The pre-European settlement vegetation for the survey site, as delineated and mapped by Comer and Albert (1997) indicates that as of circa 1800 the upland areas throughout the vast majority of sections 17 and 18 in Springfield Township were dominated by black oak barrens. Overall, black oak barrens and oak-hickory forest dominated most of the upland habitats in the northwest region of Oakland County, which is strongly indicative of the sandy soils present throughout the glacial interlobate region. The prairie fen areas now known and delineated were included in a pre-European settlement vegetation type classed as wet prairie, likely owing to the fact that the early surveyors recognized the strong prairie grassland component of these wetlands.

East Tract Prairie Fen

The prairie fen areas of Davis Lake comprise an important part of a particularly large, high quality prairie fen complex that ranges over two miles along an extensive wetland drainage (Figure 4, occurring from Davisburg Road in the east and extending nearly to East Rattalee Lake Road to the northwest. This well-documented, tracked element occurrence of prairie fen is among the most exemplary of its type in Michigan (Examples of is shown in Figures 5 and 6) and is known to support several rare plant and animal species, including federally listed taxa such as the Eastern massasauga rattlesnake (*Sistrurus catenatus*) and Poweshiek skipperling (*Oarisma poweshiek*). For the purposes of this report, this segment of fen was delineated as all of the contiguous areas of prairie fen adjoining the southern and western borders of Davis Lake. This site is thus inclusive of the area on the south side of the outflowing stream drainage shown in Figure 3, which thus technically includes a portion of the western tract of the former Hartman property.

The floristic inventory of this prairie fen resulted in the identification of 135 vascular plant species, composed of 127 native taxa (94%) and 8 non-native taxa (6%). The relatively high number of species tallied is especially notable given that field inventories did not begin until the end of June, and thus a significant number of potential species, including several common taxa likely to be present, could not be sought. Sweet grass (*Anthoxanthum hirtum*), for example, is an extremely common species of southern Michigan fens, but flowers very early prior to vegetative growth, then becoming virtually

indistinguishable in sterile condition, thus surveys for this taxon, among several other possible fen graminoids and forbs, could not be reliably conducted.

With regard to the floristic quality metrics (See FQA in Appendix) this site scored a very high FQI (floristic quality index) of 54.6, and a very high mean C or coefficient of conservatism (Slaughter et al 2015) of 4.7, the C value indicating that the flora of the site is dominated by species requiring a high degree of natural area intactness and function. No rare plant taxa were observed during the survey of this tract, although two state threatened species, white ladyslipper (*Cypripedium candidum*) and mat muhly (*Muhlenbergia richardsonis*) are known in close proximity on the north side of Davis Lake (MNFI 2018) and thus were sought carefully during all field efforts. Due to the fact that field inventories did not take place until June 29th, white ladyslipper could not be sought reliably as the blooming period is mid-to late-May into early June. Mat muhly, which when found frequently occurs in abundance, is known from large patches on the north side of Davis Lake, but could not be identified after repeated sampling on the south side. The more pronounced, longer slope on the north side of the lake suggests better microhabitat conditions, and mat muhly is relatively abundant there. Despite the repeated searches, which included extracting tufts of turf areas to comb through carefully for stems of this species, mat muhly should still be sought on the south side of Davis Lake, where it may occur in very disparate, thin colonies or possibly in other areas where it was simply not intersected despite several meander-searches of the area.

Of the 135 species identified, only 8 non-native taxa were recorded during inventories. This list may be somewhat conservative, as we did not focus valuable field time surveying every "hard" border of the site in detail, such as along the roadside on the eastern side, to note common weeds and the like, thus the list compiled references the species within the functional borders of the community. Of the species tallied, several are well-known problematical invasive taxa, including Autumn olive (*Elaeagnus umbellata*), glossy buckthorn (*Frangula alnus*), purple loosestrife (*Lythrum salicaria*), common buckthorn (*Rhamnus cathartica*), and narrow-leaved cat-tail (*Typha angustifolia*). Autumn olive is fairly common in all the upland areas around the fen, but also occurs sporadically in the fen itself. The buckthorns are particularly aggressive invaders of fens, whereas in this site and in adjacent areas, glossy buckthorn appears to be the most abundant while common buckthorn is relatively occasional, although elsewhere in the complex localized infestations of common buckthorn occur. Purple loosestrife is distributed somewhat sparsely in this site, with some small localized areas of denser colonies. Narrow-leaved cat-tail is locally established in the far eastern region of the fen, and although some stems of wide-leaved cat-tail (*T. latifolia*) are present, the majority of the colonies observed were narrow-leaved cat-tail, especially near the junction of the railroad tracks and Eaton Road, where water flow is inhibited and becomes stagnant, and where nutrients, dust, and other materials on the road infiltrate and affect ecological processes of the adjacent wetlands.

The natural community boundary for the prairie fen in this tract abuts the lake on the north edge, the road on the east, the former access road and uplands to the west, and then various upland areas along the abrupt border on the south along the railroad corridor, including a small peninsula of patch forest. Groundwater seeps and springs occur along both sides of the railroad track and down into the fen, originating from the higher topography on the south side of this large wetland drainage valley.

East Tract Disturbed Patch Forest

A small, disturbed, patch forest occurs on a distinct upland peninsula jutting out along the southern boundary of the East Tract (Figure 3). This site, located directly south of the eastern end of Davis Lake,

essentially comprises a successional dry-mesic forest. The vegetation of this area is very unevenly distributed, however, including numerous open to semi-open areas dominated by invasive shrubs and vines and much local habitat variation as well. Portions of the patch forest along the railroad corridor are heavily choked with non-native shrubs, whereas other areas along the corridor include small pockets of wet depressions in addition to upland openings with dry-site prairie species, thus this area is very heterogeneous throughout. The local variation in habitat, microtopography, and levels of disturbance (e.g. there is considerable artificial disturbance along the heavily managed railroad right-of-way) is reflected in the floristic data. Although only two brief site visits were allocated to surveying this small area for characterization purposes, the floristic inventory of this site resulted in the identification of 75 species, consisting of 55 native taxa (73%) and 20 non-native taxa (27%) (See FQA in Appendix). With regard to floristic quality, the FQI was 21.7, whereas the mean C was 2.5, which are comparatively low, in this case especially with regard to the mean C. The FQI is borderline low but could reasonably be expected to much lower considering that this is a relatively disturbed site with a high proportion of non-native species, many of which are highly invasive taxa. This is most likely explained by the presence of a number of native species with moderate to relatively high C values persisting in certain areas, such as prairie species in dry openings (e.g. big bluestem, little bluestem, stiff goldenrod), or fen species and others able to colonize upland edges (e.g. golden alexanders, slender wheatgrass, Michigan holly, highbush blueberry), and barrens remnants (e.g. black oak, burr oak). No rare species were identified during surveys of this site, but perhaps the most interesting species encountered was finding a virtual grove of Juneberry or shadbush (*Amelanchier*) trees. Initially identified as *A. arborea*, it is now thought that this taxon is likely to be *A. laevis* (smooth shadbush), although identification is currently tentative owing to the lack of flowers and/or fruits with which to make a positive determination. This colony was highly noteworthy owing to both the unusually tall and very large diameter trees present (See Photos in Appendix) as the typical growth form of this species is most commonly a small shrubby tree, usually not having both the height and dbh (diameter at breast height) to become an overstory species. This colony thus comprises a very unique stand within the patch forest and is perhaps the most unique floristic feature of the site.

The invasive non-native species observed includes a wide representation of the most pernicious taxa of the region, including such aggressive species as the non-native giant reed (*Phragmites australis*), narrow-leaved cat-tail and the hybrid cat-tail (*T.* x*glauca*), Morrow's honeysuckle (*Lonicera morrowii*), Oriental bittersweet, glossy buckthorn, common buckthorn, multiflora rose (*Rosa multiflora*), spotted knapweed (*Centaurea stoebe*), Autumn olive, and tall boneset (*Eupatorium altissimum*), among numerous other comparatively less noxious and ubiquitous weeds such as wild carrot (*Daucus carota*), common burdock (*Arctium minus*), and common St. John's-wort (*Hypericum perforatum*). Morrow's honeysuckle forms particularly dense colonies near the railroad boundary and elsewhere, and it is possible that the closely related and similar looking tatarian honeysuckle is present as well as the common hybrid honeysuckle (*L.* x*bella*) between these two species.

With the remnant trees remaining at this site, particularly with regard to some individuals of black oak and burr oak that exhibit an open growth form, this area is strongly indicated as a barrens remnant, a conclusion further corroborated by a number of the prairie forbs and graminoids that persist within and in close proximity to this tract. A portion of the patch forest is shown in Figure 7.

West Tract Dry-Mesic Southern Forest

Much of the northern portion of the west tract of the former Hartman property contains a large and diverse dry-mesic southern forest (Figure 3). This natural community occurs in the steepest topography

of the area and is characterized by significant south to southwestern-facing slopes. This community extends into, and is contiguous with, the same landform to the east just north of Davis Lake, where considerable restoration management activities have been conducted, including invasive species removal and prescribed fire management to improve forest structure, control invasive plants, and improve native groundcover diversity. This site is extremely heterogeneous in almost all aspects, including forest structure, quality, groundcover diversity, and disturbance history, and undoubtedly has experienced many different management activities. Thus, the typing of the site as a dry-mesic forest should be treated as a fairly broad classification for an area that mostly likely was a former black oak barrens community prior to European settlement. This site was intensively surveyed via numerous meander-searches to optimally characterize the flora, community structure, plant diversity, and community processes as well as possible (Figure 8).

Floristic inventories resulted in cataloging a total of 122 species, of which 106 taxa were native (87%) and 16 species were non-native (13%) (See FQA in Appendix). The total number of species appears to be a comparatively high number and is particularly noteworthy given that our surveys did not incorporate the spring blooming period, thus likely preventing the inclusion of early, more ephemeral species, including selected forbs, grasses, and sedges that would have been long past at the initiation of our inventories the end of June. The relatively high diversity recorded may reflect the inherent variability in community structure and past management histories. Despite the relatively late date of the inventory, this site scored a relatively high FQI value of 35.3, with a total mean C of 3.2, which is a relatively moderate value. Given the relative paucity of non-native taxa recorded for this site, it is valid to note in this particular case a fairly high native mean C of 3.7, a metric calculated by excluding the non-native taxa for comparative purposes. Of the 16 non-native species identified, many are well-known problematical species, including Japanese barberry, Autumn olive, spindle tree (*Euonymus europaeus*), glossy buckthorn (which although common in fens and other wetlands also invades upland sites), common buckthorn, common privet (*Ligustrum vulgare*), Morrow's honeysuckle, multiflora rose, and dog-strangling vine (*Vincetoxicum rossicum*). Although some of these invasives were noted as sparse within the site, having been encountered only occasionally, which was the case for Japanese barberry, spindle tree, and common privet, the presence of even a single individual is problematical, given the ability to rapidly spread.

No rare plant species are known nor were found following multiple meander-searches of this forest, and the potential for rare taxa in these woods is considered relatively low, owing partly to the fact that dry-mesic southern forests are not a particularly rich habitat for rare plants (Cohen et al. 2015). However, it is difficult to be conclusive given that no inventories were conducted in April, May, and most of June, resulting in missing a significant survey window comprising the first three months of the growing season.

As noted above, a distinctive aspect of this site is its high variability in structure and apparent stand history. The local topography is not a monolithic set of southwest to south-facing slopes as it includes localized areas of small valleys or ravines, and some of these areas include small vernal wetlands and seasonal streams and seeps with muck soils with wetland vegetation, which are likely important to amphibians and other animal species. Moreover, adding to this complexity is the condition and structure of portions of certain lower slope areas, particularly where the toe of the slope flattens out and begins to grade into the edge of both a prairie fen and a recently discovered wet-mesic prairie. In this transition zone a set of markedly different plant taxa are found in drier relict openings, including such notable species as lupine (*Lupinus perennis*), northern blazing star (*Liatris scariosa*), big bluestem, little bluestem (*Schizachyrium scoparium*), and smooth aster (*Symphyotrichum leave*). In addition to

these species, hairy pinweed (*Lechea mucronata*) was identified and collected, comprising only the second record for Oakland County, where it was last collected in 1919 in Royal Oak (MICHIGAN FLORA ONLINE 2011).

Some examples of the past management history of the site, which has included timber extraction, is expressed in the several examples of stump-sprouted trees encountered (Figure 9). Despite the numerous examples of past timber cutting activities in this tract, large specimen trees persist, such as the red oak (*Quercus rubra*) featured in Figure 10.

West Tract Wetland Depression

A small wetland depression, occurring within the above dry-mesic southern forest community in a mid- to lower slope position (Figures 3), was selectively sampled (at the request of Springfield Township staff) to type, characterize, and determine if this site was a potentially unique feature. Although highly limited and perhaps too small to consider classifying as a functional natural community, the site was briefly examined and meander-searched, and ultimately determined to be similar to southern shrub-carr (Cohen et al. 2015), based primarily on the type and structure of the vegetation present (Figure 11). There is a strong affinity to inundated southern swamp, yet the site completely lacks buttonbush (*Cephalanthus occidentalis*), the defining dominant species of that natural community type, and thus here aligns best with southern shrub-carr. With the exception of a single overstory tree, peach-leaved willow (*Salix amygdaloides*), the site is dominated by high shrubs, including such species as pussy willow (*S. discolor*), elderberry (*Sambucus canadensis*), gray dogwood (*Cornus foemina*), Michigan holly (*Ilex verticillata*), and poison sumac (*Toxicodendron vernix*). The groundcover was dominated by graminoids, including several species of *Carex* and *Scirpus*, and had a relatively diverse group of forbs. A brief survey encompassed the entirety of the wetland depression, resulting in a total of 41 species tallied, of which 35 species were native (85%) and 6 species were non-native (15%) (See FQA in Appendix). In terms of floristic quality, the FQI was a relatively moderate 21.8, with a moderately high mean C of 3.4. This survey was brief and far from definitive but did clarify that nothing particularly unique or noteworthy was identified during this single visit. The groundcover was moderately diverse in both forbs and graminoids, comprised of such species as skunk cabbage (*Symplocarpus foetidus*), late goldenrod (*Solidago giganteus*), carices such as *Carex stricta*, C. *lacustris*, and C. *comosa*, joe-pye-weed (*Eutrochium maculatum*), manna grass (*Glyceria canadensis*), and sensitive fern (*Onoclea sensibilis*). Most non-native taxa observed occurred along the border of the depression, including such species as Japanese bittersweet, glossy buckthorn, Morrow's honeysuckle, multiflora rose, and bittersweet nightshade, whereas some non-native taxa occurred entirely within the depression, such as narrow-leaved cat-tail and bittersweet nightshade.

West Tract Prairie Fen

This large and diverse prairie fen encompasses the majority of the wetland area surrounding the small, unnamed pothole lake in the northwestern region of the tract and includes all of the wetland between the stream and the railroad corridor in the southwestern portion of this parcel (Figure 3). Despite being considerably smaller in area than the east tract prairie fen, this quality of the site was comparable in all respects and had higher floristic diversity. Floristic inventory of this prairie fen resulted in the identification of 151 species, consisting of 137 native taxa (91%) and 14 non-native taxa (9%) (See FQA in Appendix). As observed in the survey of the east tract fen, the species tally is relatively high given the late start of June 29th. The tally is further notable in view of the markedly smaller area in comparison to the east tract fen (Figure 3). In terms of floristic quality metrics, the FQI is 52.8, which is indicative of an

extremely high quality, intact natural area, with an extremely high C value of 4.3, both values of which are very similar to those generated for the east tract prairie fen.

No rare plant species were identified during the meander-searches, although according to the MNFI statewide database (MNFI 2018), an occurrence of white ladyslipper (*Cypripedium candidum*) is known in the fen area north of the stream. Although sterile stems of *Cypripedium* were encountered during surveys, it was not possible to reliably distinguish *C. candidum* in sterile condition from the common yellow ladyslipper found in this region (*C. parviflorum*), but the observed stems may very well have been *C. candidum*. Mat muhly was also a survey target in this fen, owing to the large occurrence known just to the east, but was not found here despite several meander-searches. It is possible, however, that mat muhly occurs here, and thus should still be sought. Although no rare plants were identified in this site, an Eastern massasauga rattlesnake was encountered in the fen on August 18th while conducting a meander-search between the railroad corridor and the stream. This reptile species, although relatively frequent locally, is federally threatened and state special concern (MNFI 2018), and thus constitutes an important rare animal of both local and global significance.

Of the 151 vascular plant species identified, a relatively small number of non-native species were found, differing somewhat from the proportion found in the east tract prairie fen (9% here versus 6% of the total species identified in the east tract). These consisted of such noxious invasives as spotted knapweed, Oriental bittersweet, Autumn olive, glossy buckthorn, Morrow's honeysuckle, purple loosestrife, multiflora rose, narrow-leaved cat-tail, and dog-strangling vine, whereas the remaining species largely comprised common, mostly ephemeral weeds along borders or limited to small patches, such as wild carrot (*Daucus carota*), narrow-leaved plantain (*Plantago lanceolata*), bull thistle (*Cirsium vulgare*), and bittersweet nightshade.

This fen is composed of two distinct zones, consisting of the area that surrounds the small, pothole lake in the north and the area that occurs south of the stream drainage flowing west from Davis Lake. The pothole lake, which appears to be relatively deep, is most likely a kettle (or kettle-hole) depression, a landform derived as a result of blocks of ice calving from glaciers (Figure 12). When an ice block settled and became submerged on an outwash plain, it ultimately formed a steep-sided lake upon melting. The fen surrounding this kettle lake has a slight but distinct slope running downward from the upland border on the eastern and northern sides, and strong vegetational zonation along the lakeshore where hardstem bulrush (*Schoenoplectus acutus*) dominates. A small stream drainage occurs at the south end of the lake, intersecting the much larger stream flowing from Davis Lake. An important feature in this zone of fen, which was not readily apparent during initial surveys, is a significant vegetation and gradient change in local topography and soils southeast of the pothole lake, at the periphery of the forested area. Recognition of these features ultimately resulted in the identification and delineation of a different and rare natural community type, as described in the last section of findings below.

The second zone (Figure 13) of this tract is more uniform structurally, comprising the "typical" sedge meadow zone of a prairie fen dominated by sedges, grasses, forbs, and especially low shrubs of shrubby cinquefoil (*Dasiphora fruticosa*). Here there is a slight downward slope from the south toward the stream, though not as obvious as the more strongly sloping areas around the pothole lake, with numerous, small marl springs and seeps, especially near the base of the high, extremely steep railroad embankment. This is one of the few areas where sundew (*Drosera rotundifolia*) was found and the only area where grass-of-Parnassus (*Parnassia glauca*) was found during inventories of the entire area.

West Tract Disturbed Patch Forest

A broad upland peninsula jutting northward from the railroad corridor forms a large patch of disturbed, successional forest in the southern portion of this parcel (Figure 3). The site is highly variable, ranging from dry open areas with prairie grasses and forbs, such as along the railroad tracks, to colonies of trembling and big-tooth aspen and Eastern cottonwood in more mesic conditions along the northern and eastern periphery of the peninsula. Survey of this successional patch forest was conducted primarily for characterization purposes. Floristic inventory of the site resulted in the identification of 69 species, consisting of 51 native taxa (74%) and 18 non-native species (26%) (See FQA in Appendix). With regard to floristic quality, the FQI was 18.3, which is relatively low, and the mean C was 2.2, which is extremely low. Similar to the east tract disturbed patch forest, non-native plant species made up a significant component of the total flora, including all of the non-native taxa mentioned for other sites but also additional noxious species not observed elsewhere, such as tree-of-heaven (*Ailanthus altissima*), smooth brome (*Bromus inermis*), black medick (*Medicago lupulina*), Scotch pine (*Pinus sylvestris*), and Canada bluegrass (*Poa compressa*). However, despite the abundance of numerous non-native species, there was also a number of notable native species in this highly disturbed site persisting in openings and edges, such as butterfly weed (*Asclepias tuberosa*), hazelnut (*Corylus americana*), fall witch grass (*Digitaria cognata*), bush clover (*Lespedeza capitata*), wild-bergamot (*Monarda fistulosa*), common mountain mint (*Pycnanthemum virginianum*), burr oak, black oak, big and little bluestem, Riddell's goldenrod (*Solidago riddellii*), showy goldenrod (*Solidago speciosa*), and several native asters (*Symphyotrichum leave*, S. *lateriflorum*, S. *novae-angliae*, S. *pilosum*, and S. *urophyllum*). Several of these species were persisting in openings and other gaps as relict prairie species, indicating that with future restoration management would have a high potential of being successful here. A portion of this disturbed patch is shown in Figure 14.

West Tract Wet-Mesic Prairie

One of the most unique and high quality natural features discovered during this survey was a small but high quality patch of wet-mesic prairie, which occurs in a transitional area between prairie fen and the upland forest in the west tract (Figure 3). Located southeast of the pothole lake, at the periphery of the dry-mesic southern forest, this community did not become apparent until the appearance of warm-season species, most notably big and little bluestem, signaled the presence of different substrate conditions (Figure 15). This was also noticed with respect to an abrupt change in vegetation composition and dominance in one area and was also consistent with a distinct topographic position as the prairie fen graded to upland (Figure 16). Ultimately, it was determined by MNFI lead ecologist J. Cohen that this transition zone essentially comprised a wet-mesic prairie community. Owing to the late discovery and delineation of this natural community, only a preliminary species list was able to be assembled, although several interesting species were tallied in the process. The preliminary floristic inventory resulted in the identification of 34 total species, consisting of 29 native species and 5 non-native species (See FQA in Appendix). Although the total FQI is only 21.6, which is relatively low, the total mean C is 3.7, which is very high, indicative of the presence of a number of very conservative species.

Notable native species include big and little bluestem, butterfly weed, spikerush (*Eleocharis elliptica*), sneezeweed (*Helenium autumnale*), Canadian rush (*Juncus canadensis*), ground juniper (*Juniperus communis*), panic grass (*Panicum flexile*), nut-rush (*Scleria verticillata*), Ohio goldenrod (*Solidago ohioensis*), Riddell's goldenrod, northern blazing star (*Liatris scariosa*) (Figure 17), New England aster, and prairie heart-leaved aster (*S. oolentangiensis*). The panic grass discovered was among the more

notable species, having been collected only twice before in Oakland County, and not since 1924. The soils of the wet-mesic prairie were characterized by slightly acidic sandy loams overlying alkaline sandy silty clay. Overall, this wet-mesic prairie occurrence is of both local and statewide significance, it is ranked globally as G2 (globally imperiled) and S1 (critically imperiled) in Michigan. Currently there are 11 occurrences of this naturally community being tracked statewide (MNFI 2018).

MANAGEMENT RECOMMENDATIONS

Owing to the fact that considerable restoration management activities are in active progress in close proximity to the Hartman Tract, the following recommendations are brief, in deference to the knowledgeable Springfield Township natural resource managers who conduct such ongoing work on virtually a daily basis and know infinitely more about the use and deployment of such efforts.

East Tract Prairie Fen

The primary management activities for this site (exclusive of the extensive culvert work that will be occurring at the former stream crossing) appear to comprise the obligatory, periodic prescribed fire management and additional measures for invasive species control. Purple loosestrife is not particularly problematical for the most part and likely amenable to spot control treatment, whereas more aggressive treatments are likely needed for narrow-cat-tail, which is locally problematical on the east side, and possibly for the scattered infestations of glossy buckthorn and the occasional common buckthorn individuals.

East Tract Disturbed Patch Forest

The primary management for this patch forest obviously includes eventual prescribed fire (which may need to be proceeded by hydro-axing), in conjunction with the considerable non-native shrub control measures needed for much of the periphery of this area. The edge of the railroad corridor contains a heavy infestation of Morrow's honeysuckle (and possibly other taxa), and potentially pre-treatment of invasives is necessary prior to fire for those species known to be promoted by prescribed fire. Fen species that occur around the edge of this peninsula are likely to benefit with fire through the creation of vastly more edge habitat that can be colonized.

West Tract Dry-Mesic Southern Forest

This is a large and diverse site, for which management recommendations alone would comprise a long and detailed report. However, following our surveys it is clear that the management activities that have been conducted on the north side of Davis Lake have been highly successful, as observed during forays with M. Losey hiking through that habitat. In those areas the forest is much more open, the native groundcover has been given a competitive advantage, and thus the continuation of such management in the Hartman tract is likely to lead to similar success. Lower slope areas should be particularly highlighted for prescribed fire and other management, as certain species that remain present in these areas, such as remnant openings with lupine, northern blazing star, pinweed, bluestems, and other species, indicate that implement of such management would reap a valuable response, and these sites should be considered very high priority areas.

West Tract Wetland Depression

There are no particular recommendations for this limited site, other than including this site in future spring surveys if the recommendations below are considered and implemented.

West Tract Prairie Fen

Interestingly, the survey of this fen tract was initiated with very low expectations, but ultimately found to be among the most interesting sites surveyed as meander-searches ensued. Although more invasives were tallied in this site than in the east tract prairie, invasives in this area, which do require treatment (such as the localized infestations of purple loosestrife and scattered glossy buckthorn patches) do not present overwhelming challenges.

West Tract Disturbed Patch Forest

This large patch forest would likely respond positively to management activities aimed toward restoring representative, functional examples of the upland prairie and barrens communities that once existed alongside the pristine, high quality prairie fens. It is likely that considerable work, such as tree and shrub removal, will need to be conducted prior to the use of fire, as many areas are considerably choked by invasive shrubs and vines, as well as successional overstory trees that block the light needed to develop a better fuel layer. As noted above, a number of gaps and openings contained scattered prairie plants, especially toward the southern region of the forest, and these areas will prosper with the implantation of burns.

West Tract Wet-Mesic Prairie

Owing to the lateness of discovery, this site, comprising the most unique of the communities present within the Hartman Tract (and perhaps beyond at least in some respects), requires less in terms of immediate management than other sites, and more in terms of future inventory efforts. This site may perhaps be among the most interesting with regard to early season inventory, and thus should be the highest priority for such future investigations. This particular prairie may also serve as a "search image" for staff such that other examples of this natural community type could be sought within the greater complex of this extensive drainage valley.

FUTURE INVENTORY AND MANAGEMENT OPPORTUNITIES

Briefly, potential future activities in the Hartman Tract and possibly adjacent areas include such efforts as conducting early season floristic inventories from a selected period in April through at least mid-June. This would serve to better identify colonies of rare plant species and assist in more fully assessing and characterizing the early flora and its quality, which in turn would help influence and assist in restoration management activities. Selected animal inventories would also greatly inform managers, especially if consideration is given to conducting mussel surveys of the stream issuing from Davis Lake (Shiawassee River), which has mussel sign (cast shells) and an indication, via the gravelly substrate and general water conditions, that important mussel habitat may be present. Mussel surveys in prairie fen complexes in recent years, such as the detailed inventories conducted in Jackson County , have resulted in the identification of important occurrences of rare mussel taxa, such as the state threatened slippershell (*Alasmidonta viridis*) for which important populations were discovered near Watkins Lake State Park (Cohen et al 2017). To that end, aquatic inventories of several key areas within and outside the Hartman tract, including Davis Lake, the upper Shiawassee River, the pothole lake and adjacent areas would strongly aid conservation and management efforts within Springfield Township and well beyond.

ACKNOWLEDGEMENTS

This project was supported through a service agreement with Springfield Township, Oakland County, Michigan. We extend our sincere thanks to Michael Losey, Springfield Township Natural Resources Manager, for his support of Michigan Natural Features Inventory and providing immeasurable help in guiding our field work. We appreciate his endless enthusiasm and dedication to preserving, restoring, and managing the natural areas of Oakland County. We also thank John Paskus, MNFI Senior Conservation Scientist and Conservation Planner, for leading us to this work. His early conversations with Mike Losey were invaluable in securing this contract. MNFI Lead Ecologist, Josh Cohen provided valuable assistance in the identification and classification of the rare wet-mesic prairie natural community. We would also like to thank Collin Walls, the Springfield Township Supervisor, for his general support of MNFI over the years, and for providing encouragement and information during this inventory, including several very enjoyable and informative conversations concerning past, present, and future survey efforts. Additionally, we thank Nancy Toben and Ashley Atkins for their excellent administrative support and Kraig Korroch and Rebecca Rogers for the great technical assistance.

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Figure 1. A floristic and natural community assessment of two recently acquired land parcels of a collective 55 acres in size known as the Hartman Tract (T04N R08E Sections 17 and 18)

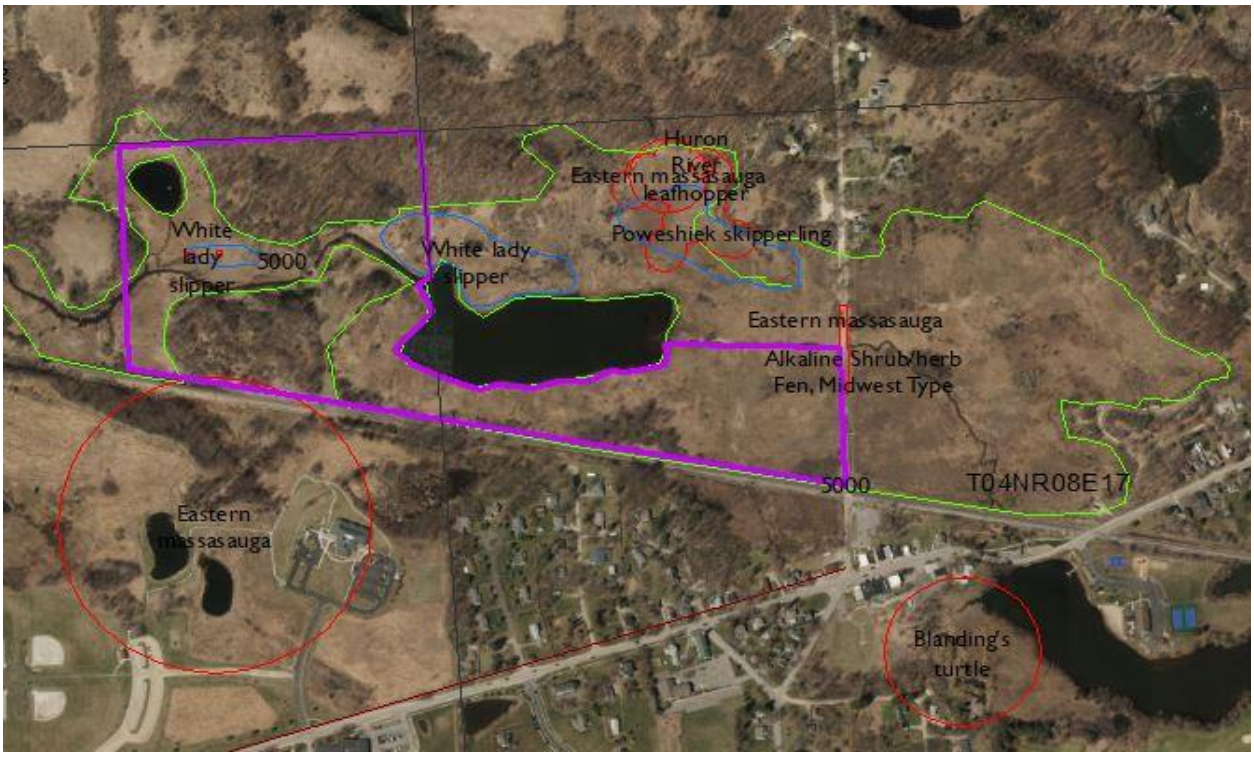

Figure 2. Known natural features of the survey area and environs in Springfield Township, showing locations and spatial extent for rare species and natural communities tracked within the MNFI statewide database.

Figure 3. Delineated survey sites inventoried within the Hartman Tract.

Figure 4. Selected GPS survey routes to show examples of meander-searches; a Garmin Montana model 650t PS unit was employed to record survey tracks for most meander-searches carried out in addition to taking point locations where needed. The map does not depict all survey track routes.

Figure 5. The prairie fen located in the east tract is among the most exemplary of its type in Michigan.

Figure 6. The fen areas of Davis Lake are part of a high quality prairie fen complex that stretches over two miles along an extensive wetland drainage. The complex is known to support several rare plant and animal species.

Figure 7. A portion of the disturbed forest patch looking NW from the railroad tracks.

Figure 8. Much of the northern portion of the west tract contains a large and diverse dry-mesic southern forest.

Figure 9. Past timber harvesting practices are evidenced by this stump-sprouted red oak (*Quercus rubra*) in the dry-mesic southern forest located in the west tract.

Figure 10. Despite past timber harvests, several large species trees like this red oak can still be found in the dry-mesic southern forest.

Figure 11. The small wetland depression in the west tract was determined to be a southern shrub-carr community based primarily on the type and structure of the vegetation present.

Figure 12. Looking south from the north side of the small pothole lake located within the west tract. This lake is most likely a kettle lake, a landform derived as a result of blocks of ice calving from glaciers.

Figure 13. The "typical" sedge meadow zone located in the west tract prairie fen. This zone is dominated by sedges, grasses, fords and low shrubs such as shrubby cinquefoil (*Dasiphora fruticosa*).

Figure 14. The several relict prairie species found in the disturbed patch forest indicates a high potential for future restoration success at this area of the west tract.

Figure 15. One of the most unique discoveries during this survey was a small but high-quality patch of wet-mesic prairie in the west tract.

Figure 16. A noticeable change in vegetation composition and dominance can be seen as the topography grades to upland.

Figure 17. Northern blazing star (Liatris scariosa) was one of the notable native species found at the high quality wet-mesic prairie.

APPENDIX -SITE FLORISTIC QUALITY ASSESSMENT (FQA) REPORTS

Appendix 1 - East Tract Prairie Fen

Appendix 2 - East Tract Disturbed Patch Forest

Appendix 3 - West Tract Dry-Mesic Southern Forest

Appendix 4 - West Tract Wetland Depression

Appendix 5 - West Tract Prairie Fen

Appendix 6 - West Tract Disturbed Patch Forest

Appendix 7 - West Tract Wet-Mesic Prairie

Appendix 8 - *Amelanchier laevis* (smooth shadbush) photo

Hartman Property at Shiawassee Basin Preserve									
Prairie Fen (East Tract) FQA Report									
06/29/2018									
Davisburg									
Oakland									
MI									
USA									
FQA DB Region:	Michigan								
FQA DB Publication Year:	2014								
FQA DB Description:	Reznicek, A.A., M.R. Penskar, B.S. Walters, and B.S. Slaughter. 2014.								
	Michigan Floristic Quality Assessment Database								
Practitioner:	Mike Penskar, Mike Sanders, Mike Losey								
Latitude:									
Longitude:									
Weather Notes:	Sunny, warm, humid								
Duration Notes:	ca. 8 hours								
Community Type Notes:	prairie fen; survey will ultimately encompasses forested areas within the new tracts								
Other Notes:	AKA as the "TRI-MIKE INVENTORY"								
Private/Public:	Public								
Conservatism-Based Metrics:									
Total Mean C:	4.5								
Native Mean C:	4.9								
Total FQI:	48.7								
Native FQI:	51.2								
Adjusted FQI:	47.3								
% C value 0:	7.7								
% C value 1-3:	32.5								
% C value 4-6:	35								
% C value 7-10:	24.8								
Native Tree Mean C:	2								
Native Shrub Mean C:	3.8								
Native Herbaceous Mean C:	5.2								

Species Richness:									
Total Species:	117								
Native Species:	109	93.20%							
Non-native Species:	8	6.80%							
Species Wetness:									
Mean Wetness:	-2.2								
Native Mean Wetness:	-2.3								
Physiognomy Metrics:									
Tree:	6	5.10%							
Shrub:	17	14.50%							
Vine:	7	6%							
Forb:	52	44.40%							
Grass:	12	10.30%							
Sedge:	18	15.40%							
Rush:	1	0.90%							
Fern:	4	3.40%							
Bryophyte:	0	0%							
Duration Metrics:									
Annual:	2	1.70%							
Perennial:	113	96.60%							
Biennial:	2	1.70%							
Native Annual:	2	1.70%							
Native Perennial:	105	89.70%							
Native Biennial:	2	1.70%							
Species:									
Scientific Name	**Family**	**Acronym**	**Native?**	**C**	**W**	**Physiognomy**	**Duration**	**Common Name**	
Acer rubrum	Sapindaceae	ACERUB	native	1	0	tree	perennial	red maple	
Achillea millefolium	Asteraceae	ACHMIL	native	1	3	forb	perennial	yarrow	
Andropogon gerardii	Poaceae	ANDGER	native	5	0	grass	perennial	big bluestem	
Anemone virginiana	Ranunculaceae	ANEVIR	native	3	3	forb	perennial	thimbleweed	

Apios americana	Fabaceae	APIAME	native	3	-3	vine	perennial	groundnut	
Apocynum cannabinum; a. sibiricum	Apocynaceae	APOCAN	native	3	0	forb	perennial	indian-hemp	
Asclepias incarnata	Apocynaceae	ASCINC	native	6	-5	forb	perennial	swamp milkweed	
Asclepias syriaca	Apocynaceae	ASCSYR	native	1	5	forb	perennial	common milkweed	
Asclepias tuberosa	Apocynaceae	ASCTUB	native	5	5	forb	perennial	butterfly-weed	
Betula pumila	Betulaceae	BETPUM	native	8	-5	shrub	perennial	bog birch	
Bromus ciliatus	Poaceae	BROCIL	native	6	-3	grass	perennial	fringed brome	
Calamagrostis canadensis	Poaceae	CALCAN	native	3	-5	grass	perennial	blue-joint	
Calopogon tuberosus	Orchidaceae	CALTUB	native	9	-5	forb	perennial	grass-pink	
Caltha palustris	Ranunculaceae	CALPAR	native	6	-5	forb	perennial	marsh-marigold	
Calystegia sepium	Convolvulaceae	CALSEP	native	2	0	vine	perennial	hedge bindweed	
Carex buxbaumii	Cyperaceae	CXBUXB	native	10	-5	sedge	perennial	sedge	
Carex flava	Cyperaceae	CXFLAV	native	4	-5	sedge	perennial	sedge	
Carex hystericina	Cyperaceae	CXHYST	native	2	-5	sedge	perennial	sedge	
Carex lasiocarpa	Cyperaceae	CXLASI	native	8	-5	sedge	perennial	sedge	
Carex leptalea	Cyperaceae	CXLEPA	native	5	-5	sedge	perennial	sedge	
Carex prairea	Cyperaceae	CXPRAI	native	10	-3	sedge	perennial	sedge	
Carex sterilis	Cyperaceae	CXSTER	native	10	-5	sedge	perennial	sedge	
Carex stipata	Cyperaceae	CXSTIP	native	1	-5	sedge	perennial	sedge	
Carex stricta	Cyperaceae	CXSTRI	native	4	-5	sedge	perennial	sedge	
Carex tetanica	Cyperaceae	CXTETA	native	9	-3	sedge	perennial	sedge	
Chelone glabra	Plantaginaceae	CHEGLB	native	7	-5	forb	perennial	turtlehead	
Cicuta maculata	Apiaceae	CICMAC	native	4	-5	forb	biennial	water hemlock	
Cirsium arvense	Asteraceae	CIRARV	non-native	0	3	forb	perennial	canada thistle	
Cirsium muticum	Asteraceae	CIRMUT	native	6	-5	forb	biennial	swamp thistle	
Cladium mariscoides	Cyperaceae	CLAMAR	native	10	-5	sedge	perennial	twig-rush	
Comandra umbellata	Santalaceae	COMUMB	native	5	3	forb	perennial	bastard-toadflax	
Cornus amomum	Cornaceae	CORAMO	native	2	-3	shrub	perennial	silky dogwood	
Cornus foemina	Cornaceae	CORFOE	native	1	0	shrub	perennial	gray dogwood	
Cornus sericea; c. stolonifera	Cornaceae	CORSER	native	2	-3	shrub	perennial	red-osier	
Cuscuta gronovii	Convolvulaceae	CUSGRO	native	3	-3	vine	annual	common dodder	
Cypripedium candidum	Orchidaceae	CYPCAN	native	10	-5	forb	perennial	white lady-slipper	
Cypripedium parviflorum; c. calceolus	Orchidaceae	CYPPAR	native	5	0	forb	perennial	yellow lady-slipper	
Dasiphora fruticosa; potentilla f.	Rosaceae	DASFRU	native	8	-3	shrub	perennial	shrubby cinquefoil	
Dichanthelium praecocius; panicum p.	Poaceae	DICPRA	native	8	5	grass	perennial	panic grass	

Doellingeria umbellata; aster u.	Asteraceae	DOEUMB	native	5	-3	forb	perennial	flat-topped white aster
Drosera rotundifolia	Droseraceae	DROROT	native	6	-5	forb	perennial	round-leaved sundew
Elaeagnus umbellata	Elaeagnaceae	ELAUMB	non-native	0	3	shrub	perennial	autumn-olive
Eleocharis elliptica	Cyperaceae	ELEELL	native	6	-5	sedge	perennial	golden-seeded spike rush
Eleocharis rostellata	Cyperaceae	ELEROS	native	10	-5	sedge	perennial	spike-rush
Elymus trachycaulus; agropyron t.	Poaceae	ELYTRA	native	8	3	grass	perennial	slender wheatgrass
Equisetum fluviatile	Equisetaceae	EQUFLU	native	7	-5	fern	perennial	water horsetail
Eriophorum viridi-carinatum	Cyperaceae	ERIVID	native	8	-5	sedge	perennial	green-keeled cotton-grass
Eupatorium perfoliatum	Asteraceae	EUPPER	native	4	-3	forb	perennial	boneset
Euthamia graminifolia	Asteraceae	EUTGRA	native	3	0	forb	perennial	grass-leaved goldenrod
Eutrochium maculatum; eupatorium m.	Asteraceae	EUTMAC	native	4	-5	forb	perennial	joe-pye-weed
Fragaria virginiana	Rosaceae	FRAVIR	native	2	3	forb	perennial	wild strawberry
Frangula alnus; rhamnus frangula	Rhamnaceae	FRAALN	non-native	0	0	shrub	perennial	glossy buckthorn
Fraxinus pennsylvanica	Oleaceae	FRAPEN	native	2	-3	tree	perennial	red ash
Galium boreale	Rubiaceae	GALBOR	native	3	0	forb	perennial	northern bedstraw
Glyceria striata	Poaceae	GLYSTR	native	4	-5	grass	perennial	fowl manna grass
Hypericum ascyron	Hypericaceae	HYPASC	native	8	0	forb	perennial	giant st. johns-wort
Impatiens capensis	Balsaminaceae	IMPCAP	native	2	-3	forb	annual	spotted touch-me-not
Iris virginica	Iridaceae	IRIVIR	native	5	-5	forb	perennial	southern blue flag
Juncus tenuis	Juncaceae	JUNTEN	native	1	0	rush	perennial	path rush
Larix laricina	Pinaceae	LARLAR	native	5	-3	tree	perennial	tamarack
Lathyrus palustris	Fabaceae	LATPAL	native	7	-3	vine	perennial	marsh pea
Liatris spicata	Asteraceae	LIASPI	native	8	0	forb	perennial	marsh blazing-star
Lilium michiganense	Liliaceae	LILMIC	native	5	-3	forb	perennial	michigan lily
Lobelia spicata	Campanulaceae	LOBSPI	native	4	0	forb	perennial	pale spiked lobelia
Lysimachia quadriflora	Myrsinaceae	LYSQUR	native	10	-5	forb	perennial	whorled loosestrife
Lythrum salicaria	Lythraceae	LYTSAL	non-native	0	-5	forb	perennial	purple loosestrife
Maianthemum stellatum; smilacina s.	Convallariaceae	MAISTE	native	5	0	forb	perennial	starry false solomon-seal
Monarda fistulosa	Lamiaceae	MONFIS	native	2	3	forb	perennial	wild-bergamot
Onoclea sensibilis	Onocleaceae	ONOSEN	native	2	-3	fern	perennial	sensitive fern
Packera paupercula; senecio p.; senecio plattensis	Asteraceae	PACPAU	native	3	0	forb	perennial	balsam ragwort
Parnassia glauca	Parnassiaceae	PARGLA	native	8	-5	forb	perennial	grass-of-parnassus
Parthenocissus quinquefolia	Vitaceae	PARQUI	native	5	3	vine	perennial	virginia creeper
Pedicularis lanceolata	Orobanchaceae	PEDLAN	native	8	-3	forb	perennial	swamp-betony
Persicaria amphibia; polygonum a.	Polygonaceae	PERAMP	native	6	-5	forb	perennial	water smartweed

Phalaris arundinacea	Poaceae	PHAARU	native	0	-3	grass	perennial	reed canary grass
Poa compressa	Poaceae	POACOM	non-native	0	3	grass	perennial	canada bluegrass
Populus tremuloides	Salicaceae	POPTRE	native	1	0	tree	perennial	quaking aspen
Pycnanthemum virginianum	Lamiaceae	PYCVIR	native	5	-3	forb	perennial	common mountain mint
Rhamnus alnifolia	Rhamnaceae	RHAALN	native	8	-5	shrub	perennial	alder-leaved buckthorn
Rhamnus cathartica	Rhamnaceae	RHACAT	non-native	0	0	tree	perennial	common buckthorn
Rhus typhina	Anacardiaceae	RHUTYP	native	2	3	shrub	perennial	staghorn sumac
Rhynchospora capillacea	Cyperaceae	RHYCAL	native	10	-5	sedge	perennial	beak-rush
Ribes americanum	Grossulariaceae	RIBAME	native	6	-3	shrub	perennial	wild black currant
Rubus occidentalis	Rosaceae	RUBOCC	native	1	5	shrub	perennial	black raspberry
Rudbeckia hirta	Asteraceae	RUDHIR	native	1	3	forb	perennial	black-eyed susan
Rumex orbiculatus	Polygonaceae	RUMORB	native	9	-5	forb	perennial	great water dock
Salix bebbiana	Salicaceae	SALBEB	native	1	-3	shrub	perennial	bebbs willow
Salix discolor	Salicaceae	SALDIS	native	1	-3	shrub	perennial	pussy willow
Sambucus canadensis	Adoxaceae	SAMCAN	native	3	-3	shrub	perennial	elderberry
Schizachyrium scoparium; andropogon s.	Poaceae	SCHSCO	native	5	3	grass	perennial	little bluestem
Schoenoplectus acutus; scirpus a.	Cyperaceae	SCHACU	native	5	-5	sedge	perennial	hardstem bulrush
Schoenoplectus pungens; scirpus americanus	Cyperaceae	SCHPUN	native	5	-5	sedge	perennial	threesquare
Scirpus atrovirens	Cyperaceae	SCIATV	native	3	-5	sedge	perennial	bulrush
Scutellaria galericulata	Lamiaceae	SCUGAL	native	5	-5	forb	perennial	marsh skullcap
Selaginella eclipes	Selaginellaceae	SELECL	native	5	-3	fern	perennial	selaginella
Solanum dulcamara	Solanaceae	SOLDUL	non-native	0	0	vine	perennial	bittersweet nightshade
Solidago canadensis	Asteraceae	SOLCAN	native	1	3	forb	perennial	canada goldenrod
Solidago gigantea	Asteraceae	SOLGIG	native	3	-3	forb	perennial	late goldenrod
Solidago ohioensis	Asteraceae	SOLOHI	native	8	-5	forb	perennial	ohio goldenrod
Sorghastrum nutans	Poaceae	SORNUT	native	6	3	grass	perennial	indian grass
Sparganium eurycarpum	Typhaceae	SPAEUR	native	5	-5	forb	perennial	common bur-reed
Spartina pectinata	Poaceae	SPAPEC	native	5	-3	grass	perennial	cordgrass
Sphenopholis intermedia	Poaceae	SPHINT	native	4	0	grass	perennial	slender wedgegrass
Spiraea alba	Rosaceae	SPIALB	native	4	-3	shrub	perennial	meadowsweet
Symphyotrichum boreale; aster b.	Asteraceae	SYMBOR	native	9	-5	forb	perennial	northern bog aster
Symphyotrichum firmum; aster puniceus	Asteraceae	SYMFIR	native	4	-3	forb	perennial	smooth swamp aster
Thalictrum dasycarpum	Ranunculaceae	THADAS	native	3	-3	forb	perennial	purple meadow-rue
Thelypteris palustris	Thelypteridaceae	THEPAL	native	2	-3	fern	perennial	marsh fern
Toxicodendron vernix	Anacardiaceae	TOXVER	native	6	-5	shrub	perennial	poison sumac

Triantha glutinosa; tofieldia g.	Melanthiaceae	TRIGLU	native	10	-5	forb	perennial	false asphodel
Triglochin maritima	Juncaginaceae	TRIMAR	native	8	-5	forb	perennial	common bog arrow-grass
Typha angustifolia	Typhaceae	TYPANG	non-native	0	-5	forb	perennial	narrow-leaved cat-tail
Typha latifolia	Typhaceae	TYPLAT	native	1	-5	forb	perennial	broad-leaved cat-tail
Ulmus americana	Ulmaceae	ULMAME	native	1	-3	tree	perennial	american elm
Viburnum lentago	Adoxaceae	VIBLEN	native	4	0	shrub	perennial	nannyberry
Vitis riparia	Vitaceae	VITRIP	native	3	0	vine	perennial	river-bank grape
Zizia aurea	Apiaceae	ZIZAUR	native	6	0	forb	perennial	golden alexanders

East Tract Disturbed Patch Forest									
07/19/2018									
Springfield Township									
Davisburg, Oakland County, MI									
USA									
FQA DB Region:	Michigan								
FQA DB Publication Year:	2014								
FQA DB Description:	Reznicek, A.A., M.R. Penskar, B.S. Walters, and B.S. Slaughter. 2014.								
	Michigan Floristic Assessment Onlise Database								
Practitioner:	Mike Penskar								
Latitude:									
Longitude:									
Weather Notes:	Warm, sunny, and humid								
Duration Notes:	mid-morning early afternoon, ca. 3-4 hrs. Re-surveyed Sept 19.								
Community Type Notes:	Disturbed dry-mesic forest and shrub patches adjacent to south side of fen								
Other Notes:									
Private/Public:	Public								
Conservatism-Based Metrics:									
Total Mean C:	2.5								
Native Mean C:	3.3								
Total FQI:	21.7								
Native FQI:	24.5								
Adjusted FQI:	28.3								
% C value 0:	30.7								
% C value 1-3:	34.7								
% C value 4-6:	29.3								
% C value 7-10:	5.3								
Native Tree Mean C:	3.4								
Native Shrub Mean C:	2.3								
Native Herbaceous Mean C:	3.6								
Species Richness:									
Total Species:	75								

Native Species:	55	73.30%							
Non-native Species:	20	26.70%							
Species Wetness:									
Mean Wetness:	0.7								
Native Mean Wetness:	0.3								
Physiognomy Metrics:									
Tree:	12	16%							
Shrub:	14	18.70%							
Vine:	5	6.70%							
Forb:	31	41.30%							
Grass:	9	12%							
Sedge:	2	2.70%							
Rush:	0	0%							
Fern:	2	2.70%							
Bryophyte:	0	0%							
Duration Metrics:									
Annual:	1	1.30%							
Perennial:	70	93.30%							
Biennial:	4	5.30%							
Native Annual:	1	1.30%							
Native Perennial:	54	72%							
Native Biennial:	0	0%							
Species:									
Scientific Name	**Family**	**Acronym**	**Native?**	**C**	**W**	**Physiognomy**	**Duration**	**Common Name**	
Acer negundo	Sapindaceae	ACENEG	native	0	0	tree	perennial	box-elder	
Acer rubrum	Sapindaceae	ACERUB	native	1	0	tree	perennial	red maple	
Acer saccharum	Sapindaceae	ACESAU	native	5	3	tree	perennial	sugar maple	
Achillea millefolium	Asteraceae	ACHMIL	native	1	3	forb	perennial	yarrow	
Agrostis gigantea	Poaceae	AGRGIG	non-native	0	-3	grass	perennial	redtop	
Amelanchier arborea	Rosaceae	AMEARB	native	4	3	tree	perennial	juneberry	

Andropogon gerardii	Poaceae	ANDGER	native	5	0	grass	perennial	big bluestem	
Apios americana	Fabaceae	APIAME	native	3	-3	vine	perennial	groundnut	
Apocynum cannabinum; a. sibiricum	Apocynaceae	APOCAN	native	3	0	forb	perennial	indian-hemp	
Arctium minus	Asteraceae	ARCMIN	non-native	0	3	forb	biennial	common burdock	
Asclepias syriaca	Apocynaceae	ASCSYR	native	1	5	forb	perennial	common milkweed	
Asparagus officinalis	Asparagaceae	ASPOFF	non-native	0	3	forb	perennial	garden asparagus	
Calamagrostis canadensis	Poaceae	CALCAN	native	3	-5	grass	perennial	blue-joint	
Carex pensylvanica	Cyperaceae	CXPENS	native	4	5	sedge	perennial	sedge	
Carex stricta	Cyperaceae	CXSTRI	native	4	-5	sedge	perennial	sedge	
Celastrus orbiculatus	Celastraceae	CELORB	non-native	0	5	vine	perennial	oriental bittersweet	
Centaurea stoebe; c. maculosa	Asteraceae	CENSTO	non-native	0	5	forb	biennial	spotted knapweed	
Circaea canadensis; c. lutetiana	Onagraceae	CIRCAN	native	2	3	forb	perennial	enchanters-nightshade	
Cornus foemina	Cornaceae	CORFOE	native	1	0	shrub	perennial	gray dogwood	
Daucus carota	Apiaceae	DAUCAR	non-native	0	5	forb	biennial	queen-annes-lace	
Elaeagnus umbellata	Elaeagnaceae	ELAUMB	non-native	0	3	shrub	perennial	autumn-olive	
Elymus trachycaulus; agropyron t.	Poaceae	ELYTRA	native	8	3	grass	perennial	slender wheatgrass	
Equisetum fluviatile	Equisetaceae	EQUFLU	native	7	-5	fern	perennial	water horsetail	
Equisetum laevigatum	Equisetaceae	EQULAE	native	2	-3	fern	perennial	smooth scouring rush	
Eupatorium altissimum	Asteraceae	EUPALT	non-native	0	5	forb	perennial	tall boneset	
Eupatorium perfoliatum	Asteraceae	EUPPER	native	4	-3	forb	perennial	boneset	
Euphorbia corollata	Euphorbiacea	EUPCOR	native	4	5	forb	perennial	flowering spurge	
Euthamia graminifolia	Asteraceae	EUTGRA	native	3	0	forb	perennial	grass-leaved goldenrod	
Eutrochium maculatum; eupatorium m.	Asteraceae	EUTMAC	native	4	-5	forb	perennial	joe-pye-weed	
Frangula alnus; rhamnus frangula	Rhamnaceae	FRAALN	non-native	0	0	shrub	perennial	glossy buckthorn	
Fraxinus americana	Oleaceae	FRAAME	native	5	3	tree	perennial	white ash	
Galium asprellum	Rubiaceae	GALASP	native	5	-5	vine	perennial	rough bedstraw	
Helianthus giganteus	Asteraceae	HELGIG	native	5	-3	forb	perennial	tall sunflower	
Hypericum perforatum	Hypericaceae	HYPPER	non-native	0	5	forb	perennial	common st. johns-wort	
Ilex verticillata	Aquifoliaceae	ILEVER	native	5	-3	shrub	perennial	michigan holly	
Impatiens capensis	Balsaminacea	IMPCAP	native	2	-3	forb	annual	spotted touch-me-not	
Juglans nigra	Juglandaceae	JUGNIG	native	5	3	tree	perennial	black walnut	
Leersia oryzoides	Poaceae	LEEORY	native	3	-5	grass	perennial	cut grass	
Lilium michiganense	Liliaceae	LILMIC	native	5	-3	forb	perennial	michigan lily	
Lonicera morrowii	Caprifoliacea	LONMOR	non-native	0	3	shrub	perennial	morrow honeysuckle	

Malus pumila	Rosaceae	MALPUM	non-native	0	5	tree	perennial	apple	
Monarda fistulosa	Lamiaceae	MONFIS	native	2	3	forb	perennial	wild-bergamot	
Phalaris arundinacea	Poaceae	PHAARU	native	0	-3	grass	perennial	reed canary grass	
Phragmites australis var. australis	Poaceae	PHRAUU	non-native	0	-3	grass	perennial	reed	
Prunella vulgaris	Lamiaceae	PRUVUL	native	0	0	forb	perennial	self-heal	
Prunus avium	Rosaceae	PRUAVI	non-native	0	5	tree	perennial	sweet cherry	
Prunus serotina	Rosaceae	PRUSER	native	2	3	tree	perennial	wild black cherry	
Prunus virginiana	Rosaceae	PRUVIR	native	2	3	shrub	perennial	choke cherry	
Quercus macrocarpa	Fagaceae	QUEMAC	native	5	3	tree	perennial	bur oak	
Quercus velutina	Fagaceae	QUEVEL	native	6	5	tree	perennial	black oak	
Rhus glabra	Anacardiacea	RHUGLA	native	2	5	shrub	perennial	smooth sumac	
Rosa multiflora	Rosaceae	ROSMUL	non-native	0	3	shrub	perennial	multiflora rose	
Rubus allegheniensis	Rosaceae	RUBALL	native	1	3	shrub	perennial	common blackberry	
Rubus flagellaris	Rosaceae	RUBFLA	native	1	3	shrub	perennial	northern dewberry	
Rubus occidentalis	Rosaceae	RUBOCC	native	1	5	shrub	perennial	black raspberry	
Rubus strigosus	Rosaceae	RUBSTR	native	2	0	shrub	perennial	wild red raspberry	
Rudbeckia hirta	Asteraceae	RUDHIR	native	1	3	forb	perennial	black-eyed susan	
Rumex verticillatus	Polygonaceae	RUMVER	native	7	-5	forb	perennial	water dock	
Saponaria officinalis	Caryophyllace	SAPOFF	non-native	0	3	forb	perennial	bouncing bet	
Schizachyrium scoparium; andropogon s.	Poaceae	SCHSCO	native	5	3	grass	perennial	little bluestem	
Solidago canadensis	Asteraceae	SOLCAN	native	1	3	forb	perennial	canada goldenrod	
Solidago rigida	Asteraceae	SOLRIG	native	5	3	forb	perennial	stiff goldenrod	
Sorghastrum nutans	Poaceae	SORNUT	native	6	3	grass	perennial	indian grass	
Symphyotrichum firmum; aster puniceus	Asteraceae	SYMFIR	native	4	-3	forb	perennial	smooth swamp aster	
Thaspium trifoliatum	Apiaceae	THATRI	native	8	3	forb	perennial	meadow-parsnip	
Toxicodendron radicans	Anacardiacea	TOXRAD	native	2	0	vine	perennial	poison-ivy	
Typha angustifolia	Typhaceae	TYPANG	non-native	0	-5	forb	perennial	narrow-leaved cat-tail	
Typha latifolia	Typhaceae	TYPLAT	native	1	-5	forb	perennial	broad-leaved cat-tail	
Typha Ã—glauca	Typhaceae	TYPGLA	non-native	0	-5	forb	perennial	hybrid cat-tail	
Ulmus americana	Ulmaceae	ULMAME	native	1	-3	tree	perennial	american elm	
Vaccinium corymbosum	Ericaceae	VACCOR	native	6	-3	shrub	perennial	highbush blueberry	
Verbascum thapsus	Scrophulariac	VERTHA	non-native	0	5	forb	biennial	common mullein	
Viburnum opulus	Adoxaceae	VIBOPU	non-native	0	-3	shrub	perennial	european highbush-cranber	
Vitis riparia	Vitaceae	VITRIP	native	3	0	vine	perennial	river-bank grape	

West Tract Dry-Mesic Southern Forest									
07/19/2018									
Springfield Township									
Davisburg, Oakland County, MI									
USA									
FQA DB Region:	Michigan								
FQA DB Publication Year:	2014								
FQA DB Description:	Reznicek, A.A., M.R. Penskar, B.S. Walters, and B.S. Slaughter. 2014.								
Practitioner:	Mike Penskar and Michael Losey								
Latitude:									
Longitude:									
Weather Notes:	Warm, sunny, and humid								
Duration Notes:	2-3 hours July 19 2-3 hrs July 26								
Community Type Notes:	Disturbed dry-mesic southern forest on relatively steep, south-facing slopes								
Other Notes:									
Private/Public:	Public								
Conservatism-Based Metrics:									
Total Mean C:	3.2								
Native Mean C:	3.7								
Total FQI:	35.3								
Native FQI:	38.1								
Adjusted FQI:	34.5								
% C value 0:	16.4								
% C value 1-3:	32								
% C value 4-6:	47.5								
% C value 7-10:	4.1								
Native Tree Mean C:	4.2								
Native Shrub Mean C:	3.4								
Native Herbaceous Mean C:	3.7								
Species Richness:									

Total Species:	122								
Native Species:	106	86.90%							
Non-native Species:	16	13.10%							
Species Wetness:									
Mean Wetness:	2								
Native Mean Wetness:	1.8								
Physiognomy Metrics:									
Tree:	17	13.90%							
Shrub:	24	19.70%							
Vine:	8	6.60%							
Forb:	56	45.90%							
Grass:	9	7.40%							
Sedge:	5	4.10%							
Rush:	1	0.80%							
Fern:	2	1.60%							
Bryophyte:	0	0%							
Duration Metrics:									
Annual:	3	2.50%							
Perennial:	116	95.10%							
Biennial:	3	2.50%							
Native Annual:	2	1.60%							
Native Perennial:	103	84.40%							
Native Biennial:	1	0.80%							
Species:									
Scientific Name	**Family**	**Acronym**	**Native?**	**C**	**W**	**Physiognomy**	**Duration**	**Common Name**	
Acer rubrum	Sapindaceae	ACERUB	native	1	0	tree	perennial	red maple	
Achillea millefolium	Asteraceae	ACHMIL	native	1	3	forb	perennial	yarrow	
Actaea rubra	Ranunculaceae	ACTRUB	native	7	3	forb	perennial	red baneberry	
Agrimonia gryposepala	Rosaceae	AGRGRY	native	2	3	forb	perennial	tall agrimony	
Amphicarpaea bracteata	Fabaceae	AMPBRA	native	5	0	vine	annual	hog-peanut	

Andropogon gerardii	Poaceae	ANDGER	native	5	0	grass	perennial	big bluestem
Antennaria parlinii	Asteraceae	ANTPAL	native	2	5	forb	perennial	smooth pussytoes
Apocynum cannabinum; a. sibiricum	Apocynaceae	APOCAN	native	3	0	forb	perennial	indian-hemp
Arctium minus	Asteraceae	ARCMIN	non-native	0	3	forb	biennial	common burdock
Arisaema triphyllum	Araceae	ARITRI	native	5	0	forb	perennial	jack-in-the-pulpit
Asclepias exaltata	Apocynaceae	ASCEXA	native	6	5	forb	perennial	poke milkweed
Asclepias syriaca	Apocynaceae	ASCSYR	native	1	5	forb	perennial	common milkweed
Asclepias tuberosa	Apocynaceae	ASCTUB	native	5	5	forb	perennial	butterfly-weed
Athyrium filix-femina	Athyriaceae	ATHFIL	native	4	0	fern	perennial	lady fern
Berberis thunbergii	Berberidaceae	BERTHU	non-native	0	3	shrub	perennial	japanese barberry
Carex cephalophora	Cyperaceae	CXCEPP	native	3	3	sedge	perennial	sedge
Carex gracillima	Cyperaceae	CXGRAA	native	4	3	sedge	perennial	sedge
Carex muehlenbergii	Cyperaceae	CXMUEH	native	7	5	sedge	perennial	sedge
Carex pensylvanica	Cyperaceae	CXPENS	native	4	5	sedge	perennial	sedge
Carex rosea; c. convoluta	Cyperaceae	CXROSE	native	2	5	sedge	perennial	curly-styled wood sedge
Carya glabra	Juglandaceae	CARGLA	native	5	3	tree	perennial	pignut hickory
Carya ovata	Juglandaceae	CAROVA	native	5	3	tree	perennial	shagbark hickory
Centaurea stoebe; c. maculosa	Asteraceae	CENSTO	non-native	0	5	forb	biennial	spotted knapweed
Circaea alpina	Onagraceae	CIRALP	native	4	-3	forb	perennial	small enchanters-nightshade
Circaea canadensis; c. lutetiana	Onagraceae	CIRCAN	native	2	3	forb	perennial	enchanters-nightshade
Cornus foemina	Cornaceae	CORFOE	native	1	0	shrub	perennial	gray dogwood
Corylus americana	Betulaceae	CORAMA	native	5	3	shrub	perennial	hazelnut
Danthonia spicata	Poaceae	DANSPI	native	4	5	grass	perennial	poverty grass; oatgrass
Dianthus armeria	Caryophyllaceae	DIAARM	non-native	0	5	forb	annual	deptford pink
Dichanthelium implicatum; panicum i.	Poaceae	DICIMP	native	3	0	grass	perennial	panic grass
Dichanthelium latifolium; panicum l.	Poaceae	DICLAT	native	5	3	grass	perennial	broad-leaved panic grass
Elaeagnus umbellata	Elaeagnaceae	ELAUMB	non-native	0	3	shrub	perennial	autumn-olive
Elymus hystrix; hystrix patula	Poaceae	ELYHYS	native	5	3	grass	perennial	bottlebrush grass
Elymus repens; agropyron r.	Poaceae	ELYREP	non-native	0	3	grass	perennial	quack grass
Euonymus europaeus	Celastraceae	EUOEUR	non-native	0	5	shrub	perennial	spindle tree
Euonymus obovatus	Celastraceae	EUOOBO	native	5	3	shrub	perennial	running strawberry-bush
Eurybia macrophylla; aster m.	Asteraceae	EURMAC	native	4	5	forb	perennial	big-leaved aster
Euthamia graminifolia	Asteraceae	EUTGRA	native	3	0	forb	perennial	grass-leaved goldenrod
Eutrochium maculatum; eupatorium m.	Asteraceae	EUTMAC	native	4	-5	forb	perennial	joe-pye-weed

Fragaria virginiana	Rosaceae	FRAVIR	native	2	3	forb	perennial	wild strawberry
Frangula alnus; rhamnus frangula	Rhamnaceae	FRAALN	non-native	0	0	shrub	perennial	glossy buckthorn
Fraxinus americana	Oleaceae	FRAAME	native	5	3	tree	perennial	white ash
Fraxinus nigra	Oleaceae	FRANIG	native	6	-3	tree	perennial	black ash
Galium aparine	Rubiaceae	GALAPA	native	0	3	forb	annual	annual bedstraw
Galium boreale	Rubiaceae	GALBOR	native	3	0	forb	perennial	northern bedstraw
Geranium maculatum	Geraniaceae	GERMAC	native	4	3	forb	perennial	wild geranium
Geum canadense	Rosaceae	GEUCAN	native	1	0	forb	perennial	white avens
Glyceria striata	Poaceae	GLYSTR	native	4	-5	grass	perennial	fowl manna grass
Hackelia virginiana	Boraginaceae	HACVIR	native	1	3	forb	biennial	beggars lice
Hylodesmum glutinosum; desmodium g.	Fabaceae	HYLGLU	native	5	5	forb	perennial	clustered-leaved tick-trefoil
Hypericum punctatum	Hypericaceae	HYPPUN	native	4	0	forb	perennial	spotted st. johns-wort
Juncus dudleyi	Juncaceae	JUNDUD	native	1	-3	rush	perennial	dudleys rush
Juniperus communis	Cupressaceae	JUNCOI	native	4	3	shrub	perennial	common or ground juniper
Lespedeza capitata	Fabaceae	LESCAP	native	5	3	forb	perennial	round-headed bush-clover
Lespedeza hirta	Fabaceae	LESHIR	native	7	5	forb	perennial	hairy bush-clover
Liatris scariosa	Asteraceae	LIASCA	native	5	5	forb	perennial	northern blazing-star
Ligustrum vulgare	Oleaceae	LIGVUL	non-native	0	3	shrub	perennial	common privet
Lonicera morrowii	Caprifoliaceae	LONMOR	non-native	0	3	shrub	perennial	morrow honeysuckle
Lupinus perennis	Fabaceae	LUPPER	native	7	5	forb	perennial	wild lupine
Maianthemum racemosum; smilacina r.	Convallariaceae	MAIRAC	native	5	3	forb	perennial	false spikenard
Maianthemum stellatum; smilacina s.	Convallariaceae	MAISTE	native	5	0	forb	perennial	starry false solomon-seal
Menispermum canadense	Menispermaceae	MENCAE	native	5	0	vine	perennial	moonseed
Monotropa uniflora	Ericaceae	MONOUN	native	5	3	forb	perennial	indian-pipe
Oxalis stricta; o. fontana	Oxalidaceae	OXASTR	native	0	3	forb	perennial	yellow wood-sorrel
Parthenocissus quinquefolia	Vitaceae	PARQUI	native	5	3	vine	perennial	virginia creeper
Persicaria virginiana; polygonum v.	Polygonaceae	PERVIR	native	4	0	forb	perennial	jumpseed
Pinus strobus	Pinaceae	PINSTR	native	3	3	tree	perennial	white pine
Poa compressa	Poaceae	POACOM	non-native	0	3	grass	perennial	canada bluegrass
Podophyllum peltatum	Berberidaceae	PODPEL	native	3	3	forb	perennial	may-apple
Polygonatum biflorum	Convallariaceae	POLBIF	native	4	3	forb	perennial	solomon-seal
Populus grandidentata	Salicaceae	POPGRA	native	4	3	tree	perennial	big-tooth aspen
Populus tremuloides	Salicaceae	POPTRE	native	1	0	tree	perennial	quaking aspen
Potentilla simplex	Rosaceae	POTSIM	native	2	3	forb	perennial	old-field cinquefoil

Prunella vulgaris	Lamiaceae	PRUVUL	native	0	0	forb	perennial	self-heal	
Prunus serotina	Rosaceae	PRUSER	native	2	3	tree	perennial	wild black cherry	
Prunus virginiana	Rosaceae	PRUVIR	native	2	3	shrub	perennial	choke cherry	
Pteridium aquilinum	Dennstaedtiaceae	PTEAQU	native	0	3	fern	perennial	bracken fern	
Quercus alba	Fagaceae	QUEALB	native	5	3	tree	perennial	white oak	
Quercus bicolor	Fagaceae	QUEBIC	native	8	-3	tree	perennial	swamp white oak	
Quercus macrocarpa	Fagaceae	QUEMAC	native	5	3	tree	perennial	bur oak	
Quercus rubra	Fagaceae	QUERUB	native	5	3	tree	perennial	red oak	
Quercus velutina	Fagaceae	QUEVEL	native	6	5	tree	perennial	black oak	
Rhamnus cathartica	Rhamnaceae	RHACAT	non-native	0	0	tree	perennial	common buckthorn	
Rhus typhina	Anacardiaceae	RHUTYP	native	2	3	shrub	perennial	staghorn sumac	
Ribes americanum	Grossulariaceae	RIBAME	native	6	-3	shrub	perennial	wild black currant	
Ribes cynosbati	Grossulariaceae	RIBCYN	native	4	3	shrub	perennial	prickly or wild gooseberry	
Rosa multiflora	Rosaceae	ROSMUL	non-native	0	3	shrub	perennial	multiflora rose	
Rosa palustris	Rosaceae	ROSPAL	native	5	-5	shrub	perennial	swamp rose	
Rubus allegheniensis	Rosaceae	RUBALL	native	1	3	shrub	perennial	common blackberry	
Rubus flagellaris	Rosaceae	RUBFLA	native	1	3	shrub	perennial	northern dewberry	
Rubus occidentalis	Rosaceae	RUBOCC	native	1	5	shrub	perennial	black raspberry	
Rubus pubescens	Rosaceae	RUBPUB	native	4	-3	shrub	perennial	dwarf raspberry	
Rubus strigosus	Rosaceae	RUBSTR	native	2	0	shrub	perennial	wild red raspberry	
Rudbeckia hirta	Asteraceae	RUDHIR	native	1	3	forb	perennial	black-eyed susan	
Schizachyrium scoparium; andropogon s.	Poaceae	SCHSCO	native	5	3	grass	perennial	little bluestem	
Solanum dulcamara	Solanaceae	SOLDUL	non-native	0	0	vine	perennial	bittersweet nightshade	
Solidago caesia	Asteraceae	SOLCAE	native	6	3	forb	perennial	bluestem goldenrod	
Solidago canadensis	Asteraceae	SOLCAN	native	1	3	forb	perennial	canada goldenrod	
Solidago gigantea	Asteraceae	SOLGIG	native	3	-3	forb	perennial	late goldenrod	
Solidago juncea	Asteraceae	SOLJUN	native	3	5	forb	perennial	early goldenrod	
Solidago nemoralis	Asteraceae	SOLNEM	native	2	5	forb	perennial	old-field goldenrod	
Solidago patula	Asteraceae	SOLPAT	native	6	-5	forb	perennial	swamp goldenrod	
Solidago rugosa	Asteraceae	SOLRUG	native	3	0	forb	perennial	rough-leaved goldenrod	
Solidago speciosa	Asteraceae	SOLSPE	native	5	5	forb	perennial	showy goldenrod	
Spiraea alba	Rosaceae	SPIALB	native	4	-3	shrub	perennial	meadowsweet	
Symphyotrichum laeve; aster l.	Asteraceae	SYMLAE	native	5	3	forb	perennial	smooth aster	
Symphyotrichum lateriflorum; aster l.	Asteraceae	SYMLAT	native	2	0	forb	perennial	calico aster	

Symphyotrichum urophyllum; aster sagittifolius	Asteraceae	SYMURO	native	2	5	forb	perennial	arrow-leaved aster
Symplocarpus foetidus	Araceae	SYMFOE	native	6	-5	forb	perennial	skunk-cabbage
Thalictrum dioicum	Ranunculaceae	THADIO	native	6	3	forb	perennial	early meadow-rue
Tilia americana	Malvaceae	TILAME	native	5	3	tree	perennial	basswood
Toxicodendron radicans	Anacardiaceae	TOXRAD	native	2	0	vine	perennial	poison-ivy
Trillium grandiflorum	Trilliaceae	TRIGRA	native	5	3	forb	perennial	common trillium
Triosteum aurantiacum	Caprifoliaceae	TRIAUN	native	5	5	forb	perennial	horse-gentian
Ulmus americana	Ulmaceae	ULMAME	native	1	-3	tree	perennial	american elm
Verbena urticifolia	Verbenaceae	VERURT	native	4	0	forb	perennial	white vervain
Veronica officinalis	Plantaginaceae	VEROOF	non-native	0	3	forb	perennial	common speedwell
Viburnum acerifolium	Adoxaceae	VIBACE	native	6	5	shrub	perennial	maple-leaved viburnum
Viburnum lentago	Adoxaceae	VIBLEN	native	4	0	shrub	perennial	nannyberry
Vincetoxicum rossicum	Apocynaceae	VINROS	non-native	0	5	vine	perennial	dog-strangling vine
Vitis aestivalis	Vitaceae	VITAES	native	6	3	vine	perennial	summer grape
Vitis riparia	Vitaceae	VITRIP	native	3	0	vine	perennial	river-bank grape

West Tract Wetland Depression										
07/26/2018										
Springfield Township										
Davisburg, Oakland County, MI										
USA										
FQA DB Region:	Michigan									
FQA DB Publication Year:	2014									
FQA DB Description:	Reznicek, A.A., M.R. Penskar, B.S. Walters, and B.S. Slaughter. 2014.									
	Michigan Floristic Quality Assessment Database									
Practitioner:	Mike Penskar									
Latitude:										
Longitude:										
Weather Notes:	Sunny, warm and humid									
Duration Notes:	Ca. 1 hr									
Community Type Notes:	Shrub swamp, incipient hardwood swamp									
Other Notes:	Small depression on lower part of moderate slope above pothole wetland									
Private/Public:	Public									
Conservatism-Based Metrics:										
Total Mean C:	3.4									
Native Mean C:	4									
Total FQI:	21.8									
Native FQI:	23.7									
Adjusted FQI:	37									
% C value 0:	14.6									
% C value 1-3:	34.1									
% C value 4-6:	48.8									
% C value 7-10:	2.4									
Native Tree Mean C:	2									
Native Shrub Mean C:	3.2									
Native Herbaceous Mean C:	4.3									
Species Richness:										
Total Species:	41									
Native Species:	35	85.40%								
Non-native Species:	6	14.60%								

Species Wetness:										
Mean Wetness:	-2.9									
Native Mean Wetness:	-3.6									
Physiognomy Metrics:										
Tree:	2	4.90%								
Shrub:	8	19.50%								
Vine:	5	12.20%								
Forb:	17	41.50%								
Grass:	1	2.40%								
Sedge:	5	12.20%								
Rush:	0	0%								
Fern:	3	7.30%								
Bryophyte:	0	0%								
Duration Metrics:										
Annual:	1	2.40%								
Perennial:	39	95.10%								
Biennial:	1	2.40%								
Native Annual:	1	2.40%								
Native Perennial:	33	80.50%								
Native Biennial:	1	2.40%								
Species:										
Scientific Name	**Family**	**Acronym**	**Native?**	**C**	**W**	**Physiognomy**	**Duration**	**Common Name**		
Apocynum cannabinum; a. sibiricum	Apocynaceae	APOCAN	native	3	0	forb	perennial	indian-hemp		
Asclepias incarnata	Apocynaceae	ASCINC	native	6	-5	forb	perennial	swamp milkweed		
Carex comosa	Cyperaceae	CXCOMO	native	5	-5	sedge	perennial	sedge		
Carex lacustris	Cyperaceae	CXLACU	native	6	-5	sedge	perennial	sedge		
Carex stricta	Cyperaceae	CXSTRI	native	4	-5	sedge	perennial	sedge		
Celastrus orbiculatus	Celastraceae	CELORB	non-native	0	5	vine	perennial	oriental bittersweet		
Cicuta maculata	Apiaceae	CICMAC	native	4	-5	forb	biennial	water hemlock		
Cornus foemina	Cornaceae	CORFOE	native	1	0	shrub	perennial	gray dogwood		

Doellingeria umbellata; aster u.	Asteraceae	DOEUMB	native	5	-3	forb	perennial	flat-topped white aster	
Dryopteris cristata	Dryopteridaceae	DRYCRI	native	6	-5	fern	perennial	crested shield fern	
Eupatorium perfoliatum	Asteraceae	EUPPER	native	4	-3	forb	perennial	boneset	
Eutrochium maculatum; eupatorium m.	Asteraceae	EUTMAC	native	4	-5	forb	perennial	joe-pye-weed	
Frangula alnus; rhamnus frangula	Rhamnaceae	FRAALN	non-native	0	0	shrub	perennial	glossy buckthorn	
Galium asprellum	Rubiaceae	GALASP	native	5	-5	vine	perennial	rough bedstraw	
Glyceria canadensis	Poaceae	GLYCAN	native	8	-5	grass	perennial	rattlesnake grass	
Helianthus giganteus	Asteraceae	HELGIG	native	5	-3	forb	perennial	tall sunflower	
Ilex verticillata	Aquifoliaceae	ILEVER	native	5	-3	shrub	perennial	michigan holly	
Impatiens capensis	Balsaminaceae	IMPCAP	native	2	-3	forb	annual	spotted touch-me-not	
Lonicera morrowii	Caprifoliaceae	LONMOR	non-native	0	3	shrub	perennial	morrow honeysuckle	
Lycopus uniflorus	Lamiaceae	LYCUNI	native	2	-5	forb	perennial	northern bugle weed	
Onoclea sensibilis	Onocleaceae	ONOSEN	native	2	-3	fern	perennial	sensitive fern	
Persicaria amphibia; polygonum a.	Polygonaceae	PERAMP	native	6	-5	forb	perennial	water smartweed	
Rosa multiflora	Rosaceae	ROSMUL	non-native	0	3	shrub	perennial	multiflora rose	
Salix amygdaloides	Salicaceae	SALAMY	native	3	-3	tree	perennial	peach-leaved willow	
Salix discolor	Salicaceae	SALDIS	native	1	-3	shrub	perennial	pussy willow	
Sambucus canadensis	Adoxaceae	SAMCAN	native	3	-3	shrub	perennial	elderberry	
Scirpus atrovirens	Cyperaceae	SCIATV	native	3	-5	sedge	perennial	bulrush	
Scirpus cyperinus	Cyperaceae	SCICYP	native	5	-5	sedge	perennial	wool-grass	
Scutellaria galericulata	Lamiaceae	SCUGAL	native	5	-5	forb	perennial	marsh skullcap	
Solanum dulcamara	Solanaceae	SOLDUL	non-native	0	0	vine	perennial	bittersweet nightshade	
Solidago gigantea	Asteraceae	SOLGIG	native	3	-3	forb	perennial	late goldenrod	
Symphyotrichum puniceum; aster p.	Asteraceae	SYMPUN	native	5	-5	forb	perennial	swamp aster	
Symplocarpus foetidus	Araceae	SYMFOE	native	6	-5	forb	perennial	skunk-cabbage	
Thelypteris palustris	Thelypteridaceae	THEPAL	native	2	-3	fern	perennial	marsh fern	
Toxicodendron vernix	Anacardiaceae	TOXVER	native	6	-5	shrub	perennial	poison sumac	
Typha angustifolia	Typhaceae	TYPANG	non-native	0	-5	forb	perennial	narrow-leaved cat-tail	
Typha latifolia	Typhaceae	TYPLAT	native	1	-5	forb	perennial	broad-leaved cat-tail	
Ulmus americana	Ulmaceae	ULMAME	native	1	-3	tree	perennial	american elm	
Verbena hastata	Verbenaceae	VERHAS	native	4	-3	forb	perennial	blue vervain	
Vitis aestivalis	Vitaceae	VITAES	native	6	3	vine	perennial	summer grape	
Vitis riparia	Vitaceae	VITRIP	native	3	0	vine	perennial	river-bank grape	

Hartman Property at Shiawasee Basin Preserve										
Pothole Lake Fen (West Tract) FQA Report										
07/26/2018										
Davisburg, Mich										
Oakland County										
MI										
USA										
FQA DB Region:	Michigan									
FQA DB Publication Year:	2014									
FQA DB Description:	Reznicek, A.A., M.R. Penskar, B.S. Walters, and B.S. Slaughter. 2014.									
		Michigan Floristic Quality Assessment Database								
Practitioner:	Mike Penskar									
Latitude:										
Longitude:										
Weather Notes:	Warm, sunny									
Duration Notes:	3-4 hrs July 26 2-3 hrs Aug. 20 2-3 hrs Sept. 19 w/ M. Sanders									
Community Type Notes:	prairie fen, with associated wet-mesic prairie on SE side contiguous with fen and upland									
Other Notes:										
Private/Public:	Public									
Conservatism-Based Metrics:										
Total Mean C:	4.3									
Native Mean C:	4.7									
Total FQI:	52.8									
Native FQI:	55									
Adjusted FQI:	44.8									
% C value 0:	9.9									
% C value 1-3:	33.1									

% C value 4-6:	36.4									
% C value 7-10:	20.5									
Native Tree Mean C:	2.7									
Native Shrub Mean C:	3.5									
Native Herbaceous Mean C:	5.1									
Species Richness:										
Total Species:	151									
Native Species:	137	90.70%								
Non-native Species:	14	9.30%								
Species Wetness:										
Mean Wetness:	-1.9									
Native Mean Wetness:	-2.3									
Physiognomy Metrics:										
Tree:	7	4.60%								
Shrub:	22	14.60%								
Vine:	9	6%								
Forb:	78	51.70%								
Grass:	11	7.30%								
Sedge:	17	11.30%								
Rush:	4	2.60%								
Fern:	3	2%								
Bryophyte:	0	0%								
Duration Metrics:										
Annual:	7	4.60%								
Perennial:	139	92.10%								
Biennial:	5	3.30%								
Native Annual:	7	4.60%								

Native Perennial:	128	84.80%								
Native Biennial:	2	1.30%								
Species:										
Scientific Name	**Family**	**Acronym**	**Native?**	**C**	**W**	**Physiognomy**	**Duration**	**Common Name**		
Acer rubrum	Sapindaceae	ACERUB	native	1	0	tree	perennial	red maple		
Agalinis purpurea	Orobanchaceae	AGAPUR	native	7	-3	forb	annual	purple false foxglove		
Andropogon gerardii	Poaceae	ANDGER	native	5	0	grass	perennial	big bluestem		
Angelica atropurpurea	Apiaceae	ANGATR	native	6	-5	forb	perennial	purplestem angelica		
Apios americana	Fabaceae	APIAME	native	3	-3	vine	perennial	groundnut		
Apocynum cannabinum; a. sibiricum	Apocynaceae	APOCAN	native	3	0	forb	perennial	indian-hemp		
Asclepias incarnata	Apocynaceae	ASCINC	native	6	-5	forb	perennial	swamp milkweed		
Asclepias syriaca	Apocynaceae	ASCSYR	native	1	5	forb	perennial	common milkweed		
Bidens cernua	Asteraceae	BIDCER	native	3	-5	forb	annual	nodding beggar-ticks		
Bidens trichosperma; b. coronatus	Asteraceae	BIDTRI	native	7	-5	forb	annual	tickseed-sunflower		
Bromus ciliatus	Poaceae	BROCIL	native	6	-3	grass	perennial	fringed brome		
Calamagrostis canadensis	Poaceae	CALCAN	native	3	-5	grass	perennial	blue-joint		
Calamagrostis stricta; c. inexpansa; c. lacustris	Poaceae	CALSTR	native	10	-3	grass	perennial	narrow-leaved reedgrass		
Calystegia sepium	Convolvulaceae	CALSEP	native	2	0	vine	perennial	hedge bindweed		
Campanula aparinoides	Campanulaceae	CAMAPA	native	7	-5	forb	perennial	marsh bellflower		
Carex granularis	Cyperaceae	CXGRAN	native	2	-3	sedge	perennial	sedge		
Carex lacustris	Cyperaceae	CXLACU	native	6	-5	sedge	perennial	sedge		
Carex lasiocarpa	Cyperaceae	CXLASI	native	8	-5	sedge	perennial	sedge		
Carex leptalea	Cyperaceae	CXLEPA	native	5	-5	sedge	perennial	sedge		
Carex prairea	Cyperaceae	CXPRAI	native	10	-3	sedge	perennial	sedge		
Carex sterilis	Cyperaceae	CXSTER	native	10	-5	sedge	perennial	sedge		
Carex vulpinoidea	Cyperaceae	CXVULP	native	1	-5	sedge	perennial	sedge		
Celastrus orbiculatus	Celastraceae	CELORB	non-native	0	5	vine	perennial	oriental bittersweet		
Centaurea stoebe; c. maculosa	Asteraceae	CENSTO	non-native	0	5	forb	biennial	spotted knapweed		
Cephalanthus occidentalis	Rubiaceae	CEPOCC	native	7	-5	shrub	perennial	buttonbush		
Cicuta bulbifera	Apiaceae	CICBUL	native	5	-5	forb	perennial	water hemlock		
Cicuta maculata	Apiaceae	CICMAC	native	4	-5	forb	biennial	water hemlock		

Cirsium arvense	Asteraceae	CIRARV	non-native	0	3	forb	perennial	canada thistle		
Cirsium muticum	Asteraceae	CIRMUT	native	6	-5	forb	biennial	swamp thistle		
Cirsium vulgare	Asteraceae	CIRVUL	non-native	0	3	forb	biennial	bull thistle		
Cladium mariscoides	Cyperaceae	CLAMAR	native	10	-5	sedge	perennial	twig-rush		
Cornus foemina	Cornaceae	CORFOE	native	1	0	shrub	perennial	gray dogwood		
Cornus sericea; c. stolonifera	Cornaceae	CORSER	native	2	-3	shrub	perennial	red-osier		
Cyperus bipartitus; c. rivularis	Cyperaceae	CYPBIP	native	3	-3	sedge	annual	brook nut sedge		
Dasiphora fruticosa; potentilla f.	Rosaceae	DASFRU	native	8	-3	shrub	perennial	shrubby cinquefoil		
Daucus carota	Apiaceae	DAUCAR	non-native	0	5	forb	biennial	queen-annes-lace		
Desmodium canadense	Fabaceae	DESCAD	native	3	0	forb	perennial	showy tick-trefoil		
Desmodium ciliare	Fabaceae	DESCIL	native	8	5	forb	perennial	hairy tick-trefoil		
Doellingeria umbellata; aster u.	Asteraceae	DOEUMB	native	5	-3	forb	perennial	flat-topped white aster		
Drosera rotundifolia	Droseraceae	DROROT	native	6	-5	forb	perennial	round-leaved sundew		
Elaeagnus umbellata	Elaeagnaceae	ELAUMB	non-native	0	3	shrub	perennial	autumn-olive		
Eleocharis elliptica	Cyperaceae	ELEELL	native	6	-5	sedge	perennial	golden-seeded spike rush		
Eleocharis rostellata	Cyperaceae	ELEROS	native	10	-5	sedge	perennial	spike-rush		
Elymus trachycaulus; agropyron t.	Poaceae	ELYTRA	native	8	3	grass	perennial	slender wheatgrass		
Epilobium coloratum	Onagraceae	EPICOL	native	3	-5	forb	perennial	cinnamon willow-herb		
Erechtites hieraciifolius	Asteraceae	EREHIE	native	2	3	forb	annual	fireweed		
Erigeron strigosus	Asteraceae	ERISTR	native	4	3	forb	perennial	daisy fleabane		
Eupatorium perfoliatum	Asteraceae	EUPPER	native	4	-3	forb	perennial	boneset		
Euphorbia corollata	Euphorbiaceae	EUPCOR	native	4	5	forb	perennial	flowering spurge		
Euthamia graminifolia	Asteraceae	EUTGRA	native	3	0	forb	perennial	grass-leaved goldenrod		
Eutrochium maculatum; eupatorium m.	Asteraceae	EUTMAC	native	4	-5	forb	perennial	joe-pye-weed		
Fallopia scandens; polygonum s.	Polygonaceae	FALSCA	native	2	0	vine	perennial	false buckwheat		
Frangula alnus; rhamnus frangula	Rhamnaceae	FRAALN	non-native	0	0	shrub	perennial	glossy buckthorn		
Galium asprellum	Rubiaceae	GALASP	native	5	-5	vine	perennial	rough bedstraw		
Galium labradoricum	Rubiaceae	GALLAB	native	8	-5	forb	perennial	bog bedstraw		
Glyceria striata	Poaceae	GLYSTR	native	4	-5	grass	perennial	fowl manna grass		
Helenium autumnale	Asteraceae	HELAUT	native	5	-3	forb	perennial	sneezeweed		
Ilex verticillata	Aquifoliaceae	ILEVER	native	5	-3	shrub	perennial	michigan holly		
Impatiens capensis	Balsaminaceae	IMPCAP	native	2	-3	forb	annual	spotted touch-me-not		

Iris virginica	Iridaceae	IRIVIR	native	5	-5	forb	perennial	southern blue flag		
Juncus brachycephalus	Juncaceae	JUNBRP	native	7	-5	rush	perennial	rush		
Juncus canadensis	Juncaceae	JUNCAN	native	6	-5	rush	perennial	canadian rush		
Juncus dudleyi	Juncaceae	JUNDUD	native	1	-3	rush	perennial	dudleys rush		
Juncus tenuis	Juncaceae	JUNTEN	native	1	0	rush	perennial	path rush		
Juniperus virginiana	Cupressaceae	JUNVIR	native	3	3	tree	perennial	red-cedar		
Lathyrus palustris	Fabaceae	LATPAL	native	7	-3	vine	perennial	marsh pea		
Leersia oryzoides	Poaceae	LEEORY	native	3	-5	grass	perennial	cut grass		
Lespedeza capitata	Fabaceae	LESCAP	native	5	3	forb	perennial	round-headed bush-clover		
Liatris scariosa	Asteraceae	LIASCA	native	5	5	forb	perennial	northern blazing-star		
Liatris spicata	Asteraceae	LIASPI	native	8	0	forb	perennial	marsh blazing-star		
Lobelia kalmii	Campanulaceae	LOBKAL	native	10	-5	forb	perennial	bog lobelia		
Lobelia spicata	Campanulaceae	LOBSPI	native	4	0	forb	perennial	pale spiked lobelia		
Lonicera morrowii	Caprifoliaceae	LONMOR	non-native	0	3	shrub	perennial	morrow honeysuckle		
Ludwigia palustris	Onagraceae	LUDPAL	native	4	-5	forb	perennial	water-purslane		
Lycopus uniflorus	Lamiaceae	LYCUNI	native	2	-5	forb	perennial	northern bugle weed		
Lysimachia quadriflora	Myrsinaceae	LYSQUR	native	10	-5	forb	perennial	whorled loosestrife		
Lythrum salicaria	Lythraceae	LYTSAL	non-native	0	-5	forb	perennial	purple loosestrife		
Mentha canadensis; m. arvensis	Lamiaceae	MENCAS	native	3	-3	forb	perennial	wild mint		
Monarda fistulosa	Lamiaceae	MONFIS	native	2	3	forb	perennial	wild-bergamot		
Muhlenbergia glomerata	Poaceae	MUHGLO	native	10	-5	grass	perennial	marsh wild-timothy		
Muhlenbergia mexicana	Poaceae	MUHMEX	native	3	-3	grass	perennial	leafy satin grass		
Myriophyllum heterophyllum	Haloragaceae	MYRHET	native	6	-5	forb	perennial	various-leaved water-milfoil		
Nymphaea odorata	Nymphaeaceae	NYMODO	native	6	-5	forb	perennial	sweet-scented waterlily		
Onoclea sensibilis	Onocleaceae	ONOSEN	native	2	-3	fern	perennial	sensitive fern		
Packera aurea; senecio a.	Asteraceae	PACAUR	native	5	-3	forb	perennial	golden ragwort		
Parnassia glauca	Parnassiaceae	PARGLA	native	8	-5	forb	perennial	grass-of-parnassus		
Pedicularis lanceolata	Orobanchaceae	PEDLAN	native	8	-3	forb	perennial	swamp-betony		
Persicaria amphibia; polygonum a.	Polygonaceae	PERAMP	native	6	-5	forb	perennial	water smartweed		
Plantago lanceolata	Plantaginaceae	PLALAN	non-native	0	3	forb	perennial	english plantain		
Populus tremuloides	Salicaceae	POPTRE	native	1	0	tree	perennial	quaking aspen		
Prenanthes alba	Asteraceae	PREALB	native	5	3	forb	perennial	white lettuce		

Prunella vulgaris	Lamiaceae	PRUVUL	native	0	0	forb	perennial	self-heal		
Prunus serotina	Rosaceae	PRUSER	native	2	3	tree	perennial	wild black cherry		
Pycnanthemum virginianum	Lamiaceae	PYCVIR	native	5	-3	forb	perennial	common mountain mint		
Quercus macrocarpa	Fagaceae	QUEMAC	native	5	3	tree	perennial	bur oak		
Quercus velutina	Fagaceae	QUEVEL	native	6	5	tree	perennial	black oak		
Rhynchospora capillacea	Cyperaceae	RHYCAL	native	10	-5	sedge	perennial	beak-rush		
Ribes hirtellum	Grossulariaceae	RIBHIR	native	6	-3	shrub	perennial	swamp gooseberry		
Rosa multiflora	Rosaceae	ROSMUL	non-native	0	3	shrub	perennial	multiflora rose		
Rubus allegheniensis	Rosaceae	RUBALL	native	1	3	shrub	perennial	common blackberry		
Rubus flagellaris	Rosaceae	RUBFLA	native	1	3	shrub	perennial	northern dewberry		
Rubus occidentalis	Rosaceae	RUBOCC	native	1	5	shrub	perennial	black raspberry		
Rubus strigosus	Rosaceae	RUBSTR	native	2	0	shrub	perennial	wild red raspberry		
Rudbeckia hirta	Asteraceae	RUDHIR	native	1	3	forb	perennial	black-eyed susan		
Rumex orbiculatus	Polygonaceae	RUMORB	native	9	-5	forb	perennial	great water dock		
Salix bebbiana	Salicaceae	SALBEB	native	1	-3	shrub	perennial	bebbs willow		
Salix candida	Salicaceae	SALCAN	native	9	-5	shrub	perennial	hoary willow		
Salix discolor	Salicaceae	SALDIS	native	1	-3	shrub	perennial	pussy willow		
Salix petiolaris	Salicaceae	SALPET	native	1	-3	shrub	perennial	slender willow		
Sambucus canadensis	Adoxaceae	SAMCAN	native	3	-3	shrub	perennial	elderberry		
Schizachyrium scoparium; andropogon s.	Poaceae	SCHSCO	native	5	3	grass	perennial	little bluestem		
Schoenoplectus acutus; scirpus a.	Cyperaceae	SCHACU	native	5	-5	sedge	perennial	hardstem bulrush		
Scirpus atrovirens	Cyperaceae	SCIATV	native	3	-5	sedge	perennial	bulrush		
Scirpus cyperinus	Cyperaceae	SCICYP	native	5	-5	sedge	perennial	wool-grass		
Scirpus pendulus	Cyperaceae	SCIPEN	native	3	-5	sedge	perennial	bulrush		
Scleria verticillata	Cyperaceae	SCLVER	native	10	-5	sedge	annual	nut-rush		
Scutellaria galericulata	Lamiaceae	SCUGAL	native	5	-5	forb	perennial	marsh skullcap		
Scutellaria lateriflora	Lamiaceae	SCULAT	native	5	-5	forb	perennial	mad-dog skullcap		
Selaginella eclipes	Selaginellaceae	SELECL	native	5	-3	fern	perennial	selaginella		
Solanum dulcamara	Solanaceae	SOLDUL	non-native	0	0	vine	perennial	bittersweet nightshade		
Solidago canadensis	Asteraceae	SOLCAN	native	1	3	forb	perennial	canada goldenrod		
Solidago gigantea	Asteraceae	SOLGIG	native	3	-3	forb	perennial	late goldenrod		
Solidago juncea	Asteraceae	SOLJUN	native	3	5	forb	perennial	early goldenrod		

Solidago ohioensis	Asteraceae	SOLOHI	native	8	-5	forb	perennial	ohio goldenrod		
Solidago patula	Asteraceae	SOLPAT	native	6	-5	forb	perennial	swamp goldenrod		
Solidago riddellii	Asteraceae	SOLRID	native	6	-5	forb	perennial	riddells goldenrod		
Solidago uliginosa	Asteraceae	SOLULI	native	4	-5	forb	perennial	bog goldenrod		
Sparganium eurycarpum	Typhaceae	SPAEUR	native	5	-5	forb	perennial	common bur-reed		
Spartina pectinata	Poaceae	SPAPEC	native	5	-3	grass	perennial	cordgrass		
Spiraea alba	Rosaceae	SPIALB	native	4	-3	shrub	perennial	meadowsweet		
Spiranthes cernua	Orchidaceae	SPICER	native	4	-3	forb	perennial	nodding ladies-tresses		
Spiranthes magnicamporum; s. cernua	Orchidaceae	SPIMAG	native	9	3	forb	perennial	prairie ladies-tresses		
Symphyotrichum boreale; aster b.	Asteraceae	SYMBOR	native	9	-5	forb	perennial	northern bog aster		
Symphyotrichum lateriflorum; aster l.	Asteraceae	SYMLAT	native	2	0	forb	perennial	calico aster		
Symphyotrichum novae-angliae; aster n.	Asteraceae	SYMNOV	native	3	-3	forb	perennial	new england aster		
Symphyotrichum oolentangiense; aster o.	Asteraceae	SYMOOL	native	4	5	forb	perennial	prairie heart-leaved aster		
Symphyotrichum pilosum; aster p.	Asteraceae	SYMPIL	native	1	3	forb	perennial	hairy aster		
Symplocarpus foetidus	Araceae	SYMFOE	native	6	-5	forb	perennial	skunk-cabbage		
Thelypteris palustris	Thelypteridaceae	THEPAL	native	2	-3	fern	perennial	marsh fern		
Toxicodendron vernix	Anacardiaceae	TOXVER	native	6	-5	shrub	perennial	poison sumac		
Triadenum fraseri	Hypericaceae	TRIFRA	native	6	-5	forb	perennial	marsh st. johns-wort		
Triantha glutinosa; tofieldia g.	Melanthiaceae	TRIGLU	native	10	-5	forb	perennial	false asphodel		
Typha angustifolia	Typhaceae	TYPANG	non-native	0	-5	forb	perennial	narrow-leaved cat-tail		
Typha latifolia	Typhaceae	TYPLAT	native	1	-5	forb	perennial	broad-leaved cat-tail		
Ulmus americana	Ulmaceae	ULMAME	native	1	-3	tree	perennial	american elm		
Verbena hastata	Verbenaceae	VERHAS	native	4	-3	forb	perennial	blue vervain		
Viburnum lentago	Adoxaceae	VIBLEN	native	4	0	shrub	perennial	nannyberry		
Vincetoxicum rossicum	Apocynaceae	VINROS	non-native	0	5	vine	perennial	dog-strangling vine		
Viola nephrophylla	Violaceae	VIONEP	native	8	-3	forb	perennial	northern bog violet		
Vitis riparia	Vitaceae	VITRIP	native	3	0	vine	perennial	river-bank grape		
Zizia aurea	Apiaceae	ZIZAUR	native	6	0	forb	perennial	golden alexanders		

Hartman Property at Shiawassee Basin Preserve									
Disturbed Forest Patch (West Tract) FQA Report									
09/11/2018									
Davisburg									
Oakland County									
MI									
USA									
FQA DB Region:	Michigan								
FQA DB Publication Year:	2014								
FQA DB Description:	Reznicek, A.A., M.R. Penskar, B.S. Walters, and B.S. Slaughter. 2014.								
	Michigan Floristic Quality Assessment Database.								
Practitioner:	Mike Penskar								
Latitude:									
Longitude:									
Weather Notes:	Ca. 75 deg, sunny, warm, moderately humid								
Duration Notes:	2 hrs								
Community Type Notes:	Disturbed dry-mesic forest patch in former barrens area								
Other Notes:									
Private/Public:	Public								
Conservatism-Based Metrics:									
Total Mean C:	2.2								
Native Mean C:	3								
Total FQI:	18.3								
Native FQI:	21.4								
Adjusted FQI:	25.8								
% C value 0:	29								
% C value 1-3:	42								
% C value 4-6:	27.5								
% C value 7-10:	1.4								
Native Tree Mean C:	3.2								
Native Shrub Mean C:	2.9								
Native Herbaceous Mean C:	3								

Species Richness:									
Total Species:	69								
Native Species:	51	73.90%							
Non-native Species:	18	26.10%							
Species Wetness:									
Mean Wetness:	2.1								
Native Mean Wetness:	1.7								
Physiognomy Metrics:									
Tree:	15	21.70%							
Shrub:	11	15.90%							
Vine:	4	5.80%							
Forb:	29	42%							
Grass:	8	11.60%							
Sedge:	1	1.40%							
Rush:	0	0%							
Fern:	1	1.40%							
Bryophyte:	0	0%							
Duration Metrics:									
Annual:	1	1.40%							
Perennial:	66	95.70%							
Biennial:	2	2.90%							
Native Annual:	0	0%							
Native Perennial:	51	73.90%							
Native Biennial:	0	0%							
Species:									
Scientific Name	**Family**	**Acronym**	**Native?**	**C**	**W**	**Physiognomy**	**Duration**	**Common Name**	
Acer rubrum	Sapindaceae	ACERUB	native	1	0	tree	perennial	red maple	
Achillea millefolium	Asteraceae	ACHMIL	native	1	3	forb	perennial	yarrow	
Agrostis gigantea	Poaceae	AGRGIG	non-native	0	-3	grass	perennial	redtop	
Ailanthus altissima	Simaroubaceae	AILALT	non-native	0	5	tree	perennial	tree-of-heaven	

Amelanchier laevis	Rosaceae	AMELAE	native	4	5	tree	perennial	smooth shadbush
Andropogon gerardii	Poaceae	ANDGER	native	5	0	grass	perennial	big bluestem
Anemone virginiana	Ranunculaceae	ANEVIR	native	3	3	forb	perennial	thimbleweed
Apocynum cannabinum; a. sibiricum	Apocynaceae	APOCAN	native	3	0	forb	perennial	indian-hemp
Asclepias syriaca	Apocynaceae	ASCSYR	native	1	5	forb	perennial	common milkweed
Asclepias tuberosa	Apocynaceae	ASCTUB	native	5	5	forb	perennial	butterfly-weed
Asparagus officinalis	Asparagaceae	ASPOFF	non-native	0	3	forb	perennial	garden asparagus
Bromus inermis	Poaceae	BROINE	non-native	0	5	grass	perennial	smooth brome
Carex granularis	Cyperaceae	CXGRAN	native	2	-3	sedge	perennial	sedge
Celastrus orbiculatus	Celastraceae	CELORB	non-native	0	5	vine	perennial	oriental bittersweet
Centaurea stoebe; c. maculosa	Asteraceae	CENSTO	non-native	0	5	forb	biennial	spotted knapweed
Cornus foemina	Cornaceae	CORFOE	native	1	0	shrub	perennial	gray dogwood
Corylus americana	Betulaceae	CORAMA	native	5	3	shrub	perennial	hazelnut
Dactylis glomerata	Poaceae	DACGLO	non-native	0	3	grass	perennial	orchard grass
Danthonia spicata	Poaceae	DANSPI	native	4	5	grass	perennial	poverty grass; oatgrass
Daucus carota	Apiaceae	DAUCAR	non-native	0	5	forb	biennial	queen-annes-lace
Digitaria cognata; leptoloma c.	Poaceae	DIGCOG	native	3	5	grass	perennial	fall witch grass
Doellingeria umbellata; aster u.	Asteraceae	DOEUMB	native	5	-3	forb	perennial	flat-topped white aster
Elaeagnus umbellata	Elaeagnaceae	ELAUMB	non-native	0	3	shrub	perennial	autumn-olive
Equisetum arvense	Equisetaceae	EQUARV	native	0	0	fern	perennial	common horsetail
Euthamia graminifolia	Asteraceae	EUTGRA	native	3	0	forb	perennial	grass-leaved goldenrod
Fallopia scandens; polygonum s.	Polygonaceae	FALSCA	native	2	0	vine	perennial	false buckwheat
Fragaria virginiana	Rosaceae	FRAVIR	native	2	3	forb	perennial	wild strawberry
Frangula alnus; rhamnus frangula	Rhamnaceae	FRAALN	non-native	0	0	shrub	perennial	glossy buckthorn
Fraxinus americana	Oleaceae	FRAAME	native	5	3	tree	perennial	white ash
Hypericum perforatum	Hypericaceae	HYPPER	non-native	0	5	forb	perennial	common st. johns-wort
Juniperus virginiana	Cupressaceae	JUNVIR	native	3	3	tree	perennial	red-cedar
Lespedeza capitata	Fabaceae	LESCAP	native	5	3	forb	perennial	round-headed bush-clover
Linaria vulgaris	Plantaginaceae	LINVUL	non-native	0	5	forb	perennial	butter-and-eggs
Lonicera morrowii	Caprifoliaceae	LONMOR	non-native	0	3	shrub	perennial	morrow honeysuckle
Medicago lupulina	Fabaceae	MEDLUP	non-native	0	3	forb	annual	black medick
Monarda fistulosa	Lamiaceae	MONFIS	native	2	3	forb	perennial	wild-bergamot
Parthenocissus quinquefolia	Vitaceae	PARQUI	native	5	3	vine	perennial	virginia creeper
Pinus sylvestris	Pinaceae	PINSYL	non-native	0	3	tree	perennial	scotch pine
Poa compressa	Poaceae	POACOM	non-native	0	3	grass	perennial	canada bluegrass

Populus deltoides	Salicaceae	POPDEL	native	1	0	tree	perennial	cottonwood
Populus grandidentata	Salicaceae	POPGRA	native	4	3	tree	perennial	big-tooth aspen
Populus tremuloides	Salicaceae	POPTRE	native	1	0	tree	perennial	quaking aspen
Prunella vulgaris	Lamiaceae	PRUVUL	native	0	0	forb	perennial	self-heal
Prunus serotina	Rosaceae	PRUSER	native	2	3	tree	perennial	wild black cherry
Pycnanthemum virginianum	Lamiaceae	PYCVIR	native	5	-3	forb	perennial	common mountain mint
Quercus alba	Fagaceae	QUEALB	native	5	3	tree	perennial	white oak
Quercus macrocarpa	Fagaceae	QUEMAC	native	5	3	tree	perennial	bur oak
Quercus velutina	Fagaceae	QUEVEL	native	6	5	tree	perennial	black oak
Rhamnus alnifolia	Rhamnaceae	RHAALN	native	8	-5	shrub	perennial	alder-leaved buckthorn
Rhamnus cathartica	Rhamnaceae	RHACAT	non-native	0	0	tree	perennial	common buckthorn
Rhus glabra	Anacardiaceae	RHUGLA	native	2	5	shrub	perennial	smooth sumac
Rosa multiflora	Rosaceae	ROSMUL	non-native	0	3	shrub	perennial	multiflora rose
Rubus allegheniensis	Rosaceae	RUBALL	native	1	3	shrub	perennial	common blackberry
Rubus occidentalis	Rosaceae	RUBOCC	native	1	5	shrub	perennial	black raspberry
Rubus strigosus	Rosaceae	RUBSTR	native	2	0	shrub	perennial	wild red raspberry
Rudbeckia hirta	Asteraceae	RUDHIR	native	1	3	forb	perennial	black-eyed susan
Schizachyrium scoparium; andropogon s.	Poaceae	SCHSCO	native	5	3	grass	perennial	little bluestem
Solidago canadensis	Asteraceae	SOLCAN	native	1	3	forb	perennial	canada goldenrod
Solidago juncea	Asteraceae	SOLJUN	native	3	5	forb	perennial	early goldenrod
Solidago riddellii	Asteraceae	SOLRID	native	6	-5	forb	perennial	riddells goldenrod
Solidago speciosa	Asteraceae	SOLSPE	native	5	5	forb	perennial	showy goldenrod
Symphyotrichum laeve; aster l.	Asteraceae	SYMLAE	native	5	3	forb	perennial	smooth aster
Symphyotrichum lateriflorum; aster l.	Asteraceae	SYMLAT	native	2	0	forb	perennial	calico aster
Symphyotrichum novae-angliae; aster n.	Asteraceae	SYMNOV	native	3	-3	forb	perennial	new england aster
Symphyotrichum pilosum; aster p.	Asteraceae	SYMPIL	native	1	3	forb	perennial	hairy aster
Symphyotrichum urophyllum; aster sagittifol	Asteraceae	SYMURO	native	2	5	forb	perennial	arrow-leaved aster
Ulmus americana	Ulmaceae	ULMAME	native	1	-3	tree	perennial	american elm
Verbena urticifolia	Verbenaceae	VERURT	native	4	0	forb	perennial	white vervain
Vitis riparia	Vitaceae	VITRIP	native	3	0	vine	perennial	river-bank grape

Hartman Property at Shiawassee Basin Preserve									
Wet-Mesic Prairie West Tract FQA Report									
10/12/2018									
Davisburg									
Oakland County									
MI									
USA									
FQA DB Region:	Michigan								
FQA DB Publication Year:	2014								
FQA DB Description:	Reznicek, A.A., M.R. Penskar, B.S. Walters, and B.S. Slaughter. 2014.								
	Michigan Floristic Quality Assessment Database								
Practitioner:	Mike Penskar, Josh Cohen et al.								
Latitude:									
Longitude:									
Weather Notes:									
Duration Notes:									
Community Type Notes:									
Other Notes:									
Private/Public:	Public								
Conservatism-Based Metrics:									
Total Mean C:	3.7								
Native Mean C:	4.3								
Total FQI:	21.6								
Native FQI:	23.2								
Adjusted FQI:	39.7								
% C value 0:	14.7								
% C value 1-3:	35.3								
% C value 4-6:	38.2								
% C value 7-10:	11.8								
Native Tree Mean C:	1.7								
Native Shrub Mean C:	4.3								

Native Herbaceous Mean C:	4.7								
Species Richness:									
Total Species:	34								
Native Species:	29	85.30%							
Non-native Species:	5	14.70%							
Species Wetness:									
Mean Wetness:	-0.4								
Native Mean Wetness:	-1								
Physiognomy Metrics:									
Tree:	3	8.80%							
Shrub:	6	17.60%							
Vine:	0	0%							
Forb:	15	44.10%							
Grass:	3	8.80%							
Sedge:	5	14.70%							
Rush:	1	2.90%							
Fern:	1	2.90%							
Bryophyte:	0	0%							
Duration Metrics:									
Annual:	3	8.80%							
Perennial:	28	82.40%							
Biennial:	3	8.80%							
Native Annual:	3	8.80%							
Native Perennial:	26	76.50%							
Native Biennial:	0	0%							

Species:									
Scientific Name	**Family**	**Acronym**	**Native?**	**C**	**W**	**Physiognomy**	**Duration**	**Common Name**	
Andropogon gerardii	Poaceae	ANDGER	native	5	0	grass	perennial	big bluestem	
Asclepias tuberosa	Apocynaceae	ASCTUB	native	5	5	forb	perennial	butterfly-weed	
Carex flava	Cyperaceae	CXFLAV	native	4	-5	sedge	perennial	sedge	
Centaurea stoebe; c. maculosa	Asteraceae	CENSTO	non-native	0	5	forb	biennial	spotted knapweed	
Cornus foemina	Cornaceae	CORFOE	native	1	0	shrub	perennial	gray dogwood	
Cyperus bipartitus; c. rivularis	Cyperaceae	CYPBIP	native	3	-3	sedge	annual	brook nut sedge	
Daucus carota	Apiaceae	DAUCAR	non-native	0	5	forb	biennial	queen-annes-lace	
Desmodium canadense	Fabaceae	DESCAD	native	3	0	forb	perennial	showy tick-trefoil	
Elaeagnus umbellata	Elaeagnaceae	ELAUMB	non-native	0	3	shrub	perennial	autumn-olive	
Eleocharis elliptica	Cyperaceae	ELEELL	native	6	-5	sedge	perennial	golden-seeded spike rush	
Equisetum hyemale	Equisetaceae	EQUHYE	native	2	0	fern	perennial	scouring rush	
Fragaria virginiana	Rosaceae	FRAVIR	native	2	3	forb	perennial	wild strawberry	
Frangula alnus; rhamnus frangula	Rhamnaceae	FRAALN	non-native	0	0	shrub	perennial	glossy buckthorn	
Helenium autumnale	Asteraceae	HELAUT	native	5	-3	forb	perennial	sneezeweed	
Juncus canadensis	Juncaceae	JUNCAN	native	6	-5	rush	perennial	canadian rush	
Juniperus communis	Cupressaceae	JUNCOI	native	4	3	shrub	perennial	common or ground juniper	
Juniperus virginiana	Cupressaceae	JUNVIR	native	3	3	tree	perennial	red-cedar	
Liatris scariosa	Asteraceae	LIASCA	native	5	5	forb	perennial	northern blazing-star	
Lycopus uniflorus	Lamiaceae	LYCUNI	native	2	-5	forb	perennial	northern bugle weed	
Melilotus albus	Fabaceae	MELALB	non-native	0	3	forb	biennial	white sweet-clover	
Panicum flexile	Poaceae	PANFLE	native	8	-3	grass	annual	panic grass	
Populus deltoides	Salicaceae	POPDEL	native	1	0	tree	perennial	cottonwood	
Populus tremuloides	Salicaceae	POPTRE	native	1	0	tree	perennial	quaking aspen	
Rhamnus alnifolia	Rhamnaceae	RHAALN	native	8	-5	shrub	perennial	alder-leaved buckthorn	
Schizachyrium scoparium; andropogon s.	Poaceae	SCHSCO	native	5	3	grass	perennial	little bluestem	
Scirpus pendulus	Cyperaceae	SCIPEN	native	3	-5	sedge	perennial	bulrush	
Scleria verticillata	Cyperaceae	SCLVER	native	10	-5	sedge	annual	nut-rush	
Solidago nemoralis	Asteraceae	SOLNEM	native	2	5	forb	perennial	old-field goldenrod	
Solidago ohioensis	Asteraceae	SOLOHI	native	8	-5	forb	perennial	ohio goldenrod	
Solidago riddellii	Asteraceae	SOLRID	native	6	-5	forb	perennial	riddells goldenrod	

Spiraea alba	Rosaceae	SPIALB	native	4	-3	shrub	perennial	meadowsweet
Symphyotrichum novae-angliae; aster n.	Asteraceae	SYMNOV	native	3	-3	forb	perennial	new england aster
Symphyotrichum oolentangiense; aster o.	Asteraceae	SYMOOL	native	4	5	forb	perennial	prairie heart-leaved aster
Zizia aurea	Apiaceae	ZIZAUR	native	6	0	forb	perennial	golden alexanders

***Amelanchier laevis* (smooth shadbush) – East Tract Disturbed Patch Forest**

***Amelanchier laevis* (smooth shadbush) – East Tract Disturbed Patch Forest**