

Ecological Assessment and Rare Species Surveys of Recent Acquisitions at Wigwam Bay State Wildlife Area, Arenac Co., Michigan



Prepared By:

Bradford S. Slaughter and Michael A. Sanders
Michigan Natural Features Inventory
Michigan State University Extension
P.O. Box 30444
Lansing, MI 48909-7944

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Cover photograph: Stands of hardstem bulrush (*Schoenoplectus acutus*) characterize the outer zones of the Great Lakes marsh south of the Beardsley parcel, August 16, 2016. Photograph by B.S. Slaughter. All photographs in report by B.S. Slaughter unless otherwise indicated.

Executive Summary

In 2015—2016, Michigan Natural Features Inventory (MNFI) contracted with Michigan Department of Natural Resources (MDNR), Wildlife Division (WLD), to conduct ecological assessments and targeted rare species surveys at two state game/wildlife areas, including two parcels within Wigwam Bay State Wildlife Area (SWA) in Arenac County, Michigan. MNFI conducted surveys in June—August 2016. Surveys resulted in the identification of a diversity of several natural communities, although all were too disturbed to qualify as element occurrences (EOs). Five state-listed marsh birds were detected in the Great Lakes marsh communities. Management recommendations for terrestrial natural communities include grassland plantings (Beardsley parcel) and invasive species control (both parcels). Phragmites control is the primary need in the Great Lakes marsh communities to improve and perpetuate habitat for common and imperiled wetland birds.

Introduction

In 2015—2016, MNFI contracted with MDNR WLD to conduct ecological assessments and targeted species surveys of selected recent or proposed land acquisitions. These surveys were envisioned to address strategies identified in the MDNR Managed Public Land Strategy, namely prioritizing and informing land acquisitions that may support (1) key state and federal threatened and endangered species (Division Land Acquisition Strategy 2.5), and (2) representative natural communities (Division Land Acquisition Strategy 2.6). The surveys were proposed to address Objective 3.3 identified in the MDNR WLD Guiding Principles and Strategies (GPS) strategic plan, namely, updating strategic guidance for WLD's land acquisition.

In spring 2016, three areas were identified for ecological assessments and targeted species surveys: two parcels within Wigwam Bay SWA in Arenac County (addressed in this report) and the Coleman parcel and adjacent Hill Creek Fen in Barry State Game Area (addressed in a separate report).

Survey Sites

Field surveys were conducted on two parcels recently added to the Wigwam Bay SWA: (1) a ca. 102 acre (41 hectare) parcel south of Palmer Road in T18N R05E S16, formerly owned by Richard Beardsley, et al.; and (2) a ca. 146 ac (59 ha) parcel east of the Rifle River, south of Stover Road in T19N R05E S36 and T18N R05E S01, formerly owned by the Wigwam Duck Club (Figure 1). Both parcels are located in southern Arenac County on Saginaw Bay, east of Standish.

Historically, the low-relief, coarse-textured lakeplain soils in this area supported extensive areas of hemlock – white pine forests on moderately drained soils with small areas of beech – sugar maple – hemlock forest embedded within the conifer matrix (Albert and Comer 2008). Poorly drained soils supported cedar swamp, mixed conifer swamp, mixed hardwood swamp, and black ash swamp, with shrub swamp and emergent marsh occurring along streams and in small embayments (Albert and Comer 2008).

Methods

Meander surveys of potential natural communities were conducted July 1, July 2, August 16, and August 17, 2016. Lists of all vascular plants identified or keyed during surveys were taken, and threats to the ecological integrity of these areas (e.g., invasive plant species) were noted. Species lists were entered into the Universal FQA Calculator (Freyman and Masters 2013) following the Michigan Floristic Quality Assessment Database (Reznicek et al. 2014). Natural communities were identified following Cohen et al. (2015).

Marsh bird surveys targeted American bittern (*Botaurus lentiginosus*, state special concern), black tern (*Chlidonias niger*, state special concern), Caspian tern (*Sterna caspia*, state threatened), common gallinule (*Gallinula chloropus*, state threatened), common tern (*Sterna hirundo*, state threatened), Forster's tern (*Sterna forsteri*, state threatened), king rail (*Rallus elegans*, state endangered), least bittern (*Ixobrychus exilis*, state threatened), and marsh wren (*Cistothorus palustris*, state special concern). We also documented bird species identified as Species of Greatest Conservation Need (SGCN) in Michigan's Wildlife Action Plan (Derosier et al. 2015).

Meandering kayak surveys were conducted at known element occurrence (EO) locations and at sites with suitable habitat. The kayak floats took place during June 2016 and covered four locations—Langdon Road Unit (east and west sections), Pine River Unit and the Palmer Road Unit—of the SGA. Morning surveys began shortly after sunrise and ended around 11:00 am EDT. Evening surveys started around 7:00 pm EDT and ended around 10:30 pm EDT. For survey purposes the SGA was divided into a northern study area (Langdon Road units) and a southern area (Palmer Road and Pine River Units). We did eleven (11) broadcasts in the southern area and nine (9) in the northern area for a total of 20 call stations.

The kayak surveys involved slowly moving through suitable habitat and periodically playing conspecific calls using a hand-held broadcaster. We broadcasted calls of least bittern, sora (*Porzana carolina*), Virginia rail (*Rallus limicola*), king rail and American bittern. Data from all observations included the number of individuals seen or heard and the extent and quality of occupied habitat. We also conducted random visual surveys for terns and other rare species in areas with suitable habitat. Any rare species observed were documented on standard MNFI Rare Species forms and recorded spatially using a hand-held GPS unit. These data were vetted and entered into the Biotics database.

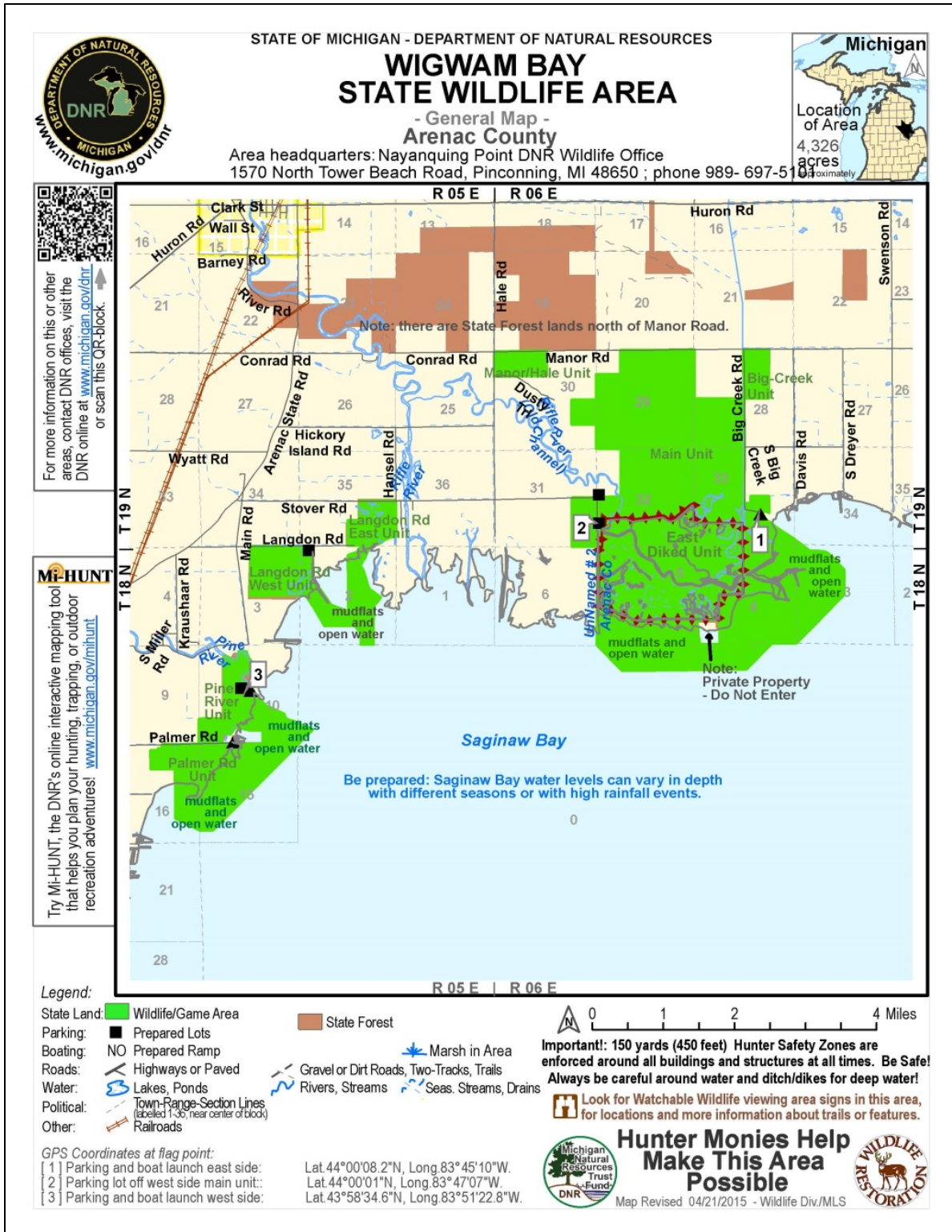


Figure 1. Map of Wigwam Bay State Wildlife Area, Arenac Co., Mich. Surveys were conducted at the SW margin of the SWA, south of Palmer Road (T18N R05E S16) and at the former Wigwam Duck Club (T19N R05E S36 and T18N R05E S01) east of and at the mouth of the Rifle River (not depicted in green).

Results: Beardsley Parcel

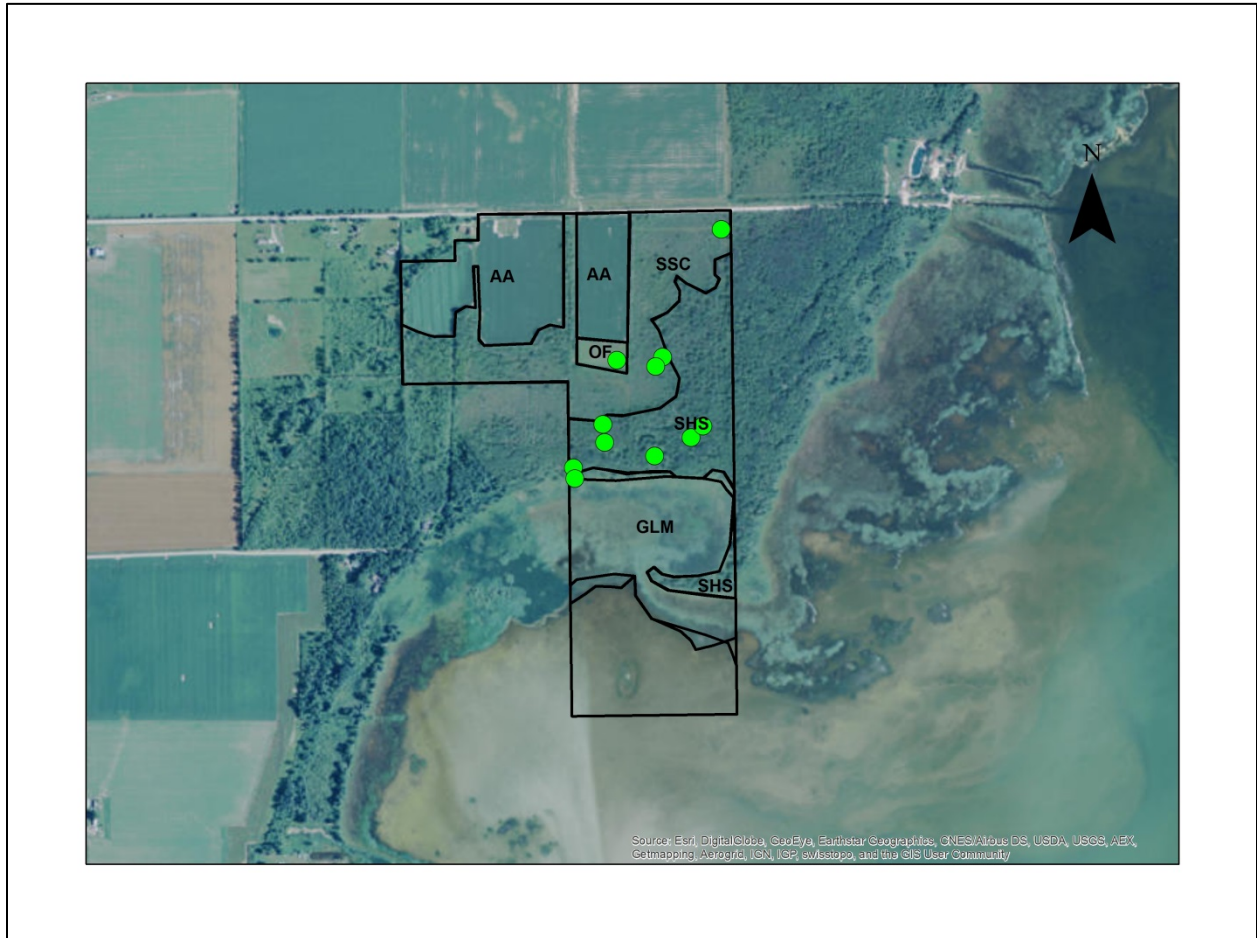


Figure 2. Natural communities (and other habitats) identified at the Coleman parcel. AA=active agriculture (row crops); GLM=Great Lakes marsh; OF=old field; SHS=southern hardwood swamp; SSC= southern shrub-carr (primarily), with inclusions of southern wet meadow.

Ecological Assessment

The Beardsley parcel currently supports five predominant cover types: Great Lakes marsh, southern hardwood swamp, southern shrub-carr, old field, and row crops (corn). All habitats have been significantly impacted by historical land use and the introduction, establishment, and spread of invasive species, including animals (e.g., emerald ash borer) and plants (e.g., common reed), and none qualify as natural community EOs. Aerial photographs taken in 1952 depict extensive clearing, with drain tiles evident throughout the site. At that time, row crop agriculture (and perhaps haying and grazing, too) had already ceased in the area that currently supports southern shrub-carr and southern hardwood swamp. The beach ridge along Saginaw Bay supported several large, open grown trees, still evident in the 2016 surveys.

Southern hardwood swamp now characterizes those areas of abandoned fields closest to trees and forest stands that were present in 1952 (i.e., in the immediate vicinity of Saginaw Bay and near the

eastern property line) (Figures 2, 3). The canopy consists primarily of small (4-9" DBH) *Fraxinus pensylvanica* (green ash) and *Ulmus americana* (American elm), with *Acer saccharinum* (silver maple) locally dominant. Most of the canopy and subcanopy green ashes have been killed by the emerald ash borer (*Agrilus planipennis*). On the higher, drier beach ridge, very large, old open-grown *Quercus macrocarpa* (bur oaks) persist. The understory of the swamp forest stands is open. The ground layer is dense to patchy, and is characterized by a variety of wetland generalists including *Carex lacustris* (lake sedge), *Glyceria striata* (fowl manna grass), *Elymus virginicus* (Virginia wild-rye), *Boehmeria cylindrica* (false nettle), *Galium obtusum* (wild madder), *Symphotrichum ontarionis* (Lake Ontario aster), and *Solidago gigantea* (late goldenrod). On the drier beach ridge, the ground layer supports a fairly weedy association of *Solidago canadensis* (Canada goldenrod), *Sanicula odorata* (black snakeroot), *Circaea canadensis* (enchanter's-nightshade), *Podophyllum peltatum* (may-apple), and *Osmorhiza longistylis* (smooth sweet-cicely). The swamp forest and beach ridge are disturbed by historical clearing and logging, grazing, drainage, vehicle traffic, and invasive species, especially *Frangula alnus* (glossy buckthorn) and *Phalaris arundinacea* (reed canary grass).



Figure 3. Young swamp forest (southern hardwood swamp) occupies lowland soils close to Saginaw Bay.

Southern shrub-carr occupies the majority of the Beardsley parcel between the southern hardwood swamp and row crops, and is interspersed with patches of open southern wet meadow (Figures 2, 4). Characteristic species include *Cornus amomum* (silky dogwood), *C. foemina* (gray dogwood), *Viburnum lentago* (nannyberry), glossy buckthorn, and *Ilex verticillata* (Michigan holly). Young, top-killed green ash and living American elm occur scattered through the shrub-carr. Of particular interest is the presence of many calciphilic shrubs, forbs, and graminoids characteristic of prairie fens and lakeplain prairies. Among these are *Dasiphora fruticosa* (shrubby cinquefoil), *Hypericum kalmianum* (Kalm's St. John's-

wort), *Potentilla anserina* (silvery cinquefoil), *Lythrum alatum* (winged loosestrife), *Lysimachia quadriflora* (whorled loosestrife), *Pycnanthemum virginianum* (Virginia mountain mint), *Liatris spicata* (marsh blazing-star), *Carex buxbaumii* (Buxbaum's sedge), *C. flava* (yellowish sedge), *C. granularis* (meadow sedge), *C. tetanica* (rigid sedge), and *Cladium mariscoides* (twig-rush). These species reflect the underlying moderately alkaline (pH= 8.0-8.2) sandy clay and clay substrate. Prairie grasses were rare or absent. A small area of old field, more recently tilled than the shrub-carr, occurs immediately south of the eastern corn field. It is characterized by non-native grasses, especially *Agrostis gigantea* (redtop) and *Elymus repens* (quack grass), associated with *Sonchus asper* (prickly sow-thistle), *Euthamia graminifolia* (grass-leaved goldenrod), and several other weedy native and non-native herbaceous species.



Figure 4. Southern shrub-carr with pockets of southern wet meadow covers approximately 37 acres (15 ha) of the Beardsley parcel.

Approximately 30 ac (12 ha) of the Beardsley parcel supported Great Lakes marsh at the time of the August 2016 survey (Figures 2, 5). The broad emergent zone is dominated by the invasive *Phragmites australis* subsp. *australis* (common reed), *Typha latifolia* (broad-leaved cat-tail), *T. angustifolia* (narrow-leaved cat-tail), and *T. x glauca* (hybrid cat-tail). At the periphery of the emergent zone adjacent to open of the deep emergent and submergent zone include *Nymphaea odorata* (sweet-scented waterlily), *Pontederia cordata* (pickerel-weed), *Potamogeton gramineus* and *P. illinoensis* (pondweeds), *Ceratophyllum demersum* (coontail), *Najas flexilis* (slender naiad), *Lemna turionifera* (red duckweed), *Spirodela polyrhiza* (greater duckweed), *Wolffia columbiana* (common water meal), and the invasive *Myriophyllum spicatum* (Eurasian water-milfoil). The invasive *Hydrocharis morsus-ranae* (European frog's-bit) was collected offshore from the Great Lakes Marina but was not noted on or in the vicinity of the Beardsley parcel.



Figure 5. The Great Lakes marsh is dominated primarily by *Typha* spp. (cat-tails) and *Phragmites australis* subsp. *australis* (common reed).

Floristic Quality Assessment and Rare Plant Surveys

A total of 178 vascular plant taxa were identified to the species level, including 153 (86%) native taxa (Appendices 1-4). No rare plant species were documented during the field surveys.

Marsh Bird Surveys

Four state-listed birds and two additional SGCN were detected within the Great Lakes marsh (Table 1).

Table 1. Detections of state-listed and SGCN marsh birds at Beardsley parcel.

CALL STATION	LATITUDE	LONGITUDE	BIRDS
1	43 57.888'	-83 51.470'	MR, LB, AB
2	43 57.735'	-83 51.643'	MR, LB, VR
3	43 57.712'	-83 51.800'	MR
4	43 57.559'	-83 51.866'	MW, FT
5	43 57.562'	-83 52.052'	MW, AB
6	43 57.633'	-83 52.187'	MW, AB, VR

7	43 57.595'	-83 52.359'	MW
8	43 57.567'	-83 52.522'	MW, AB, VR
9	43 57.600'	-83 52.562'	MW, LB, SO
10	43 57.662'	-83 52.295'	MW
11	43 50.128'	-83 51.630'	MW, LB, AB

CODES

AB – American bittern

LB – Least bittern

MW – Marsh wren

SO – Sora

FT – Forster's tern

VR – Virginia rail

Results: Wigwam Duck Club

Ecological Assessment

The Wigwam Duck Club parcel consists of four primary natural community types: mesic (grading to dry-mesic) northern forest, southern hardwood swamp, floodplain forest, and Great Lakes marsh (Figure 6). All habitats have been significantly impacted by historical land use and the introduction, establishment, and spread of invasive species, including animals (e.g., emerald ash borer) and plants (e.g., common reed), and none qualify as natural community EOs. Aerial photographs taken in 1952 indicate forested conditions over much of the tract, with drier soils at the northern border of the parcel and in the immediate vicinity of Rifle River supporting agricultural fields. These areas today support old fields, conifer plantings, and successional forest.

Mesic northern forest covers approximately 52 acres (21 acres) on old beach ridges east of Rifle River (Figures 6, 7). *Quercus rubra* (red oak) and *Acer saccharum* (sugar maple) are the primary canopy species, each locally dominant. Frequent canopy associates include *Fraxinus americana* (white ash), *Quercus macrocarpa* (bur oak), *Tilia americana* (basswood), *Carya ovata* (shagbark hickory), *Fagus grandifolia* (beech), *Prunus serotina* (black cherry), and *Populus tremuloides* (quaking aspen). Occasional to common understory species include *Cornus foemina* (dogwood), *Viburnum acerifolium* (maple-leaved viburnum), *Ribes cynosbati* (wild gooseberry), *Lindera benzoin* (spicebush), and *Elaeagnus umbellata* (autumn-olive). The diverse ground layer is characterized by *Podophyllum peltatum* (may-apple), *Geum canadense* (white avens), *Circaea canadensis* (enchanters'-nightshade), *Persicaria virginiana* (jumpseed), *Amphicarpaea bracteata* (hog-peanut), *Geranium maculatum* (wild geranium), *Elymus hystrix* (bottlebrush grass), *Festuca subverticillata* (nodding fescue), *Symphotrichum lateriflorum* (calico aster),

Poa alsodes (bluegrass), *Pteridium aquilinum* (bracken fern), and *Onoclea sensibilis* (sensitive fern). The invasive *Alliaria petiolata* (garlic mustard) is frequent to locally common.

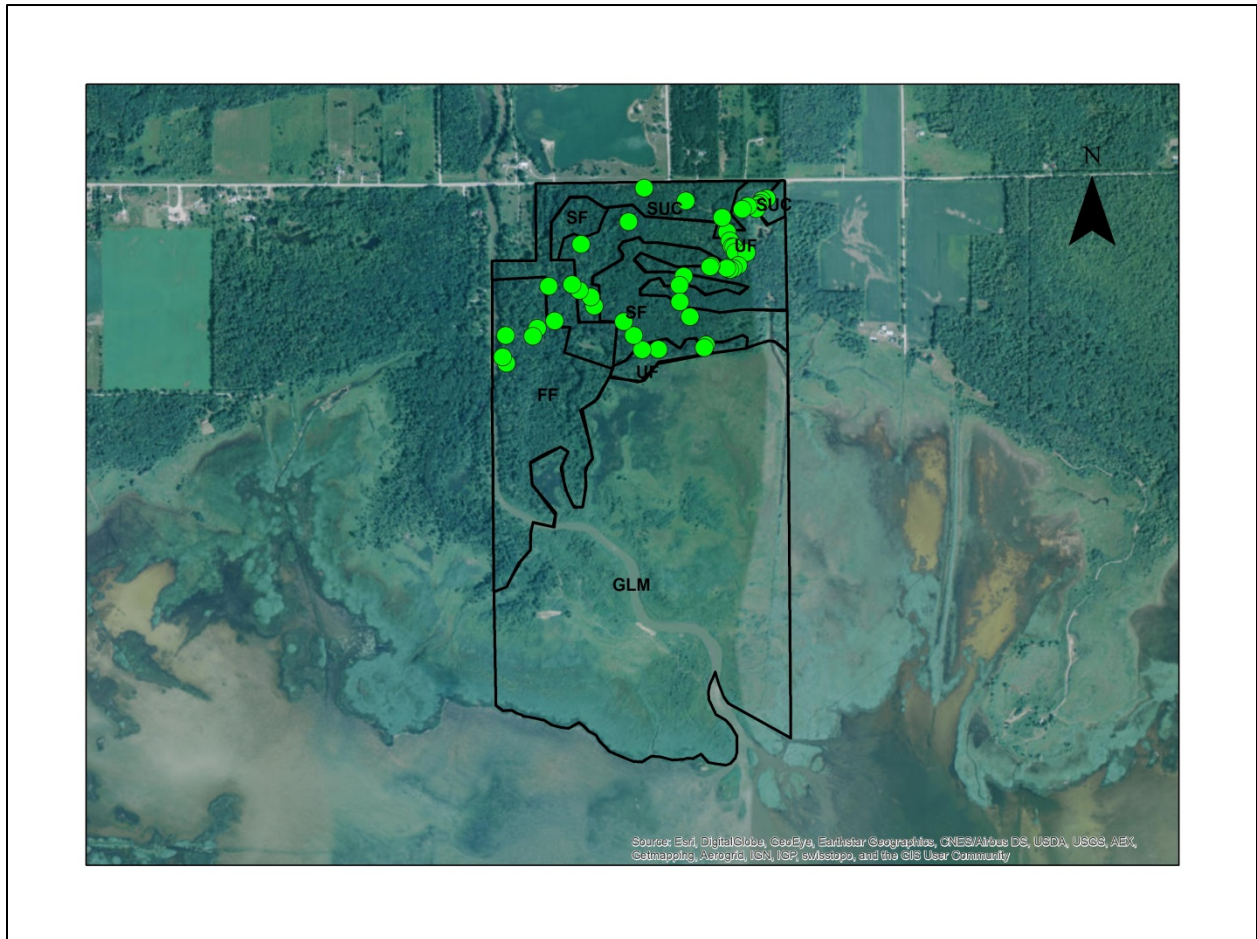


Figure 6. Natural communities (and other habitats) identified at the Wigwam Duck Club parcel. FF=floodplain forest; GLM=Great Lakes marsh; SF=swamp forest (southern hardwood swamp); SUC= successional communities, including old fields, plantings, and very young forest; UF=upland forest (primarily mesic northern forest).

Southern hardwood swamp (in swales between beach ridges) and floodplain forest (along Rifle River and extending into connected swales) collectively cover approximately 103 acres (42 ha) of the parcel (Figures 6, 8). *Acer saccharinum* (silver maple) is the primary dominant, with *Fraxinus pennsylvanica* (green ash) formerly co-dominant but largely eliminated from the canopy by emerald ash borer. Bur oak, basswood, and *Ulmus americana* (American elm) are frequent. The understory and tall shrub layer is open over much of the tract, with *Viburnum lentago* (nannyberry) and spicebush locally important. *Cephalanthus occidentalis* (buttonbush) dominates some of the lowest swales. The ground layer is variable but typically dense and diverse, characterized by sensitive fern, *Matteuccia struthiopteris* (ostrich fern), *Galium obtusum* (wild madder), calico aster, white avens, bottlebrush grass, *Caltha palustris* (marsh-marigold), *Glyceria striata* (fowl manna grass), *Boehmeria cylindrica* (false nettle), enchanters'-nightshade, *Thalictrum dasycarpum* (purple meadow-rue), and *Carex lacustris* (lake sedge).

The invasive species garlic mustard, *Lysimachia nummularia* (moneywort), and *Phalaris arundinacea* (reed canary grass) are locally dense.



Figure 7. Moderately drained beach ridges support mesic northern forest, here dominated by red oak.



Figure 8. Southern hardwood swamp grades into floodplain forest near Rifle River, here carpeted by ostrich fern.

Extensive areas of Great Lakes marsh occur in Saginaw Bay and at and near the mouth of Rifle River (Figures 6, 9). Although the marsh is generally dominated by *Phragmites australis* subsp. *australis* (common reed) and supports extensive stands of other invasive plants such as reed canary grass and *Typha angustifolia* (narrow-leaved cat-tail), the complex retains structural heterogeneity, supporting deep marsh with *Typha latifolia* (common cat-tail) and shallow marsh characterized by several sedges

(e.g., *Carex aquatilis*, *C. lacustris*, *C. prairea*, and *Cladium mariscoides*), *Juncus* spp. (rushes), and *Calamagrostis canadensis* (blue-joint). Prevalent woody species in the open marsh and on higher “islands” include green ash, American elm, *Populus deltoides* (cottonwood), *Alnus incana* (tag alder), several *Salix* spp. (willows), and *Vitis riparia* (riverbank grape).



Figure 9. The Great Lakes marsh retains structural heterogeneity despite invasion of non-native common reed and cat-tails.

Floristic Quality Assessment and Rare Plant Species

A total of 251 vascular plant taxa were identified to the species level, including 222 (88%) native taxa (Appendices 5-8). No rare plant species were documented during the field surveys.

Marsh Bird Surveys

Four state-listed birds and one additional SGCN were detected within the Great Lakes marsh (Table 2).

Table 2. Detections of state-listed and SGCN marsh birds at Wigwam Duck Club.

CALL STATION	LATITUDE	LONGITUDE	BIRDS
12	43 59.876'	-83 48.395'	MW, LB, AB, VR
13	43 59.425'	-83 49.042'	MW, LB, AB
14	43 59.375'	-83 48.872'	MW

15	43 59.177'	-83 48.904'	MW, AB, BE
16	43 59.198'	-83 48.727'	MW
17	43 59.278'	-83 48.560'	MW, AB
18	43 59.370'	-83 48.338'	MW, AB
19	43 59.247'	-83 48.767'	MW
20	43 59.279'	-83 48.909'	MW, AB

CODES

AB – American bittern

BE – Bald Eagle

LB – Least bittern

MW – Marsh wren

VR – Virginia rail

Discussion

Ecological Assessments and Recommendations—Terrestrial

Essentially the entirety of the Beardsley parcel was historically cultivated, with cleared fields and a dense network of drain tiles visible on 1952 aerial photographs. The legacy of land clearing and draining is evident today in the successional nature of the plant communities present on the parcel, with slow succession to swamp forest proceeding from the borders of the areas that were forested in 1952. The successional southern shrub-carr and southern wet meadow currently support dense infestations of glossy buckthorn and reed canary grass, among other non-native plants, but also support conservative native plant species typical of calcareous shores, fens, and lakeplain prairies. Reduction of glossy buckthorn and other shrubs via a combination of mechanical treatment and herbicide, in addition to application of prescribed fire, should be considered in this area if consistent with wildlife habitat management objectives. Conversion of the adjacent agricultural fields to grassland habitat should also be considered, as the combined ca. 70 acres (28 ha) would likely be sufficient to support several grassland bird species.

On the converse, the majority of the Wigwam Duck Club parcel does not appear to have been cultivated, although the forested areas have been fragmented by logging, construction of logging roads, and localized clearing, and are infested in places by pernicious invasive plants such as garlic mustard. Despite these disturbances the parcel retains significant vascular plant diversity. Invasive species control is the primary management recommendation. In addition, surveys for the state threatened cerulean warbler (*Setophaga cerulea*) should be conducted, as the species is listed as a probable breeder in the vicinity of

this site (Chartier et al. 2011), and is regularly observed just northeast of the Wigwam Duck Club parcel (eBird 2012).

Rare Species and Great Lakes Marsh Management Recommendations

Among the seven rare bird species documented from Wigwam Bay, marsh wrens were detected at all 21 call stations, numbering greater than 30 individual birds. At least eight American bitterns and four least bitterns responded to broadcasts. These three species were documented at both parcels. A fourth state-listed species, Forster's tern, was recorded only in the marsh adjacent to the Beardsley parcel where several individuals were observed flying over carrying food. A pair of bald eagles was observed along the lower reaches of the Rifle River, but a nest was not located. A total of seven EOs were updated during the surveys. We reconfirmed EOs for American bittern, Forster's tern, least bittern and marsh wren (2 EOs). We did not reconfirm the presence of common gallinule and black tern. No new EOs were established.

The coastal wetlands at Wigwam Bay SGA have been severely degraded by an infestation of non-native common reed (hereafter, *Phragmites*; Figure 10). And although we documented American bittern, Forster's tern, least bittern and marsh wren during the June surveys, the *Phragmites* influx has likely reduced the area's ability to support wetland-obligate birds. *Phragmites* is known to influence use by wetland birds in the Great Lakes region (Meyer et al. 2010), as well as dramatically alter ecosystem functions and plant diversity. Currier (2000) reported that *Phragmites* is a prime limiting factor for black terns and least bittern.

We recommend an aggressive control plan to manage *Phragmites* at Wigwam Bay. The control efforts should adhere to the guidelines developed for the Great Lakes region in *A Guide to the Control and Management of Invasive Phragmites* (Avers et al. 2014). Since *Phragmites* is already well established, complete eradication may not be attainable. However, it is possible to maintain it at levels that allow for regeneration of native wetland plant communities and protection of wildlife habitat (Avers et al. 2014).

Weller and Spatcher (1965) reported that marshes with a 50:50 proportion of open water and emergent vegetation, known as hemi-marshes, attract the highest density and widest diversity of wetland birds (Figure 11). Least bitterns and black terns, which have narrow habitat requirements, seem to prefer hemi-marsh conditions for nesting sites (Hickey and Malecki 1997; Monfils 2003). In one study, least bitterns were not observed in areas of dense vegetation until opened up by muskrats (Weller and Spatcher 1965). Monfils (2004a) suggests that hemi-marshes attract yellow-headed blackbirds (*Xanthocephalus xanthocephalus*). It is not surprising that we observed more American bitterns than least bitterns because American bitterns will use a wider variety of wetland types (Gibbs et al. 1992, Monfils 2004b). Managing *Phragmites* will help to promote cattail and bulrush and help achieve hemi-marsh conditions. Although complicated by naturally fluctuating water levels, wildlife managers should maintain and promote the hemi-marsh state.



Figure 10. Common reed is a serious threat at Wigwam Bay as seen in this extensive, impenetrable “wall” running along the shoreline in the northern survey units on June 4, 2016. Photo by M.A. Sanders.



Figure 11. Marshes with a 50:50 proportion of open water and emergent vegetation, known as hemi-marshes, attract the highest density and widest diversity of wetland birds. Several marsh wrens were heard singing, and American bittern, least bittern, sora and Virginia rail responded to calls at this location in the southern survey area on June 3, 2016. Photo by M.A. Sanders.

Forster's terns typically nest on floating vegetation in the interior of marshes and shallow lakes (Scharf 1991). In the Great Lakes, these colonial nesters are normally associated with the inaccessible deep water areas of cattail- and bulrush-dominated freshwater marshes where they are protected from predators and wind and wave action (Hyde 2001). We observed several Forster's terns flying over in a southwest direction into the interior of the marsh areas carrying food. However, we failed to locate active nests. Caspian terns and common terns nest on open sandy or pebble beaches on islands and peninsulas near large water bodies (Hyde 1996, Hyde 1997); we did not encounter any offshore islands or suitable beach habitat. Periodic surveying for terns is suggested as conditions and available habitat change with fluctuating water levels.

The dynamic nature of the Great Lakes coastal wetlands presents real threats to successful wetland bird breeding (Figure 12). Therefore, we recommend periodic surveys using conspecific broadcasts (Conway 2011) to track occupancy of known rare species and detect new species not previously documented in potential habitat. Maintaining upland buffer strips will help maintain the hydrologic regime of wetlands and reduce sediment, agricultural chemical and nutrient inputs.



Figure 12. High water levels, strong offshore waves and invasive encroachment pose real threats to wetland bird breeding success as seen here in the northern survey area on June 4, 2016. Photo by M.A. Sanders.

Acknowledgments

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Appendix 1. Richard Beardsley Parcel Floristic Summary.

07/01/2016

Wigwam Bay

Arenac

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. Herbarium, University of Michigan, Ann Arbor, MI and Michigan Natural Features Inventory, Michigan State University, Lansing, MI. <http://michiganflora.net>

Practitioner:

Brad Slaughter

Latitude:

43.967154

Longitude:

-83.868463

Weather Notes:

Duration Notes:

Community Type Notes:

Southern shrub-carr, southern wet meadow with emergent marsh inclusions and fen-like areas. Formerly cleared and at least hayed or pastured. Also southern hardwood swamp, inclusive of mesic loamy beach ridges, and Great Lakes marsh.

Other Notes:

Additional marsh survey 8/16/16. Also noted: *Crataegus* sp., *Lonicera mor/x* bel, *Pilea* sp., *Plantago maj/rug*, *Typha x glauca*,

Conservatism-Based Metrics:

Total Mean C:

3.3

Native Mean C:

3.9

Total FQI:

44

Native FQI:

48.2

Adjusted FQI:

36.2

% C value 0:

17.4

% C value 1-3:

36

% C value 4-6:

36.5

% C value 7-10:	10.1	
Native Tree Mean C:	3.3	
Native Shrub Mean C:	3.7	
Native Herbaceous Mean C:	3.9	
Species Richness:		
Total Species:	178	
Native Species:	153	86%
Non-native Species:	25	14%
Species Wetness:		
Mean Wetness:	-1.6	
Native Mean Wetness:	-2	
Physiognomy Metrics:		
Tree:	9	5.10%
Shrub:	20	11.20%
Vine:	10	5.60%
Forb:	97	54.50%
Grass:	14	7.90%
Sedge:	25	14%
Rush:	0	0%
Fern:	3	1.70%
Bryophyte:	0	0%
Duration Metrics:		
Annual:	6	3.40%
Perennial:	167	93.80%
Biennial:	5	2.80%
Native Annual:	5	2.80%
Native Perennial:	147	82.60%
Native Biennial:	1	0.60%

Species:

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
<i>Acer saccharinum</i>	Sapindaceae	ACESAI	native	2	-3	tree	perennial	silver maple
<i>Agrostis gigantea</i>	Poaceae	AGRIGIG	non-native	0	-3	grass	perennial	redtop
<i>Alisma triviale</i> ; a. <i>plantago-aquatica</i>	Alismataceae	ALITRI	native	1	-5	forb	perennial	northern water-plantain
<i>Ambrosia artemisiifolia</i>	Asteraceae	AMBART	native	0	3	forb	annual	common ragweed
<i>Amphicarpaea bracteata</i>	Fabaceae	AMPBRA	native	5	0	vine	annual	hog-peanut
<i>Anemone canadensis</i>	Ranunculaceae	ANECAN	native	4	-3	forb	perennial	canada anemone
<i>Anemone virginiana</i>	Ranunculaceae	ANEVIR	native	3	3	forb	perennial	thimbleweed
<i>Apocynum cannabinum</i> ; a. <i>sibiricum</i>	Apocynaceae	APOCAN	native	3	0	forb	perennial	indian-hemp
<i>Arctium minus</i>	Asteraceae	ARCMIN	non-native	0	3	forb	biennial	common burdock
<i>Arisaema triphyllum</i>	Araceae	ARITRI	native	5	0	forb	perennial	jack-in-the-pulpit
<i>Asclepias incarnata</i>	Apocynaceae	ASCINC	native	6	-5	forb	perennial	swamp milkweed
<i>Asclepias syriaca</i>	Apocynaceae	ASCSYR	native	1	5	forb	perennial	common milkweed
<i>Athyrium filix-femina</i>	Athyriaceae	ATHFIL	native	4	0	fern	perennial	lady fern
<i>Barbarea vulgaris</i>	Brassicaceae	BARVUL	non-native	0	0	forb	biennial	yellow rocket
<i>Boehmeria cylindrica</i>	Urticaceae	BOECYL	native	5	-5	forb	perennial	false nettle
<i>Calamagrostis canadensis</i>	Poaceae	CALCAN	native	3	-5	grass	perennial	blue-joint
<i>Calystegia sepium</i>	Convolvulaceae	CALSEP	native	2	0	vine	perennial	hedge bindweed
<i>Campanula aparinoides</i>	Campanulaceae	CAMAPA	native	7	-5	forb	perennial	marsh bellflower
<i>Carex aquatilis</i>	Cyperaceae	CXAQUA	native	7	-5	sedge	perennial	sedge
<i>Carex buxbaumii</i>	Cyperaceae	CXBUXB	native	10	-5	sedge	perennial	sedge
<i>Carex cristatella</i>	Cyperaceae	CXCRIS	native	3	-3	sedge	perennial	sedge
<i>Carex diandra</i>	Cyperaceae	CXDIAN	native	8	-5	sedge	perennial	sedge
<i>Carex flava</i>	Cyperaceae	CXFLAV	native	4	-5	sedge	perennial	sedge
<i>Carex gracillima</i>	Cyperaceae	CXGRAA	native	4	3	sedge	perennial	sedge
<i>Carex granularis</i>	Cyperaceae	CXGRAN	native	2	-3	sedge	perennial	sedge
<i>Carex interior</i>	Cyperaceae	CXINTE	native	3	-5	sedge	perennial	sedge
<i>Carex intumescens</i>	Cyperaceae	CXINTU	native	3	-3	sedge	perennial	sedge
<i>Carex lacustris</i>	Cyperaceae	CXLACU	native	6	-5	sedge	perennial	sedge
<i>Carex lupulina</i>	Cyperaceae	CXLUPA	native	4	-5	sedge	perennial	sedge
<i>Carex pellita</i> ; c. <i>lanuginosa</i>	Cyperaceae	CXPELL	native	2	-5	sedge	perennial	sedge
<i>Carex radiata</i> ; c. <i>rosea</i>	Cyperaceae	CXRADI	native	2	0	sedge	perennial	straight-styled wood sedge
<i>Carex stipata</i>	Cyperaceae	CXSTIP	native	1	-5	sedge	perennial	sedge
<i>Carex stricta</i>	Cyperaceae	CXSTRI	native	4	-5	sedge	perennial	sedge

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Carex tenera	Cyperaceae	CXTENE	native	4	0	sedge	perennial	sedge
Carex tetanica	Cyperaceae	CXTETA	native	9	-3	sedge	perennial	sedge
Carex vulpinoidea	Cyperaceae	CXVULP	native	1	-5	sedge	perennial	sedge
Cephalanthus occidentalis	Rubiaceae	CEPOCC	native	7	-5	shrub	perennial	buttonbush
Ceratophyllum demersum	Ceratophyllaceae	CERDEM	native	1	-5	forb	perennial	coontail
Circaea canadensis; c. lutetiana	Onagraceae	CIRCAN	native	2	3	forb	perennial	enchanters-nightshade
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
Clematis virginiana	Ranunculaceae	CLEVIR	native	4	0	vine	perennial	virgins bower
Cornus amomum	Cornaceae	CORAMO	native	2	-3	shrub	perennial	silky dogwood
Cornus foemina	Cornaceae	CORFOE	native	1	0	shrub	perennial	gray dogwood
Cryptotaenia canadensis	Apiaceae	CRYCAN	native	2	0	forb	perennial	honestwort
Dactylis glomerata	Poaceae	DACGLO	non-native	0	3	grass	perennial	orchard grass
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
Dichanthelium implicatum; panicum i.	Poaceae	DICIMP	native	3	0	grass	perennial	panic grass
Eleocharis elliptica	Cyperaceae	ELEELL	native	6	-5	sedge	perennial	golden-seeded spike rush
Eleocharis erythropoda	Cyperaceae	ELEERY	native	4	-5	sedge	perennial	spike-rush
Elymus repens; agropyron r.	Poaceae	ELYREP	non-native	0	3	grass	perennial	quack grass
Elymus virginicus	Poaceae	ELYVIR	native	4	-3	grass	perennial	virginia wild-rye
Epilobium coloratum	Onagraceae	EPICOL	native	3	-5	forb	perennial	cinnamon willow-herb
Epipactis helleborine	Orchidaceae	EPIHEL	non-native	0	0	forb	perennial	helleborine
Equisetum arvense	Equisetaceae	EQUARV	native	0	0	fern	perennial	common horsetail
Erigeron philadelphicus	Asteraceae	ERIPHI	native	2	0	forb	perennial	philadelphia fleabane
Euthamia graminifolia	Asteraceae	EUTGRA	native	3	0	forb	perennial	grass-leaved goldenrod
Festuca subverticillata; f. obtusa	Poaceae	FESSUB	native	5	3	grass	perennial	nodding fescue
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 aparine	Rubiaceae	GALAPA	native	0	3	forb	annual	annual bedstraw
Galium asprellum	Rubiaceae	GALASP	native	5	-5	vine	perennial	rough bedstraw

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Galium obtusum	Rubiaceae	GALOBT	native	5	-3	forb	perennial	wild madder
Galium triflorum	Rubiaceae	GALTRR	native	4	3	forb	perennial	fragrant bedstraw
Geum aleppicum	Rosaceae	GEUALE	native	3	0	forb	perennial	yellow avens
Geum canadense	Rosaceae	GEUCAN	native	1	0	forb	perennial	white avens
Glyceria striata	Poaceae	GLYSTR	native	4	-5	grass	perennial	fowl manna grass
Helenium autumnale	Asteraceae	HELAUT	native	5	-3	forb	perennial	sneezeweed
Hypericum kalmianum	Hypericaceae	HYPKAL	native	10	-3	shrub	perennial	kalms st. johns-wort
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 alpinoarticulatus; j. alpinus	Juncaceae	JUNALP	native	5	-5	forb	perennial	rush
Juncus balticus	Juncaceae	JUNBAL	native	4	-5	forb	perennial	rush
Juncus canadensis	Juncaceae	JUNCAN	native	6	-5	forb	perennial	canadian rush
Juncus dudleyi	Juncaceae	JUNDUD	native	1	-3	forb	perennial	dudleys rush
Juncus greenei	Juncaceae	JUNGRE	native	7	0	forb	perennial	greenes rush
Juncus nodosus	Juncaceae	JUNNOD	native	5	-5	forb	perennial	joint rush
Juncus tenuis	Juncaceae	JUNTEN	native	1	0	forb	perennial	path rush
Lemna turionifera; l. minor	Araceae	LEMTUR	native	5	-5	forb	perennial	red duckweed
Lobelia cardinalis	Campanulaceae	LOBCAR	native	7	-5	forb	perennial	cardinal-flower
Lobelia spicata	Campanulaceae	LOBSPI	native	4	0	forb	perennial	pale spiked lobelia
Lycopus americanus	Lamiaceae	LYCAME	native	2	-5	forb	perennial	common water horehound
Lycopus rubellus	Lamiaceae	LYCRUB	native	8	-5	forb	perennial	stalked water horehound
Lycopus uniflorus	Lamiaceae	LYCUNI	native	2	-5	forb	perennial	northern bugle weed
Lysimachia quadriflora	Myrsinaceae	LYSQUR	native	10	-5	forb	perennial	whorled loosestrife
Lysimachia terrestris	Myrsinaceae	LYSTER	native	6	-5	forb	perennial	swamp-candles
Lythrum alatum	Lythraceae	LYTALA	native	9	-5	forb	perennial	winged 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
Medicago lupulina	Fabaceae	MEDLUP	non-native	0	3	forb	annual	black medick
Menispermum canadense	Menispermaceae	MENCAE	native	5	0	vine	perennial	moonseed
Morus alba	Moraceae	MORALB	non-native	0	3	tree	perennial	white mulberry
Myriophyllum spicatum	Haloragaceae	MYRSPI	non-native	0	-5	forb	perennial	eurasian water-milfoil
Najas flexilis	Hydrocharitaceae	NAJFLE	native	5	-5	forb	annual	slender naiad

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Nymphaea odorata	Nymphaeaceae	NYMODO	native	6	-5	forb	perennial	sweet-scented waterlily
Onoclea sensibilis	Onocleaceae	ONOSEN	native	2	-3	fern	perennial	sensitive fern
Osmorhiza longistylis	Apiaceae	OSMLON	native	3	3	forb	perennial	smooth sweet-cicely
Oxalis stricta; o. fontana	Oxalidaceae	OXASTR	native	0	3	forb	perennial	yellow wood-sorrel
Parthenocissus inserta	Vitaceae	PARINS	native	4	3	vine	perennial	thicket 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
Persicaria virginiana; polygonum v.	Polygonaceae	PERVIR	native	4	0	forb	perennial	jumpseed
Phalaris arundinacea	Poaceae	PHAARU	native	0	-3	grass	perennial	reed canary grass
Phleum pratense	Poaceae	PHLPRA	non-native	0	3	grass	perennial	timothy
Phragmites australis var. australis	Poaceae	PHRAUU	non-native	0	-3	grass	perennial	reed
Poa compressa	Poaceae	POACOM	non-native	0	3	grass	perennial	canada bluegrass
Poa pratensis	Poaceae	POAPRA	non-native	0	3	grass	perennial	kentucky bluegrass
Podophyllum peltatum	Berberidaceae	PODPEL	native	3	3	forb	perennial	may-apple
Pontederia cordata	Pontederiaceae	PONCOR	native	8	-5	forb	perennial	pickerel-weed
Populus deltoides	Salicaceae	POPDEL	native	1	0	tree	perennial	cottonwood
Potamogeton gramineus	Potamogetonaceae	POTGRM	native	5	-5	forb	perennial	pondweed
Potamogeton illinoensis	Potamogetonaceae	POTILL	native	5	-5	forb	perennial	illinois pondweed
Potentilla anserina	Rosaceae	POTANS	native	5	-3	forb	perennial	silverweed
Proserpinaca palustris	Haloragaceae	PROPAL	native	6	-5	forb	perennial	mermaid-weed
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
Pycnanthemum virginianum	Lamiaceae	PYCVIR	native	5	-3	forb	perennial	common mountain mint
Quercus bicolor	Fagaceae	QUEBIC	native	8	-3	tree	perennial	swamp white oak
Quercus macrocarpa	Fagaceae	QUEMAC	native	5	3	tree	perennial	bur oak
Ranunculus hispidus	Ranunculaceae	RANHIS	native	5	0	forb	perennial	swamp buttercup
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
Rorippa aquatica; armoracia a.	Brassicaceae	RORAQU	native	8	-5	forb	perennial	lake cress
Rosa palustris	Rosaceae	ROSPAL	native	5	-5	shrub	perennial	swamp rose
Rubus allegheniensis	Rosaceae	RUBALL	native	1	3	shrub	perennial	common blackberry

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
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 crispus	Polygonaceae	RUMCRI	non-native	0	0	forb	perennial	curly dock
Salix exigua	Salicaceae	SALEXI	native	1	-3	shrub	perennial	sandbar willow
Salix petiolaris	Salicaceae	SALPET	native	1	-3	shrub	perennial	slender willow
Sanicula odorata; s. gregaria	Apiaceae	SANODO	native	2	0	forb	perennial	black snakeroot
Schoenoplectus acutus; scirpus a.	Cyperaceae	SCHACU	native	5	-5	sedge	perennial	hardstem bulrush
Schoenoplectus tabernaemontani; scirpus validus	Cyperaceae	SCHTAB	native	4	-5	sedge	perennial	softstem bulrush
Scirpus atrovirens	Cyperaceae	SCIATV	native	3	-5	sedge	perennial	bulrush
Scirpus pendulus	Cyperaceae	SCIPEN	native	3	-5	sedge	perennial	bulrush
Scutellaria galericulata	Lamiaceae	SCUGAL	native	5	-5	forb	perennial	marsh skullcap
Smilax hispida; s. tamnoides	Smilacaceae	SMIHIS	native	5	0	vine	perennial	bristly greenbrier
Solanum dulcamara	Solanaceae	SOLDUL	non-native	0	0	vine	perennial	bittersweet nightshade
Solidago altissima	Asteraceae	SOLALT	native	1	3	forb	perennial	tall goldenrod
Solidago canadensis	Asteraceae	SOLCAN	native	1	3	forb	perennial	canada goldenrod
Solidago gigantea	Asteraceae	SOLGIG	native	3	-3	forb	perennial	late goldenrod
Solidago rugosa	Asteraceae	SOLRUG	native	3	0	forb	perennial	rough-leaved goldenrod
Sonchus arvensis; s. uliginosus	Asteraceae	SONARV	non-native	0	3	forb	perennial	perennial sow-thistle
Sparganium eurycarpum	Typhaceae	SPAEUR	native	5	-5	forb	perennial	common bur-reed
Sphenopholis intermedia	Poaceae	SPHINT	native	4	0	grass	perennial	slender wedgegrass
Spiraea alba	Rosaceae	SPIALB	native	4	-3	shrub	perennial	meadowsweet
Spirodela polyrhiza	Araceae	SPIPOL	native	6	-5	forb	perennial	greater duckweed
Stachys hispida; s. tenuifolia	Lamiaceae	STAHIS	native	5	-3	forb	perennial	hedge-nettle
Symphotrichum lanceolatum; aster l.	Asteraceae	SYMLAN	native	2	-3	forb	perennial	panicled aster
Symphotrichum lateriflorum; aster l.	Asteraceae	SYMLAT	native	2	0	forb	perennial	calico aster
Symphotrichum novae-angliae; aster n.	Asteraceae	SYMNOV	native	3	-3	forb	perennial	new england aster
Symphotrichum ontarionis; aster o.	Asteraceae	SYMONT	native	6	0	forb	perennial	lake ontario aster
Taraxacum officinale	Asteraceae	TAROFF	non-native	0	3	forb	perennial	common dandelion
Teucrium canadense	Lamiaceae	TEUCAN	native	4	-3	forb	perennial	wood-sage
Thalictrum dasycarpum	Ranunculaceae	THADAS	native	3	-3	forb	perennial	purple meadow-rue
Tilia americana	Malvaceae	TILAME	native	5	3	tree	perennial	basswood
Toxicodendron radicans	Anacardiaceae	TOXRAD	native	2	0	vine	perennial	poison-ivy

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Trifolium hybridum	Fabaceae	TRIHYB	non-native	0	3	forb	perennial	alsike clover
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
Urtica dioica	Urticaceae	URTDIO	native	1	0	forb	perennial	stinging nettle
Utricularia vulgaris	Lentibulariaceae	UTRVUL	native	6	-5	forb	perennial	common bladderwort
Viburnum lentago	Adoxaceae	VIBLEN	native	4	0	shrub	perennial	nannyberry
Viburnum opulus	Adoxaceae	VIBOPU	non-native	0	-3	shrub	perennial	european highbush-cranberry
Viola labradorica; v. conspersa	Violaceae	VIOLAB	native	3	0	forb	perennial	dog violet
Viola sororia	Violaceae	VIOSOR	native	1	0	forb	perennial	common blue violet
Vitis riparia	Vitaceae	VITRIP	native	3	0	vine	perennial	river-bank grape
Wolffia borealis; w. punctata	Araceae	WOLBOR	native	5	-5	forb	perennial	dotted water meal
Wolffia columbiana	Araceae	WOLCOL	native	5	-5	forb	perennial	common water meal

Appendix 2. Richard Beardsley Parcel, Southern Hardwood Swamp.

07/01/2016

Wigwam Bay

Arenac

MI

USA

FQA DB Region:

Michigan

FQA DB Publication Year:

2014

Reznicek, A.A., M.R. Penskar, B.S. Walters, and B.S. Slaughter. 2014. Michigan Floristic Quality Assessment Database. Herbarium, University of Michigan, Ann Arbor, MI and Michigan Natural Features Inventory, Michigan State University, Lansing, MI. <http://michiganflora.net>

FQA DB Description:

Practitioner:

Bradford Slaughter

Latitude:

43.967154

Longitude:

-83.868463

Weather Notes:

Duration Notes:

Community Type Notes:

Southern hardwood swamp, inclusive of mesic loamy beach ridges.

Other Notes:

Also noted: *Lonicera mor/x bel*, *Pilea sp.*, *Plantago maj/rug*

Conservatism-Based Metrics:

Total Mean C:	2.7
Native Mean C:	3.2
Total FQI:	23.5
Native FQI:	25.8
Adjusted FQI:	29.6
% C value 0:	19.7
% C value 1-3:	42.1
% C value 4-6:	34.2
% C value 7-10:	3.9
Native Tree Mean C:	2.8
Native Shrub Mean C:	2.8
Native Herbaceous Mean C:	3.2

Species Richness:

Total Species:	76	
Native Species:	65	85.50%
Non-native Species:	11	14.50%

Species Wetness:

Mean Wetness:	-0.3
Native Mean Wetness:	-0.7

Physiognomy Metrics:

Tree:	7	9.20%
Shrub:	7	9.20%
Vine:	6	7.90%
Forb:	34	44.70%
Grass:	9	11.80%
Sedge:	10	13.20%
Rush:	0	0%
Fern:	3	3.90%
Bryophyte:	0	0%

Duration Metrics:

Annual:	3	3.90%
Perennial:	70	92.10%
Biennial:	3	3.90%
Native Annual:	3	3.90%
Native Perennial:	62	81.60%
Native Biennial:	0	0%

Species:

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Acer saccharinum	Sapindaceae	ACESAI	native	2	-3	tree	perennial	silver maple
Amphicarpaea bracteata	Fabaceae	AMPBRA	native	5	0	vine	annual	hog-peanut
Anemone canadensis	Ranunculaceae	ANECAN	native	4	-3	forb	perennial	canada anemone

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
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 syriaca	Apocynaceae	ASCSYR	native	1	5	forb	perennial	common milkweed
Athyrium filix-femina	Athyriaceae	ATHFIL	native	4	0	fern	perennial	lady fern
Barbarea vulgaris	Brassicaceae	BARVUL	non-native	0	0	forb	biennial	yellow rocket
Boehmeria cylindrica	Urticaceae	BOECYL	native	5	-5	forb	perennial	false nettle
Calamagrostis canadensis	Poaceae	CALCAN	native	3	-5	grass	perennial	blue-joint
Calystegia sepium	Convolvulaceae	CALSEP	native	2	0	vine	perennial	hedge bindweed
Carex cristatella	Cyperaceae	CXCRIS	native	3	-3	sedge	perennial	sedge
Carex gracillima	Cyperaceae	CXGRAA	native	4	3	sedge	perennial	sedge
Carex intumescens	Cyperaceae	CXINTU	native	3	-3	sedge	perennial	sedge
Carex lacustris	Cyperaceae	CXLACU	native	6	-5	sedge	perennial	sedge
Carex lupulina	Cyperaceae	CXLUPA	native	4	-5	sedge	perennial	sedge
Carex radiata; c. rosea	Cyperaceae	CXRADI	native	2	0	sedge	perennial	straight-styled wood sedge
Carex stipata	Cyperaceae	CXSTIP	native	1	-5	sedge	perennial	sedge
Carex tenera	Cyperaceae	CXTENE	native	4	0	sedge	perennial	sedge
Carex vulpinoidea	Cyperaceae	CXVULP	native	1	-5	sedge	perennial	sedge
Circaea canadensis; c. lutetiana	Onagraceae	CIRCAN	native	2	3	forb	perennial	enchanters-nightshade
Cirsium vulgare	Asteraceae	CIRVUL	non-native	0	3	forb	biennial	bull thistle
Cryptotaenia canadensis	Apiaceae	CRYCAN	native	2	0	forb	perennial	honewort
Dactylis glomerata	Poaceae	DACGLO	non-native	0	3	grass	perennial	orchard grass
Elymus repens; agropyron r.	Poaceae	ELYREP	non-native	0	3	grass	perennial	quack grass
Elymus virginicus	Poaceae	ELYVIR	native	4	-3	grass	perennial	virginia wild-rye
Epipactis helleborine	Orchidaceae	EPIHEL	non-native	0	0	forb	perennial	helleborine
Equisetum arvense	Equisetaceae	EQUARV	native	0	0	fern	perennial	common horsetail
Erigeron philadelphicus	Asteraceae	ERIPHI	native	2	0	forb	perennial	philadelphia fleabane
Festuca subverticillata; f. obtusa	Poaceae	FESSUB	native	5	3	grass	perennial	nodding fescue
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 aparine	Rubiaceae	GALAPA	native	0	3	forb	annual	annual bedstraw
Galium asprellum	Rubiaceae	GALASP	native	5	-5	vine	perennial	rough bedstraw
Galium obtusum	Rubiaceae	GALOBT	native	5	-3	forb	perennial	wild madder

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Galium triflorum	Rubiaceae	GALTRR	native	4	3	forb	perennial	fragrant bedstraw
Geum canadense	Rosaceae	GEUCAN	native	1	0	forb	perennial	white avens
Glyceria striata	Poaceae	GLYSTR	native	4	-5	grass	perennial	fowl manna grass
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 tenuis	Juncaceae	JUNTEN	native	1	0	forb	perennial	path rush
Lobelia cardinalis	Campanulaceae	LOBCAR	native	7	-5	forb	perennial	cardinal-flower
Lycopus rubellus	Lamiaceae	LYCRUB	native	8	-5	forb	perennial	stalked water horehound
Maianthemum stellatum; smilacina s.	Convallariaceae	MAISTE	native	5	0	forb	perennial	starry false solomon-seal
Morus alba	Moraceae	MORALB	non-native	0	3	tree	perennial	white mulberry
Onoclea sensibilis	Onocleaceae	ONOSEN	native	2	-3	fern	perennial	sensitive fern
Osmorhiza longistylis	Apiaceae	OSMLON	native	3	3	forb	perennial	smooth sweet-cicely
Oxalis stricta; o. fontana	Oxalidaceae	OXASTR	native	0	3	forb	perennial	yellow wood-sorrel
Parthenocissus inserta	Vitaceae	PARINS	native	4	3	vine	perennial	thicket creeper
Pedicularis lanceolata	Orobanchaceae	PEDLAN	native	8	-3	forb	perennial	swamp-betony
Persicaria virginiana; polygonum v.	Polygonaceae	PERVIR	native	4	0	forb	perennial	jumpseed
Phalaris arundinacea	Poaceae	PHAARU	native	0	-3	grass	perennial	reed canary grass
Phleum pratense	Poaceae	PHLPRA	non-native	0	3	grass	perennial	timothy
Poa compressa	Poaceae	POACOM	non-native	0	3	grass	perennial	canada bluegrass
Podophyllum peltatum	Berberidaceae	PODPEL	native	3	3	forb	perennial	may-apple
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
Ranunculus hispidus	Ranunculaceae	RANHIS	native	5	0	forb	perennial	swamp buttercup
Ribes cynosbati	Grossulariaceae	RIBCYN	native	4	3	shrub	perennial	prickly or wild gooseberry
Rubus allegheniensis	Rosaceae	RUBALL	native	1	3	shrub	perennial	common blackberry
Rubus occidentalis	Rosaceae	RUBOCC	native	1	5	shrub	perennial	black raspberry
Sanicula odorata; s. gregaria	Apiaceae	SANODO	native	2	0	forb	perennial	black snakeroot
Scirpus atrovirens	Cyperaceae	SCIATV	native	3	-5	sedge	perennial	bulrush
Solanum dulcamara	Solanaceae	SOLDUL	non-native	0	0	vine	perennial	bittersweet nightshade
Solidago gigantea	Asteraceae	SOLGIG	native	3	-3	forb	perennial	late goldenrod
Symphotrichum lateriflorum; aster l.	Asteraceae	SYMLAT	native	2	0	forb	perennial	calico aster

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Symphotrichum ontarionis; aster o.	Asteraceae	SYMONT	native	6	0	forb	perennial	lake ontario aster
Tilia americana	Malvaceae	TILAME	native	5	3	tree	perennial	basswood
Toxicodendron radicans	Anacardiaceae	TOXRAD	native	2	0	vine	perennial	poison-ivy
Ulmus americana	Ulmaceae	ULMAME	native	1	-3	tree	perennial	american elm
Urtica dioica	Urticaceae	URTDIO	native	1	0	forb	perennial	stinging nettle
Viburnum lentago	Adoxaceae	VIBLEN	native	4	0	shrub	perennial	nannyberry
Viola sororia	Violaceae	VIOSOR	native	1	0	forb	perennial	common blue violet

Appendix 3. Richard Bearsley Parcel, Southern Shrub-carr and Southern Wet Meadow.

07/01/2016

Wigwam Bay

Arenac

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. Herbarium, University of Michigan, Ann Arbor, MI and Michigan Natural Features Inventory, Michigan State University, Lansing, MI. <http://michiganflora.net>

Practitioner:

Bradford Slaughter

Latitude:

43.967154

Longitude:

-83.868463

Weather Notes:

Duration Notes:

Community Type Notes:

southern shrub-carr, southern wet meadow with emergent marsh inclusions and fen-like areas. Formerly cleared and at least hayed or pastured.

Other Notes:

Also noted: *Crataegus* sp., *Lonicera mor/x* bel

Conservatism-Based Metrics:

Total Mean C:

3.5

Native Mean C:

4.1

Total FQI:

38

Native FQI:

41

Adjusted FQI:

37.7

% C value 0:

18.6

% C value 1-3:

34.7

% C value 4-6:

33.9

% C value 7-10:

12.7

Native Tree Mean C:

3.6

Native Shrub Mean C:

4.1

Native Herbaceous Mean C: 4.1

Species Richness:

Total Species: 118
Native Species: 100 84.70%
Non-native Species: 18 15.30%

Species Wetness:

Mean Wetness: -2
Native Mean Wetness: -2.5

Physiognomy Metrics:

Tree: 5 4.20%
Shrub: 16 13.60%
Vine: 7 5.90%
Forb: 59 50%
Grass: 10 8.50%
Sedge: 20 16.90%
Rush: 0 0%
Fern: 1 0.80%
Bryophyte: 0 0%

Duration Metrics:

Annual: 2 1.70%
Perennial: 113 95.80%
Biennial: 3 2.50%
Native Annual: 1 0.80%
Native Perennial: 98 83.10%
Native Biennial: 1 0.80%

Species:

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Acer saccharinum	Sapindaceae	ACESAI	native	2	-3	tree	perennial	silver maple
Agrostis gigantea	Poaceae	AGRIGIG	non-native	0	-3	grass	perennial	redtop

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Alisma triviale; a. plantago-aquatica	Alismataceae	ALITRI	native	1	-5	forb	perennial	northern water-plantain
Ambrosia artemisiifolia	Asteraceae	AMBART	native	0	3	forb	annual	common ragweed
Anemone canadensis	Ranunculaceae	ANECAN	native	4	-3	forb	perennial	canada anemone
Anemone virginiana	Ranunculaceae	ANEVIR	native	3	3	forb	perennial	thimbleweed
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
Barbarea vulgaris	Brassicaceae	BARVUL	non-native	0	0	forb	biennial	yellow rocket
Calamagrostis canadensis	Poaceae	CALCAN	native	3	-5	grass	perennial	blue-joint
Calystegia sepium	Convolvulaceae	CALSEP	native	2	0	vine	perennial	hedge bindweed
Campanula aparinoides	Campanulaceae	CAMAPA	native	7	-5	forb	perennial	marsh bellflower
Carex aquatilis	Cyperaceae	CXAQUA	native	7	-5	sedge	perennial	sedge
Carex buxbaumii	Cyperaceae	CXBUXB	native	10	-5	sedge	perennial	sedge
Carex cristatella	Cyperaceae	CXCRIS	native	3	-3	sedge	perennial	sedge
Carex diandra	Cyperaceae	CXDIAN	native	8	-5	sedge	perennial	sedge
Carex flava	Cyperaceae	CXFLAV	native	4	-5	sedge	perennial	sedge
Carex gracillima	Cyperaceae	CXGRAA	native	4	3	sedge	perennial	sedge
Carex granularis	Cyperaceae	CXGRAN	native	2	-3	sedge	perennial	sedge
Carex interior	Cyperaceae	CXINTE	native	3	-5	sedge	perennial	sedge
Carex lacustris	Cyperaceae	CXLACU	native	6	-5	sedge	perennial	sedge
Carex pellita; c. lanuginosa	Cyperaceae	CXPELL	native	2	-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
Carex vulpinoidea	Cyperaceae	CXVULP	native	1	-5	sedge	perennial	sedge
Cephalanthus occidentalis	Rubiaceae	CEPOCC	native	7	-5	shrub	perennial	buttonbush
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
Clematis virginiana	Ranunculaceae	CLEVIR	native	4	0	vine	perennial	virgins bower
Cornus amomum	Cornaceae	CORAMO	native	2	-3	shrub	perennial	silky dogwood
Cornus foemina	Cornaceae	CORFOE	native	1	0	shrub	perennial	gray dogwood
Dasiphora fruticosa; potentilla f.	Rosaceae	DASFRU	native	8	-3	shrub	perennial	shrubby cinquefoil

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Daucus carota	Apiaceae	DAUCAR	non-native	0	5	forb	biennial	queen-annes-lace
Dichanthelium implicatum; panicum i.	Poaceae	DICIMP	native	3	0	grass	perennial	panic grass
Eleocharis elliptica	Cyperaceae	ELEELL	native	6	-5	sedge	perennial	golden-seeded spike rush
Eleocharis erythropoda	Cyperaceae	ELEERY	native	4	-5	sedge	perennial	spike-rush
Elymus repens; agropyron r.	Poaceae	ELYREP	non-native	0	3	grass	perennial	quack grass
Epilobium coloratum	Onagraceae	EPICOL	native	3	-5	forb	perennial	cinnamon willow-herb
Equisetum arvense	Equisetaceae	EQUARV	native	0	0	fern	perennial	common horsetail
Euthamia graminifolia	Asteraceae	EUTGRA	native	3	0	forb	perennial	grass-leaved goldenrod
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 obtusum	Rubiaceae	GALOBT	native	5	-3	forb	perennial	wild madder
Geum aleppicum	Rosaceae	GEUALE	native	3	0	forb	perennial	yellow avens
Glyceria striata	Poaceae	GLYSTR	native	4	-5	grass	perennial	fowl manna grass
Helenium autumnale	Asteraceae	HELAUT	native	5	-3	forb	perennial	sneezeweed
Hypericum kalmianum	Hypericaceae	HYPKAL	native	10	-3	shrub	perennial	kalms st. johns-wort
Ilex verticillata	Aquifoliaceae	ILEVER	native	5	-3	shrub	perennial	michigan holly
Iris virginica	Iridaceae	IRIVIR	native	5	-5	forb	perennial	southern blue flag
Juncus alpinoarticulatus; j. alpinus	Juncaceae	JUNALP	native	5	-5	forb	perennial	rush
Juncus balticus	Juncaceae	JUNBAL	native	4	-5	forb	perennial	rush
Juncus canadensis	Juncaceae	JUNCAN	native	6	-5	forb	perennial	canadian rush
Juncus dudleyi	Juncaceae	JUNDUD	native	1	-3	forb	perennial	dudleys rush
Juncus greenei	Juncaceae	JUNGRE	native	7	0	forb	perennial	greenes rush
Juncus nodosus	Juncaceae	JUNNOD	native	5	-5	forb	perennial	joint rush
Lobelia spicata	Campanulaceae	LOBSPI	native	4	0	forb	perennial	pale spiked lobelia
Lycopus americanus	Lamiaceae	LYCAME	native	2	-5	forb	perennial	common water horehound
Lycopus uniflorus	Lamiaceae	LYCUNI	native	2	-5	forb	perennial	northern bugle weed
Lysimachia quadriflora	Myrsinaceae	LYSQUR	native	10	-5	forb	perennial	whorled loosestrife
Lysimachia terrestris	Myrsinaceae	LYSTER	native	6	-5	forb	perennial	swamp-candles
Lythrum alatum	Lythraceae	LYTALA	native	9	-5	forb	perennial	winged loosestrife
Lythrum salicaria	Lythraceae	LYTSAL	non-native	0	-5	forb	perennial	purple loosestrife
Medicago lupulina	Fabaceae	MEDLUP	non-native	0	3	forb	annual	black medick
Menispermum canadense	Menispermaceae	MENCAE	native	5	0	vine	perennial	moonseed

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Parthenocissus inserta	Vitaceae	PARINS	native	4	3	vine	perennial	thicket 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
Phleum pratense	Poaceae	PHLPRA	non-native	0	3	grass	perennial	timothy
Poa compressa	Poaceae	POACOM	non-native	0	3	grass	perennial	canada bluegrass
Poa pratensis	Poaceae	POAPRA	non-native	0	3	grass	perennial	kentucky bluegrass
Potentilla anserina	Rosaceae	POTANS	native	5	-3	forb	perennial	silverweed
Proserpinaca palustris	Haloragaceae	PROPAL	native	6	-5	forb	perennial	mermaid-weed
Prunella vulgaris	Lamiaceae	PRUVUL	native	0	0	forb	perennial	self-heal
Pycnanthemum virginianum	Lamiaceae	PYCVIR	native	5	-3	forb	perennial	common mountain mint
Quercus bicolor	Fagaceae	QUEBIC	native	8	-3	tree	perennial	swamp white oak
Quercus macrocarpa	Fagaceae	QUEMAC	native	5	3	tree	perennial	bur oak
Rhus typhina	Anacardiaceae	RHUTYP	native	2	3	shrub	perennial	staghorn sumac
Ribes americanum	Grossulariaceae	RIBAME	native	6	-3	shrub	perennial	wild black currant
Rorippa aquatica; armoracia a.	Brassicaceae	RORAQU	native	8	-5	forb	perennial	lake cress
Rosa palustris	Rosaceae	ROSPAL	native	5	-5	shrub	perennial	swamp rose
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 crispus	Polygonaceae	RUMCRI	non-native	0	0	forb	perennial	curly dock
Salix exigua	Salicaceae	SALEXI	native	1	-3	shrub	perennial	sandbar willow
Salix petiolaris	Salicaceae	SALPET	native	1	-3	shrub	perennial	slender willow
Schoenoplectus tabernaemontani; scirpus validus	Cyperaceae	SCHTAB	native	4	-5	sedge	perennial	softstem bulrush
Scirpus atrovirens	Cyperaceae	SCIATV	native	3	-5	sedge	perennial	bulrush
Scirpus pendulus	Cyperaceae	SCIPEN	native	3	-5	sedge	perennial	bulrush
Scutellaria galericulata	Lamiaceae	SCUGAL	native	5	-5	forb	perennial	marsh skullcap
Smilax hispida; s. tamnoides	Smilacaceae	SMIHIS	native	5	0	vine	perennial	bristly greenbrier
Solanum dulcamara	Solanaceae	SOLDUL	non-native	0	0	vine	perennial	bittersweet nightshade
Solidago altissima	Asteraceae	SOLALT	native	1	3	forb	perennial	tall goldenrod
Solidago canadensis	Asteraceae	SOLCAN	native	1	3	forb	perennial	canada goldenrod
Solidago gigantea	Asteraceae	SOLGIG	native	3	-3	forb	perennial	late goldenrod
Solidago rugosa	Asteraceae	SOLRUG	native	3	0	forb	perennial	rough-leaved goldenrod
Sonchus arvensis; s. uliginosus	Asteraceae	SONARV	non-native	0	3	forb	perennial	perennial sow-thistle

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Sparganium eurycarpum	Typhaceae	SPAEUR	native	5	-5	forb	perennial	common bur-reed
Sphenopholis intermedia	Poaceae	SPHINT	native	4	0	grass	perennial	slender wedgegrass
Spiraea alba	Rosaceae	SPIALB	native	4	-3	shrub	perennial	meadowsweet
Stachys hispida; s. tenuifolia	Lamiaceae	STAHIS	native	5	-3	forb	perennial	hedge-nettle
Symphotrichum lanceolatum; aster l.	Asteraceae	SYMLAN	native	2	-3	forb	perennial	panicked aster
Symphotrichum novae-angliae; aster n.	Asteraceae	SYMNOV	native	3	-3	forb	perennial	new england aster
Symphotrichum ontarionis; aster o.	Asteraceae	SYMONT	native	6	0	forb	perennial	lake ontario aster
Taraxacum officinale	Asteraceae	TAROFF	non-native	0	3	forb	perennial	common dandelion
Teucrium canadense	Lamiaceae	TEUCAN	native	4	-3	forb	perennial	wood-sage
Thalictrum dasycarpum	Ranunculaceae	THADAS	native	3	-3	forb	perennial	purple meadow-rue
Trifolium hybridum	Fabaceae	TRIHYP	non-native	0	3	forb	perennial	alsike clover
Typha angustifolia	Typhaceae	TYPANG	non-native	0	-5	forb	perennial	narrow-leaved cat-tail
Ulmus americana	Ulmaceae	ULMAME	native	1	-3	tree	perennial	american elm
Viburnum lentago	Adoxaceae	VIBLEN	native	4	0	shrub	perennial	nannyberry
Viburnum opulus	Adoxaceae	VIBOPU	non-native	0	-3	shrub	perennial	european highbush-cranberry
Viola labradorica; v. conspersa	Violaceae	VIOLAB	native	3	0	forb	perennial	dog violet
Vitis riparia	Vitaceae	VITRIP	native	3	0	vine	perennial	river-bank grape

Appendix 4. Richard Bearsley Parcel, Great Lakes Marsh.

08/17/2016

Wigwam Bay

Arenac

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. Herbarium, University of Michigan, Ann Arbor, MI and Michigan Natural Features Inventory, Michigan State University, Lansing, MI. <http://michiganflora.net>

Practitioner: Brad Slaughter

Latitude: 43.960694

Longitude: -83.871013

Weather Notes:

Duration Notes:

Community Type Notes: Great Lakes marsh

Other Notes: Incomplete floristic survey conducted from kayak. Also: *Typha x glauca*.

Conservatism-Based Metrics:

Total Mean C: 3.8

Native Mean C: 4.6

Total FQI: 15.7

Native FQI: 17.2

Adjusted FQI: 41.7

% C value 0: 17.6

% C value 1-3: 17.6

% C value 4-6: 58.8

% C value 7-10: 5.9

Native Tree Mean C: 1

Native Shrub Mean C: n/a

Native Herbaceous Mean C: 4.8

Species Richness:

Total Species:	17	
Native Species:	14	82.40%
Non-native Species:	3	17.60%

Species Wetness:

Mean Wetness:	-4.6
Native Mean Wetness:	-4.6

Physiognomy Metrics:

Tree:	1	5.90%
Shrub:	0	0%
Vine:	0	0%
Forb:	14	82.40%
Grass:	1	5.90%
Sedge:	1	5.90%
Rush:	0	0%
Fern:	0	0%
Bryophyte:	0	0%

Duration Metrics:

Annual:	1	5.90%
Perennial:	16	94.10%
Biennial:	0	0%
Native Annual:	1	5.90%
Native Perennial:	13	76.50%
Native Biennial:	0	0%

Species:

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Ceratophyllum demersum	Ceratophyllaceae	CERDEM	native	1	-5	forb	perennial	coontail
Lemna turionifera; l. minor	Araceae	LEMTUR	native	5	-5	forb	perennial	red duckweed
Myriophyllum spicatum	Haloragaceae	MYRSP1	non-native	0	-5	forb	perennial	eurasian water-milfoil

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
<i>Najas flexilis</i>	Hydrocharitaceae	NAJFLE	native	5	-5	forb	annual	slender naiad
<i>Nymphaea odorata</i>	Nymphaeaceae	NYMODO	native	6	-5	forb	perennial	sweet-scented waterlily
<i>Phragmites australis</i> var. <i>australis</i>	Poaceae	PHRAUU	non-native	0	-3	grass	perennial	reed
<i>Pontederia cordata</i>	Pontederiaceae	PONCOR	native	8	-5	forb	perennial	pickerel-weed
<i>Populus deltoides</i>	Salicaceae	POPDEL	native	1	0	tree	perennial	cottonwood
<i>Potamogeton gramineus</i>	Potamogetonaceae	POTGRM	native	5	-5	forb	perennial	pondweed
<i>Potamogeton illinoensis</i>	Potamogetonaceae	POTILL	native	5	-5	forb	perennial	illinois pondweed
<i>Schoenoplectus acutus</i> ; <i>scirpus</i> a.	Cyperaceae	SCHACU	native	5	-5	sedge	perennial	hardstem bulrush
<i>Spirodela polyrhiza</i>	Araceae	SPIPOL	native	6	-5	forb	perennial	greater duckweed
<i>Typha angustifolia</i>	Typhaceae	TYPANG	non-native	0	-5	forb	perennial	narrow-leaved cat-tail
<i>Typha latifolia</i>	Typhaceae	TYPLAT	native	1	-5	forb	perennial	broad-leaved cat-tail
<i>Utricularia vulgaris</i>	Lentibulariaceae	UTRVUL	native	6	-5	forb	perennial	common bladderwort
<i>Wolffia borealis</i> ; w. <i>punctata</i>	Araceae	WOLBOR	native	5	-5	forb	perennial	dotted water meal
<i>Wolffia columbiana</i>	Araceae	WOLCOL	native	5	-5	forb	perennial	common water meal

Appendix 5. Wigwam Duck Club Floristic Quality Summary.

07/02/2016

Wigwam Bay

Arenac

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. Herbarium, University of Michigan, Ann Arbor, MI and Michigan Natural Features Inventory, Michigan State University, Lansing, MI. <http://michiganflora.net>

Practitioner:

Brad Slaughter

Latitude:

44.001873

Longitude:

-83.817908

Weather Notes:

Duration Notes:

Community Type Notes:

Mesic northern forest grading to dry-mesic northern forest, including disturbed areas and conifer plantings with old field species along roads; southern hardwood swamp, floodplain forest, inundated shrub swamp; Great Lakes marsh.

Other Notes:

Additional spp. noted 8/17/16. Also noted: *Carex* spp., *Chenopodium* sp., *Crataegus* spp., *Lactuca* sp., *Lemna* min/tur, *Persicaria* sp., *Potamogeton* sp., *Sagittaria* sp. *Pinus* res planted and not included on list.

Conservatism-Based Metrics:

Total Mean C:

3.6

Native Mean C:

4.1

Total FQI:

57

Native FQI:

61.1

Adjusted FQI:

38.6

% C value 0:

14.7

% C value 1-3:

29.1

% C value 4-6:

47.4

% C value 7-10:	8.8	
Native Tree Mean C:	3.8	
Native Shrub Mean C:	3.9	
Native Herbaceous Mean C:	4.1	
Species Richness:		
Total Species:	251	
Native Species:	222	88.40%
Non-native Species:	29	11.60%
Species Wetness:		
Mean Wetness:	-0.3	
Native Mean Wetness:	-0.5	
Physiognomy Metrics:		
Tree:	26	10.40%
Shrub:	29	11.60%
Vine:	14	5.60%
Forb:	119	47.40%
Grass:	25	10%
Sedge:	26	10.40%
Rush:	0	0%
Fern:	12	4.80%
Bryophyte:	0	0%
Duration Metrics:		
Annual:	10	4%
Perennial:	236	94%
Biennial:	5	2%
Native Annual:	9	3.60%
Native Perennial:	211	84.10%
Native Biennial:	2	0.80%

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 saccharinum	Sapindaceae	ACESAI	native	2	-3	tree	perennial	silver maple
Acer saccharum	Sapindaceae	ACESAU	native	5	3	tree	perennial	sugar maple
Achillea millefolium	Asteraceae	ACHMIL	native	1	3	forb	perennial	yarrow
Adiantum pedatum	Pteridaceae	ADIPED	native	6	3	fern	perennial	maidenhair fern
Agalinis purpurea	Orobanchaceae	AGAPUR	native	7	-3	forb	annual	purple false foxglove
Agalinis tenuifolia	Orobanchaceae	AGATEN	native	5	-3	forb	annual	common false foxglove
Agrimonia gryposepala	Rosaceae	AGRGRY	native	2	3	forb	perennial	tall agrimony
Agrostis gigantea	Poaceae	AGRIGIG	non-native	0	-3	grass	perennial	redtop
Alisma triviale; a. plantago-aquatica	Alismataceae	ALITRI	native	1	-5	forb	perennial	northern water-plantain
Alliaria petiolata	Brassicaceae	ALLPET	non-native	0	3	forb	biennial	garlic mustard
Alnus incana; a. rugosa	Betulaceae	ALNINC	native	5	-3	shrub	perennial	speckled alder
Amelanchier interior	Rosaceae	AMEINT	native	4	5	shrub	perennial	serviceberry
Amphicarpaea bracteata	Fabaceae	AMPBRA	native	5	0	vine	annual	hog-peanut
Anemone canadensis	Ranunculaceae	ANECAN	native	4	-3	forb	perennial	canada anemone
Anemone quinquefolia	Ranunculaceae	ANEQUI	native	5	3	forb	perennial	wood anemone
Anemone virginiana	Ranunculaceae	ANEVIR	native	3	3	forb	perennial	thimbleweed
Apios americana	Fabaceae	APIAME	native	3	-3	vine	perennial	groundnut
Apocynum androsaemifolium	Apocynaceae	APOAND	native	3	5	forb	perennial	spreading dogbane
Apocynum cannabinum; a. sibiricum	Apocynaceae	APOCAN	native	3	0	forb	perennial	indian-hemp
Arisaema triphyllum	Araceae	ARITRI	native	5	0	forb	perennial	jack-in-the-pulpit
Asclepias incarnata	Apocynaceae	ASCINC	native	6	-5	forb	perennial	swamp milkweed
Asclepias syriaca	Apocynaceae	ASCSYR	native	1	5	forb	perennial	common milkweed
Athyrium filix-femina	Athyriaceae	ATHFIL	native	4	0	fern	perennial	lady fern
Barbarea vulgaris	Brassicaceae	BARVUL	non-native	0	0	forb	biennial	yellow rocket
Berteroa incana	Brassicaceae	BERINC	non-native	0	5	forb	annual	hoary alyssum
Betula alleghaniensis	Betulaceae	BETALL	native	7	0	tree	perennial	yellow birch
Betula papyrifera	Betulaceae	BETPAP	native	2	3	tree	perennial	paper birch
Bidens frondosa	Asteraceae	BIDFRO	native	1	-3	forb	annual	common beggar-ticks
Boehmeria cylindrica	Urticaceae	BOECYL	native	5	-5	forb	perennial	false nettle
Brachyelytrum aristosum; b. erectum	Poaceae	BRAARI	native	7	5	grass	perennial	northern shorthusk
Brachyelytrum erectum	Poaceae	BRAERE	native	7	5	grass	perennial	long-awned wood grass

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Bromus inermis	Poaceae	BROINE	non-native	0	5	grass	perennial	smooth brome
Calamagrostis canadensis	Poaceae	CALCAN	native	3	-5	grass	perennial	blue-joint
Caltha palustris	Ranunculaceae	CALPAR	native	6	-5	forb	perennial	marsh-marigold
Carex aquatilis	Cyperaceae	CXAQUA	native	7	-5	sedge	perennial	sedge
Carex bromoides	Cyperaceae	CXBROM	native	6	-3	sedge	perennial	sedge
Carex cephaloidea	Cyperaceae	CXCEPD	native	5	3	sedge	perennial	sedge
Carex crinita	Cyperaceae	CXCRIN	native	4	-5	sedge	perennial	sedge
Carex cristatella	Cyperaceae	CXCRIS	native	3	-3	sedge	perennial	sedge
Carex gracillima	Cyperaceae	CXGRAA	native	4	3	sedge	perennial	sedge
Carex grayi	Cyperaceae	CXGRAY	native	6	-3	sedge	perennial	sedge
Carex gynandra	Cyperaceae	CXGYNA	native	3	-5	sedge	perennial	sedge
Carex hirtifolia	Cyperaceae	CXHIRI	native	5	3	sedge	perennial	sedge
Carex intumescens	Cyperaceae	CXINTU	native	3	-3	sedge	perennial	sedge
Carex lacustris	Cyperaceae	CXLACU	native	6	-5	sedge	perennial	sedge
Carex lupulina	Cyperaceae	CXLUPA	native	4	-5	sedge	perennial	sedge
Carex pedunculata	Cyperaceae	CXPEDU	native	5	3	sedge	perennial	sedge
Carex pensylvanica	Cyperaceae	CXPENS	native	4	5	sedge	perennial	sedge
Carex prairea	Cyperaceae	CXPRAI	native	10	-3	sedge	perennial	sedge
Carex radiata; c. rosea	Cyperaceae	CXRADI	native	2	0	sedge	perennial	straight-styled wood sedge
Carex retrorsa	Cyperaceae	CXRETS	native	3	-5	sedge	perennial	sedge
Carex rosea; c. convoluta	Cyperaceae	CXROSE	native	2	5	sedge	perennial	curly-styled wood sedge
Carex stipata	Cyperaceae	CXSTIP	native	1	-5	sedge	perennial	sedge
Carex tuckermanii	Cyperaceae	CXTUCK	native	8	-5	sedge	perennial	sedge
Carex vulpinoidea	Cyperaceae	CXVULP	native	1	-5	sedge	perennial	sedge
Carpinus caroliniana	Betulaceae	CARCAO	native	6	0	tree	perennial	blue-beech
Carya ovata	Juglandaceae	CAROVA	native	5	3	tree	perennial	shagbark hickory
Caulophyllum thalictroides	Berberidaceae	CAUTHA	native	5	5	forb	perennial	blue cohosh
Celastrus orbiculatus	Celastraceae	CELORB	non-native	0	5	vine	perennial	oriental bittersweet
Celtis occidentalis	Cannabaceae	CELOCC	native	5	0	tree	perennial	hackberry
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
Cinna arundinacea	Poaceae	CINARU	native	7	-3	grass	perennial	wood reedgrass

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
<i>Circaea canadensis</i> ; <i>c. lutetiana</i>	Onagraceae	CIRCAN	native	2	3	forb	perennial	enchanters-nightshade
<i>Cirsium arvense</i>	Asteraceae	CIRARV	non-native	0	3	forb	perennial	canada thistle
<i>Cladium mariscoides</i>	Cyperaceae	CLAMAR	native	10	-5	sedge	perennial	twig-rush
<i>Clematis virginiana</i>	Ranunculaceae	CLEVIR	native	4	0	vine	perennial	virgins bower
<i>Comandra umbellata</i>	Santalaceae	COMUMB	native	5	3	forb	perennial	bastard-toadflax
<i>Cornus amomum</i>	Cornaceae	CORAMO	native	2	-3	shrub	perennial	silky dogwood
<i>Cornus foemina</i>	Cornaceae	CORFOE	native	1	0	shrub	perennial	gray dogwood
<i>Cornus sericea</i> ; <i>c. stolonifera</i>	Cornaceae	CORSER	native	2	-3	shrub	perennial	red-osier
<i>Cyperus bipartitus</i> ; <i>c. rivularis</i>	Cyperaceae	CYPBIP	native	3	-3	sedge	annual	brook nut sedge
<i>Dactylis glomerata</i>	Poaceae	DACGLO	non-native	0	3	grass	perennial	orchard grass
<i>Daucus carota</i>	Apiaceae	DAUCAR	non-native	0	5	forb	biennial	queen-annes-lace
<i>Desmodium canadense</i>	Fabaceae	DESCAD	native	3	0	forb	perennial	showy tick-trefoil
<i>Dichanthelium implicatum</i> ; <i>panicum i.</i>	Poaceae	DICIMP	native	3	0	grass	perennial	panic grass
<i>Dioscorea villosa</i> ; <i>dioscorea villosa</i>	Dioscoreaceae	DIOVIL	native	4	0	forb	perennial	wild yam
<i>Dryopteris cristata</i>	Dryopteridaceae	DRYCRI	native	6	-5	fern	perennial	crested shield fern
<i>Echinocystis lobata</i>	Cucurbitaceae	ECHLOB	native	2	-3	vine	annual	wild-cucumber
<i>Elaeagnus umbellata</i>	Elaeagnaceae	ELAUMB	non-native	0	3	shrub	perennial	autumn-olive
<i>Elymus hystrix</i> ; <i>hystrix patula</i>	Poaceae	ELYHYS	native	5	3	grass	perennial	bottlebrush grass
<i>Elymus repens</i> ; <i>agropyron r.</i>	Poaceae	ELYREP	non-native	0	3	grass	perennial	quack grass
<i>Elymus villosus</i>	Poaceae	ELYVIL	native	5	3	grass	perennial	silky wild-rye
<i>Elymus virginicus</i>	Poaceae	ELYVIR	native	4	-3	grass	perennial	virginia wild-rye
<i>Epilobium coloratum</i>	Onagraceae	EPICOL	native	3	-5	forb	perennial	cinnamon willow-herb
<i>Epipactis helleborine</i>	Orchidaceae	EPIHEL	non-native	0	0	forb	perennial	helleborine
<i>Equisetum arvense</i>	Equisetaceae	EQUARV	native	0	0	fern	perennial	common horsetail
<i>Equisetum hyemale</i>	Equisetaceae	EQUHYE	native	2	0	fern	perennial	scouring rush
<i>Equisetum variegatum</i>	Equisetaceae	EQUVAR	native	6	-3	fern	perennial	variegated scouring rush
<i>Erigeron philadelphicus</i>	Asteraceae	ERIPHI	native	2	0	forb	perennial	philadelphia fleabane
<i>Eupatorium perfoliatum</i>	Asteraceae	EUPPER	native	4	-3	forb	perennial	boneset
<i>Eurybia macrophylla</i> ; <i>aster m.</i>	Asteraceae	EURMAC	native	4	5	forb	perennial	big-leaved aster
<i>Eutrochium maculatum</i> ; <i>eupatorium m.</i>	Asteraceae	EUTMAC	native	4	-5	forb	perennial	joe-pye-weed
<i>Fagus grandifolia</i>	Fagaceae	FAGGRA	native	6	3	tree	perennial	american beech
<i>Festuca subverticillata</i> ; <i>f. obtusa</i>	Poaceae	FESSUB	native	5	3	grass	perennial	nodding fescue
<i>Fragaria virginiana</i>	Rosaceae	FRAVIR	native	2	3	forb	perennial	wild strawberry

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Fraxinus americana	Oleaceae	FRAAME	native	5	3	tree	perennial	white ash
Fraxinus nigra	Oleaceae	FRANIG	native	6	-3	tree	perennial	black ash
Fraxinus pennsylvanica	Oleaceae	FRAPEN	native	2	-3	tree	perennial	red ash
Galium boreale	Rubiaceae	GALBOR	native	3	0	forb	perennial	northern bedstraw
Galium circaezans	Rubiaceae	GALCIR	native	4	3	forb	perennial	white wild licorice
Galium obtusum	Rubiaceae	GALOBT	native	5	-3	forb	perennial	wild madder
Galium trifidum	Rubiaceae	GALTRD	native	6	-3	forb	perennial	small bedstraw
Galium triflorum	Rubiaceae	GALTRR	native	4	3	forb	perennial	fragrant bedstraw
Gaylussacia baccata	Ericaceae	GAYBAC	native	7	3	shrub	perennial	huckleberry
Geranium maculatum	Geraniaceae	GERMAC	native	4	3	forb	perennial	wild geranium
Geum canadense	Rosaceae	GEUCAN	native	1	0	forb	perennial	white avens
Glechoma hederacea	Lamiaceae	GLEHED	non-native	0	3	forb	perennial	ground-ivy
Glyceria striata	Poaceae	GLYSTR	native	4	-5	grass	perennial	fowl manna grass
Hackelia virginiana	Boraginaceae	HACVIR	native	1	3	forb	biennial	beggars lice
Hamamelis virginiana	Hamamelidaceae	HAMVIR	native	5	3	shrub	perennial	witch-hazel
Heracleum maximum	Apiaceae	HERMAX	native	3	-3	forb	perennial	cow-parsnip
Hylodesmum glutinosum; desmodium g.	Fabaceae	HYLGLU	native	5	5	forb	perennial	clustered-leaved tick-trefoil
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 alpinoarticulatus; j. alpinus	Juncaceae	JUNALP	native	5	-5	forb	perennial	rush
Juncus balticus	Juncaceae	JUNBAL	native	4	-5	forb	perennial	rush
Juncus canadensis	Juncaceae	JUNCAN	native	6	-5	forb	perennial	canadian rush
Juncus dudleyi	Juncaceae	JUNDUD	native	1	-3	forb	perennial	dudleys rush
Laportea canadensis	Urticaceae	LAPCAN	native	4	-3	forb	perennial	wood nettle
Lathyrus palustris	Fabaceae	LATPAL	native	7	-3	vine	perennial	marsh pea
Leersia virginica	Poaceae	LEEVIR	native	5	-3	grass	perennial	white grass
Lemna turionifera; l. minor	Araceae	LEMTUR	native	5	-5	forb	perennial	red duckweed
Lindera benzoin	Lauraceae	LINBEN	native	7	-3	shrub	perennial	spicebush
Lobelia cardinalis	Campanulaceae	LOBCAR	native	7	-5	forb	perennial	cardinal-flower
Lobelia kalmii	Campanulaceae	LOBKAL	native	10	-5	forb	perennial	bog lobelia
Lobelia siphilitica	Campanulaceae	LOBSIP	native	4	-3	forb	perennial	great blue lobelia
Lonicera dioica	Caprifoliaceae	LONDIO	native	5	3	vine	perennial	red honeysuckle

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
<i>Lycopus uniflorus</i>	Lamiaceae	LYCUNI	native	2	-5	forb	perennial	northern bugle weed
<i>Lysimachia ciliata</i>	Myrsinaceae	LYSCIL	native	4	-3	forb	perennial	fringed loosestrife
<i>Lysimachia nummularia</i>	Myrsinaceae	LYSNUM	non-native	0	-3	forb	perennial	moneywort
<i>Lysimachia thyrsoflora</i>	Myrsinaceae	LYSTHY	native	6	-5	forb	perennial	tufted loosestrife
<i>Lythrum salicaria</i>	Lythraceae	LYTSAL	non-native	0	-5	forb	perennial	purple loosestrife
<i>Maianthemum canadense</i>	Convallariaceae	MAICAN	native	4	3	forb	perennial	canada mayflower
<i>Maianthemum racemosum</i> ; <i>smilacina</i> r.	Convallariaceae	MAIRAC	native	5	3	forb	perennial	false spikenard
<i>Maianthemum stellatum</i> ; <i>smilacina</i> s.	Convallariaceae	MAISTE	native	5	0	forb	perennial	starry false solomon-seal
<i>Matteuccia struthiopteris</i>	Onocleaceae	MATSTR	native	3	0	fern	perennial	ostrich fern
<i>Medeola virginiana</i>	Convallariaceae	MEDVIR	native	10	3	forb	perennial	indian cucumber-root
<i>Menispermum canadense</i>	Menispermaceae	MENCAE	native	5	0	vine	perennial	moonseed
<i>Milium effusum</i>	Poaceae	MILEFF	native	8	3	grass	perennial	wood millet
<i>Monarda fistulosa</i>	Lamiaceae	MONFIS	native	2	3	forb	perennial	wild-bergamot
<i>Monotropa uniflora</i>	Ericaceae	MONOUN	native	5	3	forb	perennial	indian-pipe
<i>Myosotis scorpioides</i>	Boraginaceae	MYOSCO	non-native	0	-5	forb	perennial	forget-me-not
<i>Nymphaea odorata</i>	Nymphaeaceae	NYMODO	native	6	-5	forb	perennial	sweet-scented waterlily
<i>Onoclea sensibilis</i>	Onocleaceae	ONOSEN	native	2	-3	fern	perennial	sensitive fern
<i>Oryzopsis asperifolia</i>	Poaceae	ORYASP	native	6	5	grass	perennial	rough-leaved rice-grass
<i>Osmorhiza claytonii</i>	Apiaceae	OSMCLI	native	4	3	forb	perennial	hairy sweet-cicely
<i>Osmunda regalis</i>	Osmundaceae	OSMREG	native	5	-5	fern	perennial	royal fern
<i>Ostrya virginiana</i>	Betulaceae	OSTVIR	native	5	3	tree	perennial	ironwood; hop-hornbeam
<i>Oxalis stricta</i> ; <i>o. fontana</i>	Oxalidaceae	OXASTR	native	0	3	forb	perennial	yellow wood-sorrel
<i>Parthenocissus inserta</i>	Vitaceae	PARINS	native	4	3	vine	perennial	thicket creeper
<i>Parthenocissus quinquefolia</i>	Vitaceae	PARQUI	native	5	3	vine	perennial	virginia creeper
<i>Pedicularis lanceolata</i>	Orobanchaceae	PEDLAN	native	8	-3	forb	perennial	swamp-betony
<i>Persicaria amphibia</i> ; <i>polygonum</i> a.	Polygonaceae	PERAMP	native	6	-5	forb	perennial	water smartweed
<i>Persicaria virginiana</i> ; <i>polygonum</i> v.	Polygonaceae	PERVIR	native	4	0	forb	perennial	jumpseed
<i>Phalaris arundinacea</i>	Poaceae	PHAARU	native	0	-3	grass	perennial	reed canary grass
<i>Phleum pratense</i>	Poaceae	PHLPRA	non-native	0	3	grass	perennial	timothy
<i>Phragmites australis</i> var. <i>americanus</i>	Poaceae	PHRAUM	native	5	-3	grass	perennial	reed
<i>Phragmites australis</i> var. <i>australis</i>	Poaceae	PHRAUU	non-native	0	-3	grass	perennial	reed
<i>Phryma leptostachya</i>	Phrymaceae	PHRLEP	native	4	3	forb	perennial	lopseed
<i>Picea abies</i>	Pinaceae	PICABI	non-native	0	5	tree	perennial	norway spruce

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
<i>Pilea pumila</i>	Urticaceae	PILPUM	native	5	-3	forb	annual	clearweed
<i>Pinus strobus</i>	Pinaceae	PINSTR	native	3	3	tree	perennial	white pine
<i>Plantago lanceolata</i>	Plantaginaceae	PLALAN	non-native	0	3	forb	perennial	english plantain
<i>Plantago rugelii</i>	Plantaginaceae	PLARUG	native	0	0	forb	perennial	red-stalked plantain
<i>Poa alsodes</i>	Poaceae	POAALS	native	9	0	grass	perennial	bluegrass
<i>Poa compressa</i>	Poaceae	POACOM	non-native	0	3	grass	perennial	canada bluegrass
<i>Poa pratensis</i>	Poaceae	POAPRA	non-native	0	3	grass	perennial	kentucky bluegrass
<i>Podophyllum peltatum</i>	Berberidaceae	PODPEL	native	3	3	forb	perennial	may-apple
<i>Polygonatum pubescens</i>	Convallariaceae	POLPUB	native	5	5	forb	perennial	downy solomon seal
<i>Populus deltoides</i>	Salicaceae	POPDEL	native	1	0	tree	perennial	cottonwood
<i>Populus grandidentata</i>	Salicaceae	POPGRA	native	4	3	tree	perennial	big-tooth aspen
<i>Populus tremuloides</i>	Salicaceae	POPTRE	native	1	0	tree	perennial	quaking aspen
<i>Potentilla anserina</i>	Rosaceae	POTANS	native	5	-3	forb	perennial	silverweed
<i>Prunella vulgaris</i>	Lamiaceae	PRUVUL	native	0	0	forb	perennial	self-heal
<i>Prunus serotina</i>	Rosaceae	PRUSER	native	2	3	tree	perennial	wild black cherry
<i>Prunus virginiana</i>	Rosaceae	PRUVIR	native	2	3	shrub	perennial	choke cherry
<i>Pteridium aquilinum</i>	Dennstaedtiaceae	PTEAQU	native	0	3	fern	perennial	bracken fern
<i>Pycnanthemum virginianum</i>	Lamiaceae	PYCVIR	native	5	-3	forb	perennial	common mountain mint
<i>Pyrola elliptica</i>	Ericaceae	PYRELL	native	6	3	forb	perennial	large-leaved shinleaf
<i>Quercus alba</i>	Fagaceae	QUEALB	native	5	3	tree	perennial	white oak
<i>Quercus macrocarpa</i>	Fagaceae	QUEMAC	native	5	3	tree	perennial	bur oak
<i>Quercus rubra</i>	Fagaceae	QUERUB	native	5	3	tree	perennial	red oak
<i>Ranunculus abortivus</i>	Ranunculaceae	RANABO	native	0	0	forb	perennial	small-flowered buttercup
<i>Ranunculus flabellaris; ranunculus lapponicus</i>	Ranunculaceae	RANFLA	native	10	-5	forb	perennial	yellow water crowfoot
<i>Ranunculus hispidus</i>	Ranunculaceae	RANHIS	native	5	0	forb	perennial	swamp buttercup
<i>Ribes americanum</i>	Grossulariaceae	RIBAME	native	6	-3	shrub	perennial	wild black currant
<i>Ribes cynosbati</i>	Grossulariaceae	RIBCYN	native	4	3	shrub	perennial	prickly or wild gooseberry
<i>Ribes hirtellum</i>	Grossulariaceae	RIBHIR	native	6	-3	shrub	perennial	swamp gooseberry
<i>Rosa multiflora</i>	Rosaceae	ROSMUL	non-native	0	3	shrub	perennial	multiflora rose
<i>Rubus allegheniensis</i>	Rosaceae	RUBALL	native	1	3	shrub	perennial	common blackberry
<i>Rubus occidentalis</i>	Rosaceae	RUBOCC	native	1	5	shrub	perennial	black raspberry
<i>Rubus pubescens</i>	Rosaceae	RUBPUB	native	4	-3	shrub	perennial	dwarf raspberry
<i>Rubus strigosus</i>	Rosaceae	RUBSTR	native	2	0	shrub	perennial	wild red raspberry

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Rudbeckia hirta	Asteraceae	RUDHIR	native	1	3	forb	perennial	black-eyed susan
Rumex obtusifolius	Polygonaceae	RUMOBT	non-native	0	0	forb	perennial	bitter dock
Salix discolor	Salicaceae	SALDIS	native	1	-3	shrub	perennial	pussy willow
Salix exigua	Salicaceae	SALEXI	native	1	-3	shrub	perennial	sandbar willow
Salix myricoides	Salicaceae	SALMYR	native	9	-3	shrub	perennial	blueleaf willow
Salix petiolaris	Salicaceae	SALPET	native	1	-3	shrub	perennial	slender willow
Sambucus canadensis	Adoxaceae	SAMCAN	native	3	-3	shrub	perennial	elderberry
Saponaria officinalis	Caryophyllaceae	SAPOFF	non-native	0	3	forb	perennial	bouncing bet
Schoenoplectus pungens; scirpus americanus	Cyperaceae	SCHPUN	native	5	-5	sedge	perennial	threesquare
Schoenoplectus tabernaemontani; scirpus validus	Cyperaceae	SCHTAB	native	4	-5	sedge	perennial	softstem bulrush
Scirpus atrovirens	Cyperaceae	SCIATV	native	3	-5	sedge	perennial	bulrush
Scutellaria lateriflora	Lamiaceae	SCULAT	native	5	-5	forb	perennial	mad-dog skullcap
Sium suave	Apiaceae	SIUSUA	native	5	-5	forb	perennial	water-parsnip
Smilax ecirrata	Smilacaceae	SMIECI	native	6	5	forb	perennial	upright carrion-flower
Smilax hispida; s. tamnoides	Smilacaceae	SMIHIS	native	5	0	vine	perennial	bristly greenbrier
Solanum dulcamara	Solanaceae	SOLDUL	non-native	0	0	vine	perennial	bittersweet nightshade
Solanum ptychanthum	Solanaceae	SOLPTY	native	1	3	forb	annual	black 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 rugosa	Asteraceae	SOLRUG	native	3	0	forb	perennial	rough-leaved 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
Symphotrichum cordifolium; aster c.	Asteraceae	SYMCOR	native	4	5	forb	perennial	heart-leaved aster
Symphotrichum lateriflorum; aster l.	Asteraceae	SYMLAT	native	2	0	forb	perennial	calico aster
Taenidia integerrima	Apiaceae	TAEINT	native	8	5	forb	perennial	yellow-pimpernel
Taraxacum officinale	Asteraceae	TAROFF	non-native	0	3	forb	perennial	common dandelion
Teucrium canadense	Lamiaceae	TEUCAN	native	4	-3	forb	perennial	wood-sage
Thalictrum dasycarpum	Ranunculaceae	THADAS	native	3	-3	forb	perennial	purple meadow-rue
Thalictrum dioicum	Ranunculaceae	THADIO	native	6	3	forb	perennial	early meadow-rue
Thelypteris noveboracensis	Thelypteridaceae	THENOV	native	5	0	fern	perennial	new york fern
Thelypteris palustris	Thelypteridaceae	THEPAL	native	2	-3	fern	perennial	marsh fern

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Tilia americana	Malvaceae	TILAME	native	5	3	tree	perennial	basswood
Toxicodendron radicans	Anacardiaceae	TOXRAD	native	2	0	vine	perennial	poison-ivy
Trientalis borealis	Myrsinaceae	TRIBOR	native	5	0	forb	perennial	star-flower
Trifolium hybridum	Fabaceae	TRIHYP	non-native	0	3	forb	perennial	alsike clover
Trillium grandiflorum	Trilliaceae	TRIGRA	native	5	3	forb	perennial	common trillium
Triosteum aurantiacum	Caprifoliaceae	TRIAUN	native	5	5	forb	perennial	horse-gentian
Tsuga canadensis	Pinaceae	TSUCAN	native	5	3	tree	perennial	hemlock
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
Urtica dioica	Urticaceae	URTDIO	native	1	0	forb	perennial	stinging nettle
Uvularia grandiflora	Convallariaceae	UVUGRA	native	5	5	forb	perennial	bellwort
Vaccinium angustifolium	Ericaceae	VACANG	native	4	3	shrub	perennial	low sweet blueberry
Verbena hastata	Verbenaceae	VERHAS	native	4	-3	forb	perennial	blue vervain
Viburnum acerifolium	Adoxaceae	VIBACE	native	6	5	shrub	perennial	maple-leaved viburnum
Viburnum lentago	Adoxaceae	VIBLEN	native	4	0	shrub	perennial	nannyberry
Viola affinis	Violaceae	VIOAFF	native	2	-3	forb	perennial	le contes violet
Viola pubescens	Violaceae	VIOPUB	native	4	3	forb	perennial	yellow violet
Viola sororia	Violaceae	VIOSOR	native	1	0	forb	perennial	common blue violet
Vitis riparia	Vitaceae	VITRIP	native	3	0	vine	perennial	river-bank grape

Appendix 6. Wigwam Duck Club Uplands.

07/02/2016

Wigwam Bay

Arenac

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. Herbarium, University of Michigan, Ann Arbor, MI and Michigan Natural Features Inventory, Michigan State University, Lansing, MI. <http://michiganflora.net>

Practitioner:

Bradford Slaughter

Latitude:

44.001873

Longitude:

-83.817908

Weather Notes:

Duration Notes:

Mesic northern forest grading to dry-mesic northern forest, including disturbed areas and conifer plantings with old field species along roads.

Community Type Notes:

Additional spp. noted 8/17/16. Also noted: *Chenopodium* sp., *Lactuca* sp., *Prenanthes* sp. *Pinus* res planted and not included on list.

Other Notes:

Conservatism-Based Metrics:

Total Mean C:

3.7

Native Mean C:

4

Total FQI:

38.8

Native FQI:

40.2

Adjusted FQI:

38.3

% C value 0:

13.6

% C value 1-3:

26.4

% C value 4-6:

52.7

% C value 7-10:

7.3

Native Tree Mean C:

4.3

Native Shrub Mean C: 3.8
 Native Herbaceous Mean C: 3.9

Species Richness:

Total Species: 110
 Native Species: 101 91.80%
 Non-native Species: 9 8.20%

Species Wetness:

Mean Wetness: 2.3
 Native Mean Wetness: 2.2

Physiognomy Metrics:

Tree: 19 17.30%
 Shrub: 13 11.80%
 Vine: 5 4.50%
 Forb: 52 47.30%
 Grass: 9 8.20%
 Sedge: 6 5.50%
 Rush: 0 0%
 Fern: 6 5.50%
 Bryophyte: 0 0%

Duration Metrics:

Annual: 2 1.80%
 Perennial: 107 97.30%
 Biennial: 1 0.90%
 Native Annual: 1 0.90%
 Native Perennial: 100 90.90%
 Native Biennial: 0 0%

Species:

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Acer saccharum	Sapindaceae	ACESAU	native	5	3	tree	perennial	sugar maple

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Achillea millefolium	Asteraceae	ACHMIL	native	1	3	forb	perennial	yarrow
Adiantum pedatum	Pteridaceae	ADIPED	native	6	3	fern	perennial	maidenhair fern
Alliaria petiolata	Brassicaceae	ALLPET	non-native	0	3	forb	biennial	garlic mustard
Amelanchier interior	Rosaceae	AMEINT	native	4	5	shrub	perennial	serviceberry
Amphicarpaea bracteata	Fabaceae	AMPBRA	native	5	0	vine	annual	hog-peanut
Anemone quinquefolia	Ranunculaceae	ANEQUI	native	5	3	forb	perennial	wood anemone
Anemone virginiana	Ranunculaceae	ANEVIR	native	3	3	forb	perennial	thimbleweed
Apocynum androsaemifolium	Apocynaceae	APOAND	native	3	5	forb	perennial	spreading dogbane
Asclepias syriaca	Apocynaceae	ASCSYR	native	1	5	forb	perennial	common milkweed
Berteroa incana	Brassicaceae	BERINC	non-native	0	5	forb	annual	hoary alyssum
Betula alleghaniensis	Betulaceae	BETALL	native	7	0	tree	perennial	yellow birch
Betula papyrifera	Betulaceae	BETPAP	native	2	3	tree	perennial	paper birch
Brachyelytrum aristosum; b. erectum	Poaceae	BRAARI	native	7	5	grass	perennial	northern shorthusk
Brachyelytrum erectum	Poaceae	BRAERE	native	7	5	grass	perennial	long-awned wood grass
Carex cephaloidea	Cyperaceae	CXCEPD	native	5	3	sedge	perennial	sedge
Carex gracillima	Cyperaceae	CXGRAA	native	4	3	sedge	perennial	sedge
Carex intumescens	Cyperaceae	CXINTU	native	3	-3	sedge	perennial	sedge
Carex pedunculata	Cyperaceae	CXPEDU	native	5	3	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
Carpinus caroliniana	Betulaceae	CARCAO	native	6	0	tree	perennial	blue-beech
Carya ovata	Juglandaceae	CAROVA	native	5	3	tree	perennial	shagbark hickory
Caulophyllum thalictroides	Berberidaceae	CAUTHA	native	5	5	forb	perennial	blue cohosh
Circaea canadensis; c. lutetiana	Onagraceae	CIRCAN	native	2	3	forb	perennial	enchanters-nightshade
Comandra umbellata	Santalaceae	COMUMB	native	5	3	forb	perennial	bastard-toadflax
Cornus foemina	Cornaceae	CORFOE	native	1	0	shrub	perennial	gray dogwood
Dactylis glomerata	Poaceae	DACGLO	non-native	0	3	grass	perennial	orchard grass
Dioscorea villosa; dioscorea villosa	Dioscoreaceae	DIOVIL	native	4	0	forb	perennial	wild yam
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
Epipactis helleborine	Orchidaceae	EPIHEL	non-native	0	0	forb	perennial	helleborine
Equisetum arvense	Equisetaceae	EQUARV	native	0	0	fern	perennial	common horsetail
Equisetum hyemale	Equisetaceae	EQUHYE	native	2	0	fern	perennial	scouring rush

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
<i>Erigeron philadelphicus</i>	Asteraceae	ERIPHI	native	2	0	forb	perennial	philadelphia fleabane
<i>Eurybia macrophylla</i> ; aster m.	Asteraceae	EURMAC	native	4	5	forb	perennial	big-leaved aster
<i>Fagus grandifolia</i>	Fagaceae	FAGGRA	native	6	3	tree	perennial	american beech
<i>Festuca subverticillata</i> ; f. obtusa	Poaceae	FESSUB	native	5	3	grass	perennial	nodding fescue
<i>Fraxinus americana</i>	Oleaceae	FRAAME	native	5	3	tree	perennial	white ash
<i>Galium boreale</i>	Rubiaceae	GALBOR	native	3	0	forb	perennial	northern bedstraw
<i>Galium circaezans</i>	Rubiaceae	GALCIR	native	4	3	forb	perennial	white wild licorice
<i>Galium obtusum</i>	Rubiaceae	GALOBT	native	5	-3	forb	perennial	wild madder
<i>Galium triflorum</i>	Rubiaceae	GALTRR	native	4	3	forb	perennial	fragrant bedstraw
<i>Gaylussacia baccata</i>	Ericaceae	GAYBAC	native	7	3	shrub	perennial	huckleberry
<i>Geranium maculatum</i>	Geraniaceae	GERMAC	native	4	3	forb	perennial	wild geranium
<i>Geum canadense</i>	Rosaceae	GEUCAN	native	1	0	forb	perennial	white avens
<i>Hamamelis virginiana</i>	Hamamelidaceae	HAMVIR	native	5	3	shrub	perennial	witch-hazel
<i>Hylodesmum glutinosum</i> ; <i>desmodium</i> g.	Fabaceae	HYLGLU	native	5	5	forb	perennial	clustered-leaved tick-trefoil
<i>Lindera benzoin</i>	Lauraceae	LINBEN	native	7	-3	shrub	perennial	spicebush
<i>Lonicera dioica</i>	Caprifoliaceae	LONDIO	native	5	3	vine	perennial	red honeysuckle
<i>Maianthemum canadense</i>	Convallariaceae	MAICAN	native	4	3	forb	perennial	canada mayflower
<i>Maianthemum racemosum</i> ; <i>smilacina</i> r.	Convallariaceae	MAIRAC	native	5	3	forb	perennial	false spikenard
<i>Maianthemum stellatum</i> ; <i>smilacina</i> s.	Convallariaceae	MAISTE	native	5	0	forb	perennial	starry false solomon-seal
<i>Medeola virginiana</i>	Convallariaceae	MEDVIR	native	10	3	forb	perennial	indian cucumber-root
<i>Monarda fistulosa</i>	Lamiaceae	MONFIS	native	2	3	forb	perennial	wild-bergamot
<i>Monotropa uniflora</i>	Ericaceae	MONOUN	native	5	3	forb	perennial	indian-pipe
<i>Onoclea sensibilis</i>	Onocleaceae	ONosen	native	2	-3	fern	perennial	sensitive fern
<i>Oryzopsis asperifolia</i>	Poaceae	ORYASP	native	6	5	grass	perennial	rough-leaved rice-grass
<i>Osmorhiza claytonii</i>	Apiaceae	OSMCLI	native	4	3	forb	perennial	hairy sweet-cicely
<i>Ostrya virginiana</i>	Betulaceae	OSTVIR	native	5	3	tree	perennial	ironwood; hop-hornbeam
<i>Oxalis stricta</i> ; o. fontana	Oxalidaceae	OXASTR	native	0	3	forb	perennial	yellow wood-sorrel
<i>Persicaria virginiana</i> ; <i>polygonum</i> v.	Polygonaceae	PERVIR	native	4	0	forb	perennial	jumpseed
<i>Phryma leptostachya</i>	Phrymaceae	PHRLEP	native	4	3	forb	perennial	lopseed
<i>Picea abies</i>	Pinaceae	PICABI	non-native	0	5	tree	perennial	norway spruce
<i>Pinus strobus</i>	Pinaceae	PINSTR	native	3	3	tree	perennial	white pine
<i>Plantago rugelii</i>	Plantaginaceae	PLARUG	native	0	0	forb	perennial	red-stalked plantain
<i>Poa alsodes</i>	Poaceae	POAALS	native	9	0	grass	perennial	bluegrass

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
<i>Poa compressa</i>	Poaceae	POACOM	non-native	0	3	grass	perennial	canada bluegrass
<i>Poa pratensis</i>	Poaceae	POAPRA	non-native	0	3	grass	perennial	kentucky bluegrass
<i>Podophyllum peltatum</i>	Berberidaceae	PODPEL	native	3	3	forb	perennial	may-apple
<i>Polygonatum pubescens</i>	Convallariaceae	POLPUB	native	5	5	forb	perennial	downy solomon seal
<i>Populus deltoides</i>	Salicaceae	POPDEL	native	1	0	tree	perennial	cottonwood
<i>Populus grandidentata</i>	Salicaceae	POPGRA	native	4	3	tree	perennial	big-tooth aspen
<i>Populus tremuloides</i>	Salicaceae	POPTRE	native	1	0	tree	perennial	quaking aspen
<i>Prunella vulgaris</i>	Lamiaceae	PRUVUL	native	0	0	forb	perennial	self-heal
<i>Prunus serotina</i>	Rosaceae	PRUSER	native	2	3	tree	perennial	wild black cherry
<i>Prunus virginiana</i>	Rosaceae	PRUVIR	native	2	3	shrub	perennial	choke cherry
<i>Pteridium aquilinum</i>	Dennstaedtiaceae	PTEAQU	native	0	3	fern	perennial	bracken fern
<i>Pyrola elliptica</i>	Ericaceae	PYRELL	native	6	3	forb	perennial	large-leaved shinleaf
<i>Quercus alba</i>	Fagaceae	QUEALB	native	5	3	tree	perennial	white oak
<i>Quercus macrocarpa</i>	Fagaceae	QUEMAC	native	5	3	tree	perennial	bur oak
<i>Quercus rubra</i>	Fagaceae	QUERUB	native	5	3	tree	perennial	red oak
<i>Ranunculus abortivus</i>	Ranunculaceae	RANABO	native	0	0	forb	perennial	small-flowered buttercup
<i>Ribes cynosbati</i>	Grossulariaceae	RIBCYN	native	4	3	shrub	perennial	prickly or wild gooseberry
<i>Rubus occidentalis</i>	Rosaceae	RUBOCC	native	1	5	shrub	perennial	black raspberry
<i>Rubus strigosus</i>	Rosaceae	RUBSTR	native	2	0	shrub	perennial	wild red raspberry
<i>Sambucus canadensis</i>	Adoxaceae	SAMCAN	native	3	-3	shrub	perennial	elderberry
<i>Smilax ecirrata</i>	Smilacaceae	SMIECI	native	6	5	forb	perennial	upright carrion-flower
<i>Smilax hispida</i> ; <i>s. tamnoides</i>	Smilacaceae	SMIHIS	native	5	0	vine	perennial	bristly greenbrier
<i>Solidago caesia</i>	Asteraceae	SOLCAE	native	6	3	forb	perennial	bluestem goldenrod
<i>Solidago gigantea</i>	Asteraceae	SOLGIG	native	3	-3	forb	perennial	late goldenrod
<i>Symphotrichum cordifolium</i> ; aster c.	Asteraceae	SYMCOR	native	4	5	forb	perennial	heart-leaved aster
<i>Symphotrichum lateriflorum</i> ; aster l.	Asteraceae	SYMLAT	native	2	0	forb	perennial	calico aster
<i>Taenidia integerrima</i>	Apiaceae	TAEINT	native	8	5	forb	perennial	yellow-pimpernel
<i>Taraxacum officinale</i>	Asteraceae	TAROFF	non-native	0	3	forb	perennial	common dandelion
<i>Teucrium canadense</i>	Lamiaceae	TEUCAN	native	4	-3	forb	perennial	wood-sage
<i>Thalictrum dioicum</i>	Ranunculaceae	THADIO	native	6	3	forb	perennial	early meadow-rue
<i>Thelypteris noveboracensis</i>	Thelypteridaceae	THENOV	native	5	0	fern	perennial	new york fern
<i>Tilia americana</i>	Malvaceae	TILAME	native	5	3	tree	perennial	basswood
<i>Toxicodendron radicans</i>	Anacardiaceae	TOXRAD	native	2	0	vine	perennial	poison-ivy

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
<i>Trientalis borealis</i>	Myrsinaceae	TRIBOR	native	5	0	forb	perennial	star-flower
<i>Trillium grandiflorum</i>	Trilliaceae	TRIGRA	native	5	3	forb	perennial	common trillium
<i>Triosteum aurantiacum</i>	Caprifoliaceae	TRIAUN	native	5	5	forb	perennial	horse-gentian
<i>Tsuga canadensis</i>	Pinaceae	TSUCAN	native	5	3	tree	perennial	hemlock
<i>Urtica dioica</i>	Urticaceae	URTDIO	native	1	0	forb	perennial	stinging nettle
<i>Uvularia grandiflora</i>	Convallariaceae	UVUGRA	native	5	5	forb	perennial	bellwort
<i>Vaccinium angustifolium</i>	Ericaceae	VACANG	native	4	3	shrub	perennial	low sweet blueberry
<i>Viburnum acerifolium</i>	Adoxaceae	VIBACE	native	6	5	shrub	perennial	maple-leaved viburnum
<i>Viola pubescens</i>	Violaceae	VIOPUB	native	4	3	forb	perennial	yellow violet
<i>Vitis riparia</i>	Vitaceae	VITRIP	native	3	0	vine	perennial	river-bank grape

Appendix 7. Wigwam Duck Club Floodplain Forest and Southern Hardwood Swamp.

07/02/2016

Wigwam Bay

Arenac

MI

USA

FQA DB Region:

Michigan

FQA DB Publication Year:

2014

Reznicek, A.A., M.R. Penskar, B.S. Walters, and B.S. Slaughter. 2014. Michigan Floristic Quality Assessment Database. Herbarium, University of Michigan, Ann Arbor, MI and Michigan Natural Features Inventory, Michigan State University, Lansing, MI. <http://michiganflora.net>

FQA DB Description:

Practitioner:

Bradford Slaughter

Latitude:

44.001873

Longitude:

-83.817908

Weather Notes:

Duration Notes:

Community Type Notes:

Southern hardwood swamp, floodplain forest, inundated shrub swamp

Other Notes:

Additional spp. noted 8/17/16. Also noted: *Crataegus* spp., *Lemna* min/tur, *Persicaria* sp.

Conservatism-Based Metrics:

Total Mean C: 3.4

Native Mean C: 3.8

Total FQI: 40.4

Native FQI: 43

Adjusted FQI: 36.2

% C value 0: 14.2

% C value 1-3: 34

% C value 4-6: 44

% C value 7-10: 7.8

Native Tree Mean C: 3.6

Native Shrub Mean C: 3.7

Native Herbaceous Mean C: 3.8

Species Richness:

Total Species:	141	
Native Species:	128	90.80%
Non-native Species:	13	9.20%

Species Wetness:

Mean Wetness:	-1	
Native Mean Wetness:	-1.1	

Physiognomy Metrics:

Tree:	16	11.30%
Shrub:	15	10.60%
Vine:	9	6.40%
Forb:	64	45.40%
Grass:	11	7.80%
Sedge:	15	10.60%
Rush:	0	0%
Fern:	11	7.80%
Bryophyte:	0	0%

Duration Metrics:

Annual:	5	3.50%
Perennial:	132	93.60%
Biennial:	4	2.80%
Native Annual:	5	3.50%
Native Perennial:	121	85.80%
Native Biennial:	2	1.40%

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 saccharinum	Sapindaceae	ACESAI	native	2	-3	tree	perennial	silver maple

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
<i>Adiantum pedatum</i>	Pteridaceae	ADIPED	native	6	3	fern	perennial	maidenhair fern
<i>Agrimonia gryposepala</i>	Rosaceae	AGRGRY	native	2	3	forb	perennial	tall agrimony
<i>Agrostis gigantea</i>	Poaceae	AGRIGIG	non-native	0	-3	grass	perennial	redtop
<i>Alliaria petiolata</i>	Brassicaceae	ALLPET	non-native	0	3	forb	biennial	garlic mustard
<i>Alnus incana</i> ; <i>a. rugosa</i>	Betulaceae	ALNINC	native	5	-3	shrub	perennial	speckled alder
<i>Anemone canadensis</i>	Ranunculaceae	ANECAN	native	4	-3	forb	perennial	canada anemone
<i>Apocynum cannabinum</i> ; <i>a. sibiricum</i>	Apocynaceae	APOCAN	native	3	0	forb	perennial	indian-hemp
<i>Arisaema triphyllum</i>	Araceae	ARITRI	native	5	0	forb	perennial	jack-in-the-pulpit
<i>Asclepias incarnata</i>	Apocynaceae	ASCINC	native	6	-5	forb	perennial	swamp milkweed
<i>Asclepias syriaca</i>	Apocynaceae	ASCSYR	native	1	5	forb	perennial	common milkweed
<i>Athyrium filix-femina</i>	Athyriaceae	ATHFIL	native	4	0	fern	perennial	lady fern
<i>Barbarea vulgaris</i>	Brassicaceae	BARVUL	non-native	0	0	forb	biennial	yellow rocket
<i>Betula alleghaniensis</i>	Betulaceae	BETALL	native	7	0	tree	perennial	yellow birch
<i>Bidens frondosa</i>	Asteraceae	BIDFRO	native	1	-3	forb	annual	common beggar-ticks
<i>Boehmeria cylindrica</i>	Urticaceae	BOECYL	native	5	-5	forb	perennial	false nettle
<i>Brachyelytrum erectum</i>	Poaceae	BRAERE	native	7	5	grass	perennial	long-awned wood grass
<i>Caltha palustris</i>	Ranunculaceae	CALPAR	native	6	-5	forb	perennial	marsh-marigold
<i>Carex bromoides</i>	Cyperaceae	CXBROM	native	6	-3	sedge	perennial	sedge
<i>Carex crinita</i>	Cyperaceae	CXCRIN	native	4	-5	sedge	perennial	sedge
<i>Carex cristatella</i>	Cyperaceae	CXCRIS	native	3	-3	sedge	perennial	sedge
<i>Carex grayi</i>	Cyperaceae	CXGRAY	native	6	-3	sedge	perennial	sedge
<i>Carex gynandra</i>	Cyperaceae	CXGYNA	native	3	-5	sedge	perennial	sedge
<i>Carex hirtifolia</i>	Cyperaceae	CXHIRI	native	5	3	sedge	perennial	sedge
<i>Carex lacustris</i>	Cyperaceae	CXLACU	native	6	-5	sedge	perennial	sedge
<i>Carex lupulina</i>	Cyperaceae	CXLUPA	native	4	-5	sedge	perennial	sedge
<i>Carex pedunculata</i>	Cyperaceae	CXPEDU	native	5	3	sedge	perennial	sedge
<i>Carex radiata</i> ; <i>c. rosea</i>	Cyperaceae	CXRADI	native	2	0	sedge	perennial	straight-styled wood sedge
<i>Carex retrorsa</i>	Cyperaceae	CXRETS	native	3	-5	sedge	perennial	sedge
<i>Carex stipata</i>	Cyperaceae	CXSTIP	native	1	-5	sedge	perennial	sedge
<i>Carex tuckermanii</i>	Cyperaceae	CXTUCK	native	8	-5	sedge	perennial	sedge
<i>Carex vulpinoidea</i>	Cyperaceae	CXVULP	native	1	-5	sedge	perennial	sedge
<i>Carpinus caroliniana</i>	Betulaceae	CARCAO	native	6	0	tree	perennial	blue-beech
<i>Celastrus orbiculatus</i>	Celastraceae	CELORB	non-native	0	5	vine	perennial	oriental bittersweet

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
<i>Celtis occidentalis</i>	Cannabaceae	CELOCC	native	5	0	tree	perennial	hackberry
<i>Cephalanthus occidentalis</i>	Rubiaceae	CEPOCC	native	7	-5	shrub	perennial	buttonbush
<i>Cicuta maculata</i>	Apiaceae	CICMAC	native	4	-5	forb	biennial	water hemlock
<i>Cinna arundinacea</i>	Poaceae	CINARU	native	7	-3	grass	perennial	wood reedgrass
<i>Circaea canadensis</i> ; <i>c. lutetiana</i>	Onagraceae	CIRCAN	native	2	3	forb	perennial	enchanters-nightshade
<i>Clematis virginiana</i>	Ranunculaceae	CLEVIR	native	4	0	vine	perennial	virgins bower
<i>Cornus foemina</i>	Cornaceae	CORFOE	native	1	0	shrub	perennial	gray dogwood
<i>Dioscorea villosa</i> ; <i>dioscorea villosa</i>	Dioscoreaceae	DIOVIL	native	4	0	forb	perennial	wild yam
<i>Dryopteris cristata</i>	Dryopteridaceae	DRYCRI	native	6	-5	fern	perennial	crested shield fern
<i>Echinocystis lobata</i>	Cucurbitaceae	ECHLOB	native	2	-3	vine	annual	wild-cucumber
<i>Elymus hystrix</i> ; <i>hystrix patula</i>	Poaceae	ELYHYS	native	5	3	grass	perennial	bottlebrush grass
<i>Elymus villosus</i>	Poaceae	ELYVIL	native	5	3	grass	perennial	silky wild-rye
<i>Elymus virginicus</i>	Poaceae	ELYVIR	native	4	-3	grass	perennial	virginia wild-rye
<i>Epilobium coloratum</i>	Onagraceae	EPICOL	native	3	-5	forb	perennial	cinnamon willow-herb
<i>Equisetum arvense</i>	Equisetaceae	EQUARV	native	0	0	fern	perennial	common horsetail
<i>Equisetum hyemale</i>	Equisetaceae	EQUHYE	native	2	0	fern	perennial	scouring rush
<i>Erigeron philadelphicus</i>	Asteraceae	ERIPHI	native	2	0	forb	perennial	philadelphia fleabane
<i>Eutrochium maculatum</i> ; <i>eupatorium m.</i>	Asteraceae	EUTMAC	native	4	-5	forb	perennial	joe-pye-weed
<i>Festuca subverticillata</i> ; <i>f. obtusa</i>	Poaceae	FESSUB	native	5	3	grass	perennial	nodding fescue
<i>Fragaria virginiana</i>	Rosaceae	FRAVIR	native	2	3	forb	perennial	wild strawberry
<i>Fraxinus nigra</i>	Oleaceae	FRANIG	native	6	-3	tree	perennial	black ash
<i>Fraxinus pennsylvanica</i>	Oleaceae	FRAPEN	native	2	-3	tree	perennial	red ash
<i>Galium obtusum</i>	Rubiaceae	GALOBT	native	5	-3	forb	perennial	wild madder
<i>Galium triflorum</i>	Rubiaceae	GALTRR	native	4	3	forb	perennial	fragrant bedstraw
<i>Geranium maculatum</i>	Geraniaceae	GERMAC	native	4	3	forb	perennial	wild geranium
<i>Geum canadense</i>	Rosaceae	GEUCAN	native	1	0	forb	perennial	white avens
<i>Glechoma hederacea</i>	Lamiaceae	GLEHED	non-native	0	3	forb	perennial	ground-ivy
<i>Glyceria striata</i>	Poaceae	GLYSTR	native	4	-5	grass	perennial	fowl manna grass
<i>Hackelia virginiana</i>	Boraginaceae	HACVIR	native	1	3	forb	biennial	beggars lice
<i>Heracleum maximum</i>	Apiaceae	HERMAX	native	3	-3	forb	perennial	cow-parsnip
<i>Ilex verticillata</i>	Aquifoliaceae	ILEVER	native	5	-3	shrub	perennial	michigan holly
<i>Impatiens capensis</i>	Balsaminaceae	IMPCAP	native	2	-3	forb	annual	spotted touch-me-not
<i>Iris virginica</i>	Iridaceae	IRIVIR	native	5	-5	forb	perennial	southern blue flag

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Laportea canadensis	Urticaceae	LAPCAN	native	4	-3	forb	perennial	wood nettle
Leersia virginica	Poaceae	LEEVIR	native	5	-3	grass	perennial	white grass
Lindera benzoin	Lauraceae	LINBEN	native	7	-3	shrub	perennial	spicebush
Lobelia cardinalis	Campanulaceae	LOBCAR	native	7	-5	forb	perennial	cardinal-flower
Lobelia siphilitica	Campanulaceae	LOBSIP	native	4	-3	forb	perennial	great blue lobelia
Lycopus uniflorus	Lamiaceae	LYCUNI	native	2	-5	forb	perennial	northern bugle weed
Lysimachia ciliata	Myrsinaceae	LYSCIL	native	4	-3	forb	perennial	fringed loosestrife
Lysimachia nummularia	Myrsinaceae	LYSNUM	non-native	0	-3	forb	perennial	moneywort
Lysimachia thyrsoflora	Myrsinaceae	LYSTHY	native	6	-5	forb	perennial	tufted loosestrife
Lythrum salicaria	Lythraceae	LYTSAL	non-native	0	-5	forb	perennial	purple loosestrife
Maianthemum canadense	Convallariaceae	MAICAN	native	4	3	forb	perennial	canada mayflower
Maianthemum stellatum; smilacina s.	Convallariaceae	MAISTE	native	5	0	forb	perennial	starry false solomon-seal
Matteuccia struthiopteris	Onocleaceae	MATSTR	native	3	0	fern	perennial	ostrich fern
Medeola virginiana	Convallariaceae	MEDVIR	native	10	3	forb	perennial	indian cucumber-root
Menispermum canadense	Menispermaceae	MENCAE	native	5	0	vine	perennial	moonseed
Milium effusum	Poaceae	MILEFF	native	8	3	grass	perennial	wood millet
Myosotis scorpioides	Boraginaceae	MYOSCO	non-native	0	-5	forb	perennial	forget-me-not
Onoclea sensibilis	Onocleaceae	ONOSEN	native	2	-3	fern	perennial	sensitive fern
Osmunda regalis	Osmundaceae	OSMREG	native	5	-5	fern	perennial	royal fern
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
Pedicularis lanceolata	Orobanchaceae	PEDLAN	native	8	-3	forb	perennial	swamp-betony
Persicaria virginiana; polygonum v.	Polygonaceae	PERVIR	native	4	0	forb	perennial	jumpseed
Phalaris arundinacea	Poaceae	PHAARU	native	0	-3	grass	perennial	reed canary grass
Pilea pumila	Urticaceae	PILPUM	native	5	-3	forb	annual	clearweed
Podophyllum peltatum	Berberidaceae	PODPEL	native	3	3	forb	perennial	may-apple
Populus deltoides	Salicaceae	POPDEL	native	1	0	tree	perennial	cottonwood
Populus tremuloides	Salicaceae	POPTRE	native	1	0	tree	perennial	quaking aspen
Prunella vulgaris	Lamiaceae	PRUVUL	native	0	0	forb	perennial	self-heal
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 macrocarpa	Fagaceae	QUEMAC	native	5	3	tree	perennial	bur oak

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Quercus rubra	Fagaceae	QUERUB	native	5	3	tree	perennial	red oak
Ranunculus abortivus	Ranunculaceae	RANABO	native	0	0	forb	perennial	small-flowered buttercup
Ranunculus flabellaris	Ranunculaceae	RANFLA	native	10	-5	forb	perennial	yellow water crowfoot
Ranunculus hispidus	Ranunculaceae	RANHIS	native	5	0	forb	perennial	swamp buttercup
Ribes americanum	Grossulariaceae	RIBAME	native	6	-3	shrub	perennial	wild black currant
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 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
Rumex obtusifolius	Polygonaceae	RUMOBT	non-native	0	0	forb	perennial	bitter dock
Salix petiolaris	Salicaceae	SALPET	native	1	-3	shrub	perennial	slender willow
Saponaria officinalis	Caryophyllaceae	SAPOFF	non-native	0	3	forb	perennial	bouncing bet
Scirpus atrovirens	Cyperaceae	SCIATV	native	3	-5	sedge	perennial	bulrush
Scutellaria lateriflora	Lamiaceae	SCULAT	native	5	-5	forb	perennial	mad-dog skullcap
Sium suave	Apiaceae	SIUSUA	native	5	-5	forb	perennial	water-parsnip
Smilax ecirrata	Smilacaceae	SMIECI	native	6	5	forb	perennial	upright carrion-flower
Smilax hispida; s. tamnoides	Smilacaceae	SMIHIS	native	5	0	vine	perennial	bristly greenbrier
Solanum dulcamara	Solanaceae	SOLDUL	non-native	0	0	vine	perennial	bittersweet nightshade
Solanum ptychanthum	Solanaceae	SOLPTY	native	1	3	forb	annual	black nightshade
Solidago gigantea	Asteraceae	SOLGIG	native	3	-3	forb	perennial	late goldenrod
Solidago rugosa	Asteraceae	SOLRUG	native	3	0	forb	perennial	rough-leaved goldenrod
Sparganium eurycarpum	Typhaceae	SPAEUR	native	5	-5	forb	perennial	common bur-reed
Symphotrichum lateriflorum; aster l.	Asteraceae	SYMLAT	native	2	0	forb	perennial	calico aster
Thalictrum dasycarpum	Ranunculaceae	THADAS	native	3	-3	forb	perennial	purple meadow-rue
Thelypteris noveboracensis	Thelypteridaceae	THENOV	native	5	0	fern	perennial	new york fern
Thelypteris palustris	Thelypteridaceae	THEPAL	native	2	-3	fern	perennial	marsh fern
Tilia americana	Malvaceae	TILAME	native	5	3	tree	perennial	basswood
Toxicodendron radicans	Anacardiaceae	TOXRAD	native	2	0	vine	perennial	poison-ivy
Trifolium hybridum	Fabaceae	TRIHYP	non-native	0	3	forb	perennial	alsike clover
Tsuga canadensis	Pinaceae	TSUCAN	native	5	3	tree	perennial	hemlock
Typha latifolia	Typhaceae	TYPLAT	native	1	-5	forb	perennial	broad-leaved cat-tail

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Ulmus americana	Ulmaceae	ULMAME	native	1	-3	tree	perennial	american elm
Viburnum lentago	Adoxaceae	VIBLEN	native	4	0	shrub	perennial	nannyberry
Viola affinis	Violaceae	VIOAFF	native	2	-3	forb	perennial	le contes violet
Viola pubescens	Violaceae	VIOPUB	native	4	3	forb	perennial	yellow violet
Viola sororia	Violaceae	VIOSOR	native	1	0	forb	perennial	common blue violet
Vitis riparia	Vitaceae	VITRIP	native	3	0	vine	perennial	river-bank grape

Appendix 8. Wigwam Bay Duck Club, Great Lakes Marsh.

08/17/2016

Wigwam Bay

Arenac

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. Herbarium, University of Michigan, Ann Arbor, MI and Michigan Natural Features Inventory, Michigan State University, Lansing, MI. <http://michiganflora.net>

Practitioner:

Brad Slaughter

Latitude:

43.993525

Longitude:

-83.81227

Weather Notes:

Duration Notes:

Community Type Notes:

Great Lakes Marsh

Other Notes:

Also noted: *Carex* spp., *Potamogeton* sp., *Sagittaria* sp.

Conservatism-Based Metrics:

Total Mean C: 3.3

Native Mean C: 3.9

Total FQI: 28

Native FQI: 30.5

Adjusted FQI: 35.9

% C value 0: 16.7

% C value 1-3: 38.9

% C value 4-6: 34.7

% C value 7-10: 9.7

Native Tree Mean C: 1.3

Native Shrub Mean C: 3.2

Native Herbaceous Mean C: 4.2

Species Richness:

Total Species:	72	
Native Species:	61	84.70%
Non-native Species:	11	15.30%

Species Wetness:

Mean Wetness:	-2.1
Native Mean Wetness:	-2.6

Physiognomy Metrics:

Tree:	3	4.20%
Shrub:	10	13.90%
Vine:	5	6.90%
Forb:	35	48.60%
Grass:	10	13.90%
Sedge:	8	11.10%
Rush:	0	0%
Fern:	1	1.40%
Bryophyte:	0	0%

Duration Metrics:

Annual:	3	4.20%
Perennial:	67	93.10%
Biennial:	2	2.80%
Native Annual:	3	4.20%
Native Perennial:	57	79.20%
Native Biennial:	1	1.40%

Species:

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Achillea millefolium	Asteraceae	ACHMIL	native	1	3	forb	perennial	yarrow
Agalinis purpurea	Orobanchaceae	AGAPUR	native	7	-3	forb	annual	purple false foxglove
Agalinis tenuifolia	Orobanchaceae	AGATEN	native	5	-3	forb	annual	common false foxglove

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Agrostis gigantea	Poaceae	AGRIG	non-native	0	-3	grass	perennial	redtop
Alisma triviale; a. plantago-aquatica	Alismataceae	ALITRI	native	1	-5	forb	perennial	northern water-plantain
Alnus incana; a. rugosa	Betulaceae	ALNINC	native	5	-3	shrub	perennial	speckled alder
Apios americana	Fabaceae	APIAME	native	3	-3	vine	perennial	groundnut
Apocynum cannabinum; a. sibiricum	Apocynaceae	APOCAN	native	3	0	forb	perennial	indian-hemp
Bromus inermis	Poaceae	BROINE	non-native	0	5	grass	perennial	smooth brome
Calamagrostis canadensis	Poaceae	CALCAN	native	3	-5	grass	perennial	blue-joint
Carex aquatilis	Cyperaceae	CXAQUA	native	7	-5	sedge	perennial	sedge
Carex lacustris	Cyperaceae	CXLACU	native	6	-5	sedge	perennial	sedge
Carex prairea	Cyperaceae	CXPRAI	native	10	-3	sedge	perennial	sedge
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
Cladium mariscoides	Cyperaceae	CLAMAR	native	10	-5	sedge	perennial	twig-rush
Clematis virginiana	Ranunculaceae	CLEVIR	native	4	0	vine	perennial	virgins bower
Cornus amomum	Cornaceae	CORAMO	native	2	-3	shrub	perennial	silky 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
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
Dichanthelium implicatum; panicum i.	Poaceae	DICIMP	native	3	0	grass	perennial	panic grass
Elaeagnus umbellata	Elaeagnaceae	ELAUMB	non-native	0	3	shrub	perennial	autumn-olive
Elymus repens; agropyron r.	Poaceae	ELYREP	non-native	0	3	grass	perennial	quack grass
Equisetum variegatum	Equisetaceae	EQUVAR	native	6	-3	fern	perennial	variegated scouring rush
Eupatorium perfoliatum	Asteraceae	EUPPER	native	4	-3	forb	perennial	boneset
Fragaria virginiana	Rosaceae	FRAVIR	native	2	3	forb	perennial	wild strawberry
Fraxinus pennsylvanica	Oleaceae	FRAPEN	native	2	-3	tree	perennial	red ash
Galium trifidum	Rubiaceae	GALTRD	native	6	-3	forb	perennial	small bedstraw
Iris virginica	Iridaceae	IRIVIR	native	5	-5	forb	perennial	southern blue flag
Juncus alpinoarticulatus; j. alpinus	Juncaceae	JUNALP	native	5	-5	forb	perennial	rush
Juncus balticus	Juncaceae	JUNBAL	native	4	-5	forb	perennial	rush
Juncus canadensis	Juncaceae	JUNCAN	native	6	-5	forb	perennial	canadian rush
Juncus dudleyi	Juncaceae	JUNDUD	native	1	-3	forb	perennial	dudleys rush

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Lathyrus palustris	Fabaceae	LATPAL	native	7	-3	vine	perennial	marsh pea
Lemna turionifera; l. minor	Araceae	LEMTUR	native	5	-5	forb	perennial	red duckweed
Lobelia kalmii	Campanulaceae	LOBKAL	native	10	-5	forb	perennial	bog lobelia
Lythrum salicaria	Lythraceae	LYTSAL	non-native	0	-5	forb	perennial	purple loosestrife
Monarda fistulosa	Lamiaceae	MONFIS	native	2	3	forb	perennial	wild-bergamot
Nymphaea odorata	Nymphaeaceae	NYMODO	native	6	-5	forb	perennial	sweet-scented waterlily
Parthenocissus inserta	Vitaceae	PARINS	native	4	3	vine	perennial	thicket creeper
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
Phleum pratense	Poaceae	PHLPRA	non-native	0	3	grass	perennial	timothy
Phragmites australis var. americanus	Poaceae	PHRAUM	native	5	-3	grass	perennial	reed
Phragmites australis var. australis	Poaceae	PHRAUU	non-native	0	-3	grass	perennial	reed
Plantago lanceolata	Plantaginaceae	PLALAN	non-native	0	3	forb	perennial	english plantain
Populus deltoides	Salicaceae	POPDEL	native	1	0	tree	perennial	cottonwood
Potentilla anserina	Rosaceae	POTANS	native	5	-3	forb	perennial	silverweed
Pycnanthemum virginianum	Lamiaceae	PYCVIR	native	5	-3	forb	perennial	common mountain mint
Rubus strigosus	Rosaceae	RUBSTR	native	2	0	shrub	perennial	wild red raspberry
Rudbeckia hirta	Asteraceae	RUDHIR	native	1	3	forb	perennial	black-eyed susan
Salix discolor	Salicaceae	SALDIS	native	1	-3	shrub	perennial	pussy willow
Salix exigua	Salicaceae	SALEXI	native	1	-3	shrub	perennial	sandbar willow
Salix myricoides	Salicaceae	SALMYR	native	9	-3	shrub	perennial	blueleaf willow
Sambucus canadensis	Adoxaceae	SAMCAN	native	3	-3	shrub	perennial	elderberry
Schoenoplectus pungens; scirpus americanus	Cyperaceae	SCHPUN	native	5	-5	sedge	perennial	threesquare
Schoenoplectus tabernaemontani; scirpus validus	Cyperaceae	SCHTAB	native	4	-5	sedge	perennial	softstem bulrush
Scirpus atrovirens	Cyperaceae	SCIATV	native	3	-5	sedge	perennial	bulrush
Solidago canadensis	Asteraceae	SOLCAN	native	1	3	forb	perennial	canada goldenrod
Solidago gigantea	Asteraceae	SOLGIG	native	3	-3	forb	perennial	late goldenrod
Spartina pectinata	Poaceae	SPAPEC	native	5	-3	grass	perennial	cordgrass
Spiraea alba	Rosaceae	SPIALB	native	4	-3	shrub	perennial	meadowsweet
Thalictrum dasycarpum	Ranunculaceae	THADAS	native	3	-3	forb	perennial	purple meadow-rue
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

Scientific Name	Family	Acronym	Native?	C	W	Physiognomy	Duration	Common Name
Urtica dioica	Urticaceae	URTDIO	native	1	0	forb	perennial	stinging nettle
Verbena hastata	Verbenaceae	VERHAS	native	4	-3	forb	perennial	blue vervain
Vitis riparia	Vitaceae	VITRIP	native	3	0	vine	perennial	river-bank grape