GEI Consultants

Consulting Engineers and Scientists

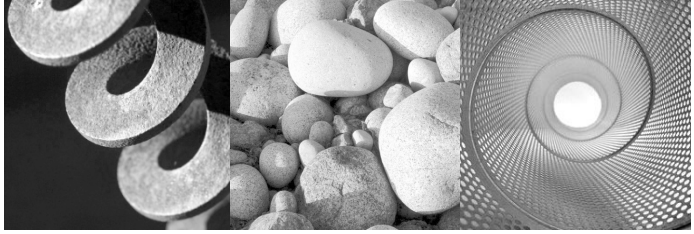
Wetland Delineation & Protected Species Report

Flat Rock-Huroc Dam Removal Feasibility Study

Huron-Clinton Metropolitan Authority

Flat Rock/Huron Charter Township
Wayne County, Michigan

January 12, 2024



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Flat Rock-Huroc Dam Removal Feasibility Study
Huron-Clinton Metropolitan Authority
Flat Rock/Huron Charter Township
Wayne County, Michigan

Submitted to:
Huron-Clinton Metropolitan Authority
13000 Highridge Drive
Brighton, MI 48114

Submitted by:
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January 12, 2024
GEI Project No. 2302140

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Wetland Ecologist

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1. Introduction

At the request of the Huron-Clinton Metropolitan Authority, GEI Consultants of Michigan, P.C. (GEI) conducted a wetland delineation and assessment of approximately 370 acres of land along the Huron River upstream of the Huroc Dam in Flat Rock, Wayne County, Michigan (Figure 1). The purpose for the field site assessment was to determine the presence or absence of wetlands within the easement area, and if wetlands were present, to delineate and document the upland/wetland boundaries and determine regulatory status with relation to the possible removal of the Flat Rock and Huroc Dams. GEI also assessed the site for the presence of threatened and/or endangered (T/E) plant and animal species or their habitats.

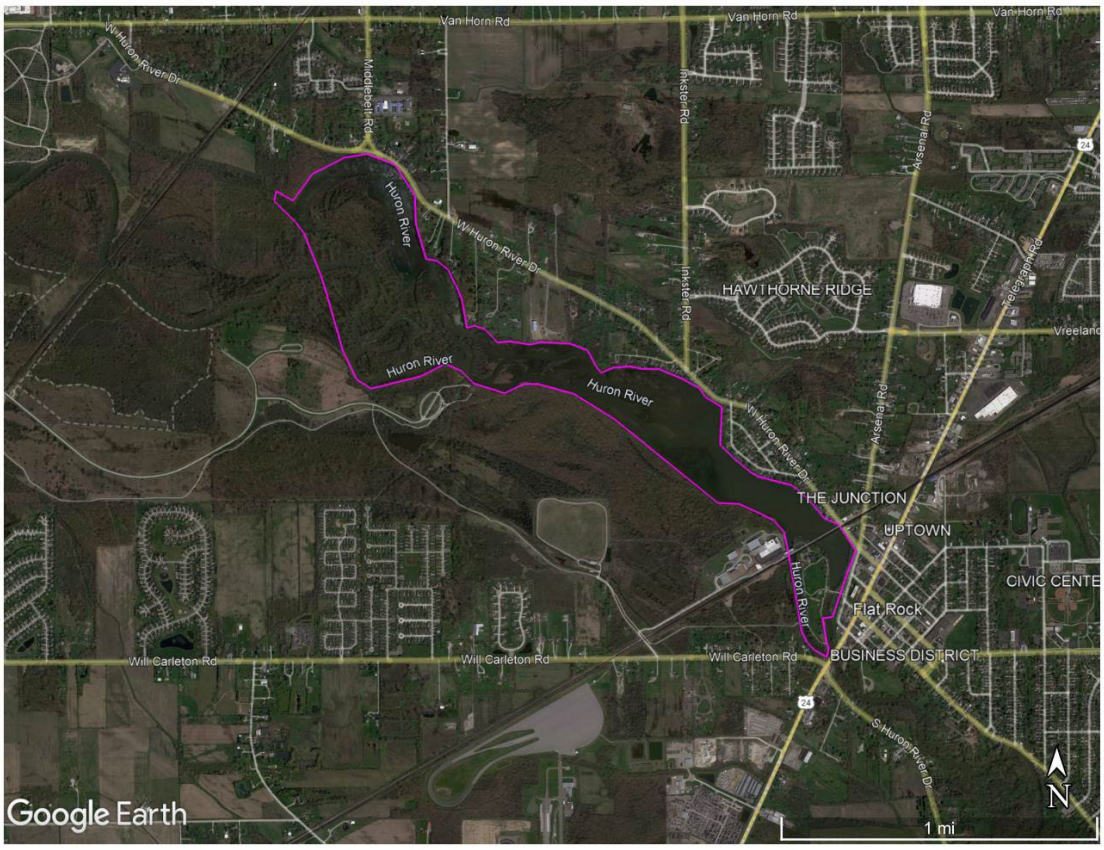

Figure 1: Approximate limits of the wetland assessment area (purple line) within the feasibility study project area in Flat Rock, Wayne County, Michigan.

2. Methods

2.1 Office Assessments

Before visiting the site, GEI reviewed several resource reference maps of the project area. These included the U.S. Geologic Survey (USGS) Topographic Map Series and National Hydrography Dataset, U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI), and U.S. Department of Agriculture Natural Resources Conservation Service (USDA NRCS) Soil Survey. These maps help to identify potential drainage ways, wetlands, streams, and wetland soil units in the project area. Additionally, GEI reviewed sources of information regarding rare and protected plant and animal species regulated by the Michigan Department of Natural Resources (MDNR). This included a request for Michigan Natural Features Inventory (MNFI) to conduct a rare species review within the specific project area.

2.2 Field Assessments

GEI walked the entire site to determine the extent and regulatory status of any wetlands present. Areas inaccessible by foot were accessed by canoe and/or kayak. Changes to Part 303, Wetlands Protection, of NREPA, P.A. 451 of 1994, as amended, has the office of Environment, Great Lakes, and Energy (EGLE formerly MDEQ) utilizing the United States Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual (Environmental Laboratory 1987) and the Northeast Northcentral Regional Supplement (USACE 2012) for the identification and delineation of wetlands. GEI utilized the methods and procedures in this manual and supplement to identify and delineate wetlands on the site.

Wetland boundaries were marked in the field with pink flagging tape. GEI collected geographic locations of the wetland boundaries using a Trimble R1 GPS unit capable of achieving sub-meter accuracy paired with the ESRI Field Maps mobile application. A dominance of wetland rated plants, and soils with field indicators of hydric soils coupled with visual signs of hydrology at the surface or within the soil profile were used to confirm the presence of wetlands. A dominance of upland rated plants, soils lacking field indicators of hydric soils, and/or no visual signs of hydrology were used to confirm the presence of upland. Data forms required by the USACE/EGLE for wetland determination were completed at representative locations of the wetland/upland boundaries encountered. Wetland data point locations were selected to best represent the wetland types encountered and upland data points were recorded to further document the delineated wetland/upland boundary. Plants observed within the upland and wetland areas of the site were

documented. Plant observations were recorded following the nomenclature of Michigan Flora Online (Reznicek 2011).

GEI staff also identified upland areas and recorded site conditions including dominant plant species, soils, the presence or absence of hydrology, habitat types, and surrounding land use. While on-site for wetland delineations, GEI also conducted meander searches for protected terrestrial plant and animal species known to inhabit nearby similar habitats. GEI did not conduct surveys for fish or mussels identified by the MNFI review.

3. Results

3.1 Office Assessments

Wetlands

GEI's review of the USGS topographic elevation maps, USDA NRCS soil survey maps, and USFWS NWI maps were helpful in identifying the potential presence and type of wetlands associated with the site. Figure 2 was produced using the USDA NRCS online Web Soil Survey (https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm) which identified Shoals silt loam, wet (100% hydric; 13.4% of site) as the only commonly hydric soil to occupy large portions of the site, particularly at the far upstream end. The presence of hydric soil is one of three kay parameters for classifying land as wetland.

Figure 3 was extracted from the USFWS NWI map using their online database and it identified most of the site as wetland. A palustrine forested, broad-leaved deciduous, seasonally flooded (PFO1C) wetland occupies most of the upstream, non-open water portions of the site. Several smaller patches of palustrine emergent, persistent, seasonally flooded (PEM1C) wetlands were scattered throughout the upstream area. The Huron River impoundment upstream of the Flat Rock Dam was identified as lacustrine, limnetic, unconsolidated bottom, permanently flooded, diked/impounded (L1UBHh) by the NWI.

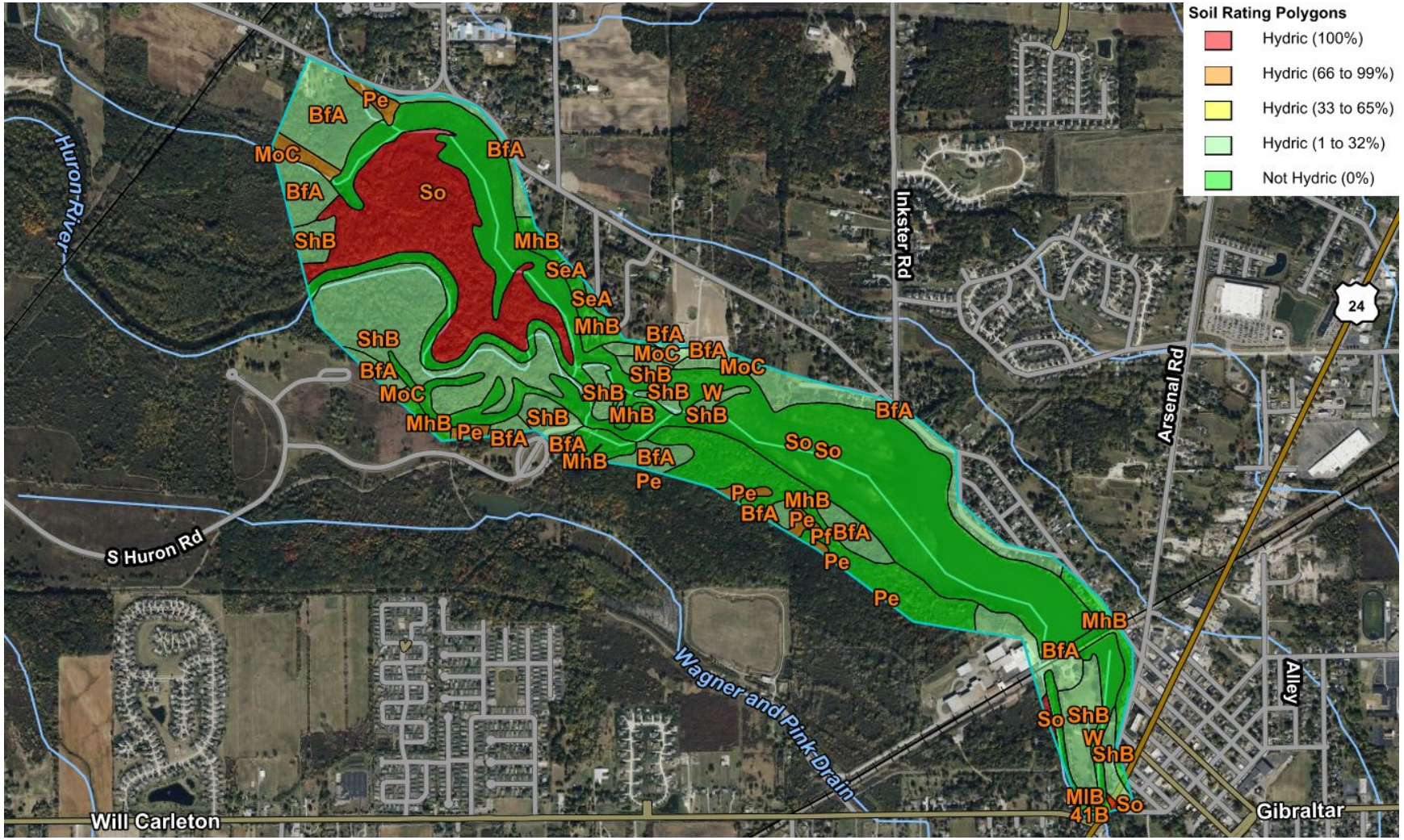

Figure 2: Map of hydric soil classifications within the assessment area.

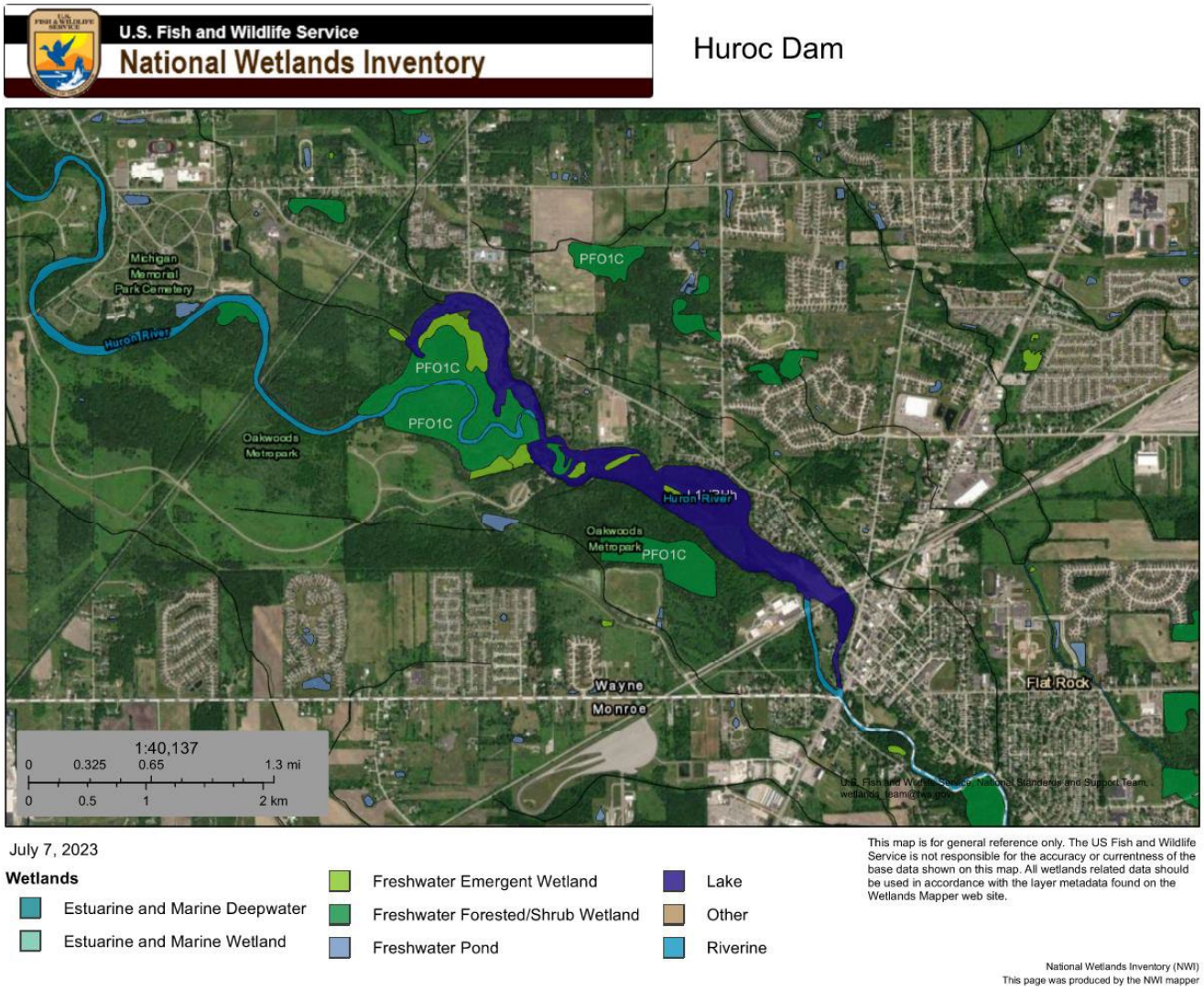

Figure 3: Map of National Wetlands Inventory classifications near the assessment area.

Protected Species

MNFI responded to GEI's rare species review request with a letter (Appendix A) which identified the presence of T/E species within or near the project site. The MNFI review included a list of all species listed as special concern, threatened, or endangered by the State of Michigan which have been documented within 1.5 miles of the project site. Of the 18 T/E species known to occur within 1.5 miles of the site, 10 were historical records (i.e., the species has not been seen at the location within the past 20 years). Tables 1 and 2 below include details of the T/E plant and animal species potentially occupying the site based on MNFI's review. Their review listed beak grass (Diarrhena obovata); however, that species has since been removed from the threatened species list in 2023 (MNFI, 2023) and to which it was not included in Table 1. The MNFI database also identified records of Special Concern (SC) species within 1.5 miles of the site; however, these species are not afforded legal protection by the State of Michigan.

Table 1: Protected plants observed within 1.5 miles of the project site. Species marked with an asterisk (*) have been observed within the past 20 years.

Classification	Species	Common Name	Federal Rank	State Rank	
Forb	*Dasistoma macrophylla*	mullein-foxglvoe	None	E	*
Rush	*Juncus brachycarpus*	short-fruited rush	None	T	*
Forb	*Justicia americana*	water willow	None	T	*
Tree	*Morus rubra*	red mullberry	None	T	*
Forb	*Nelumbo lutea*	American lotus	None	T	
Forb	*Silphium perfoliatum*	cup plant	None	T	*

Table 2: Protected animals observed within 1.5 miles of the project site. Species marked with an asterisk (*) have been observed within the past 20 years.

Classification	Species	Common Name	Federal Rank	State Rank	
Bird	*Centronyx henslowii*	Henslow's sparrow	None	E	*
Mussel	*Cyclonaias tuberculata*	purple wartyback	None	T	
Mussel	*Epioblasma triquerta*	snuffbox	LE	E	
Mussel	*Ligumia nasuta*	eastern pondmussel	None	E	
Fish	*Opsopoeodus emiliae*	pugnose minnow	None	E	
Snake	*Pantherophis gloydi*	eastern fox snake	None	T	*
Fish	*Percina copelandi*	channel darter	None	E	
Fish	*Percina shumardi*	river darter	None	E	
Fish	*Sander canadensis*	sauger	None	T	
Bird	*Setophaga cerulea*	cerulean warbler	None	T	*
Mussel	*Toxolasma parvum*	lilliput	None	E	
Mussel	*Villosa fabalis*	rayed bean	LE	E	

3.2 Field Assessments

Wetlands

On July 10-11, 2023, four GEI biologists/botanists assessed the property and determined the presence of a series of wetlands occupying upstream islands and the shoreline of most of the assessment area (Figure 4). Wetlands present include palustrine forested (PFO), palustrine emergent (PEM), and palustrine scrub-shrub (PSS) communities. Wetlands are more extensive farther upstream of the Flat Rock Dam than in the more urbanized areas downstream and immediately upstream of the dam.

Downstream of the Flat Rock Dam, Huroc Park lies on an island between the Huron River and former powerhouse tailrace. This island is maintained as an upland park space, but there are PSS and PEM fringe wetlands along the margins of the island. These wetlands were dominated by non-native species such as common buckthorn (Rhamnus cathartica) and hybrid cattail (Typha x glauca); however, there are also patches of the state threatened plant species, water willow (Justicia americana), in the area between the Flat Rock and Huroc Dams and immediately upstream of the Flat Rock Dam. Portions of the island are armored with cement walls which extend from upland to the edge of the water.

Immediately upstream of the Flat Rock Dam, there are few large wetland areas within or adjacent to the impoundment. On the north bank of the Huron River, there are many private residences with lawns extending down to a seawall along the water. Some small PEM wetland patches occupy areas along this bank where seawalls are absent. A narrow fringe of PFO wetland occupies the south bank of the Huron River just upstream of the Flat Rock Dam. In this area, a steep upland ridge is often just south of the riverbank and PFO fringe. Silver maple (Acer saccharinum) is the dominant canopy species in these wetlands, with swamp white oak (Quercus bicolor), cottonwood (Populus deltoides), and sycamore (Platanus occidentalis) also common. In this area, the understory is often sparse and shows signs of frequent scouring by the river.

Farther upstream, the PFO wetland widens and occupies a large area south of the river. In this area, there are small natural levee features occupied by cottonwood and sycamore trees and the shrub bladdernut (Staphylea trifolia) along the edge of the river. This feature is characteristic of Floodplain Forest natural communities (Tepley, et. al., 2004). The shrub spicebush (Lindera benzoin) is quite common in the understory of this area, and common herbaceous plants include lake sedge (Carex lacustris), cut grass (Leersia oryzoides), and stinging nettle (Urtica dioica).

Within the main channel of the river, there are a series of PFO islands, several of which are greater than one acre in size. A large peninsula also extends into this area from the west and is occupied by similar wetlands. Silver maple is once again the most common species in the canopy, with swamp white oak, cottonwood, and hackberry (Celtis occidentalis) also common. American elm (Ulmus americanus) and green ash (Fraxinus pennsylvanica) are often present as sub-canopy trees. The herbaceous plant community in the understory is incredibly diverse, with cut grass, Virginia wild-rye (Elymus virginicus), wood nettle (Laportea canadensis), southern blue flag (Iris virginiana), and black snakeroot (Sanicula odorata) some of the most common species. There are also large, localized patches of green dragon (Arisaema dracontium) and fog-fruit (Phyla lanceolata) on the largest islands. The non-native invasive ground cover moneywort (Lysimachia nummularia) is also present in large patches throughout the islands.

Also located within the channel of the river are patches of emergent and floating wetland vegetation rooting below the surface of the water. These vegetation patches occupy the same portion of the river as the forested islands and inhabit most of the large Huron River backwater at the farthest upstream end of the assessment area. Common plants in these patches include southern blue flag, narrow-leaved cattail (Typha angustifolia), and common bur-reed (Sparganium eurycarpum) for emergent plants and yellow pond-lily (Nuphar variegata) for floating plants.

Uplands across the site are highly variable, ranging from managed parklands and residential lawns to upland forests. Along the north bank of the Huron River, residential uplands often extend right to the water's edge or to a narrow fringe of wetland along the water. On the river's south bank, forested uplands dominated by red oak (Quercus rubra), sugar maple (Acer saccharum), and shagbark hickory (Carya ovata) often extend to a steep slope which leads down to a narrow fringe of wetlands along the river. Two upland forested "islands" occupy the highest points of the large peninsula which extends east into the open water of the Huron River. The canopy of these "islands" are dominated by wild black cherry (Prunus serotina), sassafras (Sassafras albidum), and black walnut (Juglans nigra). Within the understory, border privet (Ligustrum obtusifolium) is a common shrub over an herbaceous layer containing Virginia creeper (Parthenocissus quinquefolia), may-apple (Podophyllum peltatum), and clustered-leaved tick-trefoil (Hylodesmum glutinosum).

A set of USACE/EGLE data forms was completed at several representative locations within and adjacent to the wetlands on site (Appendix B). The locations of these data points are shown on Figure 4. Additional plant community and Floristic Quality Assessment (FQA) information is included in Appendix C.

Representative photographs of the site are included in Appendix D. Additional photographs of the site and data points were taken but not included in this report for brevity; these photographs are available upon request.

Protected Species

Water-willow (Justicia americana; state threatened) is the only T/E species encountered by GEI at the site. This species was observed in large numbers along the Huron River shoreline throughout the site, including downstream of the Flat Rock Dam. GEI did note the presence of two patches of beak grass, but this species is no longer listed as threatened by the State of Michigan. Suitable habitat for the plants mullein-foxglove (Dasistoma macrophylla), red-mulberry (Morus rubra), and cup plant (Silphium perfoliatum) were observed throughout the PFO wetlands in the upstream portion of the site, but GEI did not encounter any of these species. GEI also observed potentially suitable habitat for cerulean warbler (Setophaga cerulea) and eastern fox snake (Pantherophis gloydi) but GEI did not encounter either species. Additional habitat for T/E aquatic species may be present within the Huron River and the Huroc Dam impoundment; however, GEI did not assess aquatic features (e.g., freshwater mussels or fish) during the time of the wetland delineation.

The MNFI review did not indicate any known occurrences of protected bat species near or within the project area; however, the range of both Indiana bat (*Myotis sodalis*; federally endangered) and northern long-eared bat (*Myotis septentrionalis*; federally endangered) overlap the site. GEI opines that both species could roost in trees near the site, especially in mature silver maple and shagbark hickory trees whose exfoliating bark make them attractive as bat roost trees. Although hydrologic impacts from dam removal are unlikely to limit bats' ability to roost in the area, construction activities near the dams could require tree clearing which may remove potential roost trees. A bat tree survey or mist-net survey may be necessary if trees must be cut to facilitate construction activities.

4. Summary and Conclusions

Wetlands

It is GEI's professional opinion that all of the wetlands delineated and mapped at the site are regulated by EGLE, pursuant to Part 303 of NREPA, as they are contiguous and greater than five acres in size and/or directly connected to and/or within 500 feet of the Huron River. The Huron River is a defined stream, pursuant to Part 301, Inland Lakes, and Streams, of NREPA. A permit is required from EGLE for any proposed dredging, filling, draining, or maintained use or development within a regulated wetland pursuant to Part 303 of NREPA. GEI also opines that EGLE could reasonably classify the PFO wetlands onsite as *Southern Floodplain Forest* based on the presence of a natural levee feature and several plants which are characteristic of the natural community (e.g., indicator species) including green dragon, lizard's-tail, and bladdernut. *Southern Floodplain Forest* is listed as a "rare and imperiled" wetland community by EGLE and is therefore subject to higher mitigation requirements than other forested wetland communities (5:1 mitigation: impact ratio compared to 2:1).

Due to the dynamic nature of wetland and water resources, this study reflects wetland boundaries and presence of defined streams as they existed during the time the delineation was completed. Please be advised this regulatory delineation represents our professional opinion based on application of established regulatory methodologies. EGLE is the state agency charged with wetland regulatory oversight within the State of Michigan.

Protected Species

Based upon desktop and field review, GEI can confirm that at least one protected species, water-willow, occupies the site. GEI opines that suitable habitat exists within the site for the following protected plant and animal species: mullein-foxglove (state endangered), red mulberry (state threatened), cup plant (state threatened), eastern fox snake (state threatened), and cerulean warbler (state threatened), although none of these species were observed during GEI's survey. Although not known to inhabit the area, there is potential for use of trees at the site as roosts by protected bat species, including the federally endangered Indiana bat and northern long-eared bat. Additional efforts may be necessary to identify potential bat roost trees and to confirm the presence or absence of any protected bat species at the site.

This desktop and field review reflects the known state of rare and protected terrestrial animal and plant species populations within the project area as of July 2023. Natural systems and plant and animal populations are dynamic. Conditions within the project area may change to the benefit or detriment of any or all the species listed in this report. All species listed as either state or federally threatened or endangered are protected by law and regulated by either the Michigan Department of Natural Resources (MDNR) and/or USFWS. Development projects should avoid impacts to these species wherever possible, and any proposed adverse impacts may require a permit from the respective government agencies.

5. Literature Cited and Reference Materials

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish and Wildlife Service. FWS/OBS-79/31. Washington, DC.

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Tepley, A.J., J.G. Cohen, and L. Huberty. 2004. Natural community abstract for floodplain forest. Michigan Natural Features Inventory, Lansing, MI.15 pp.

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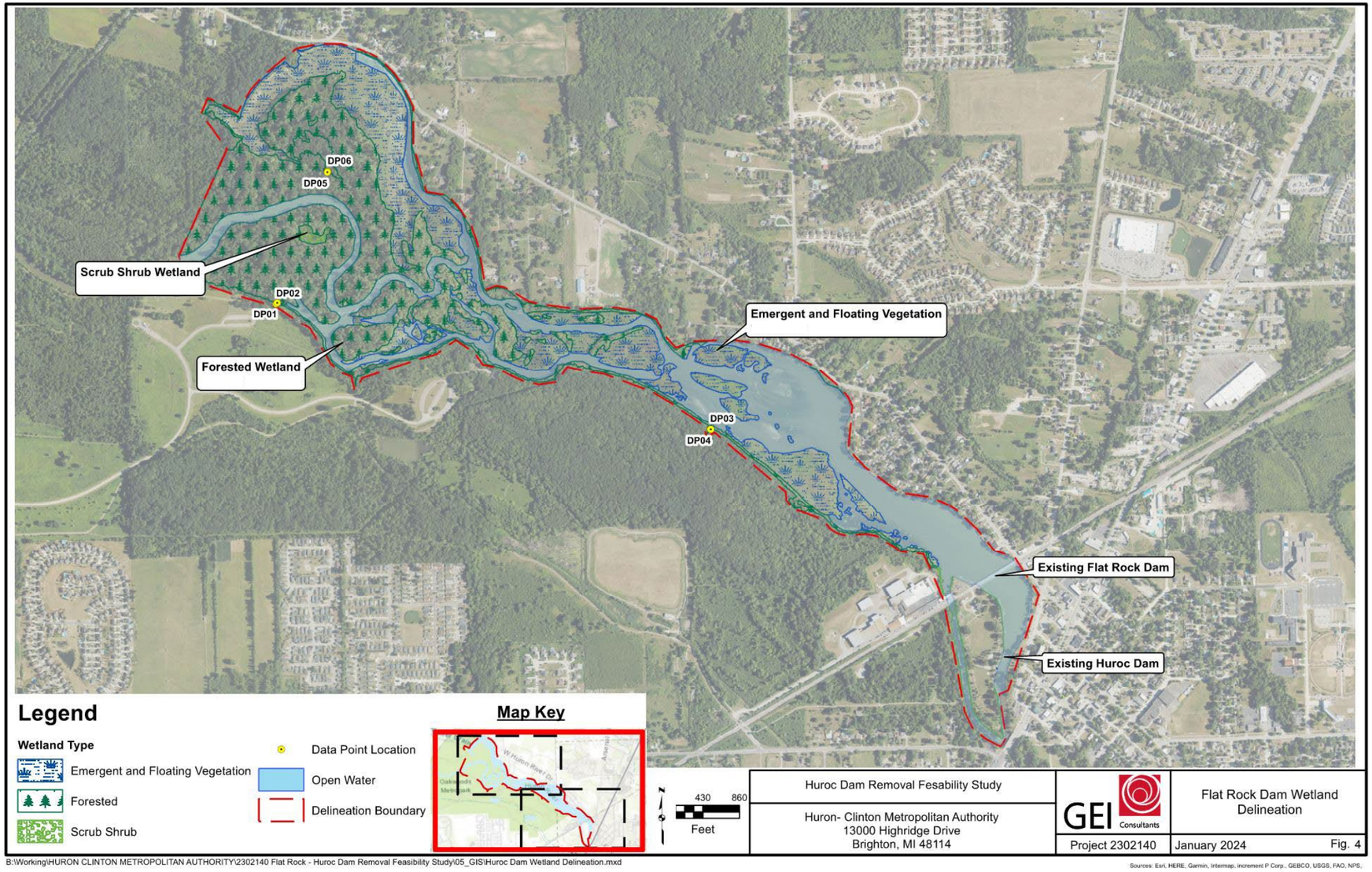

Figure 4: Overall map of field delineated wetlands and wetland data point locations at the project site in Flat Rock, Wayne County, Michigan.

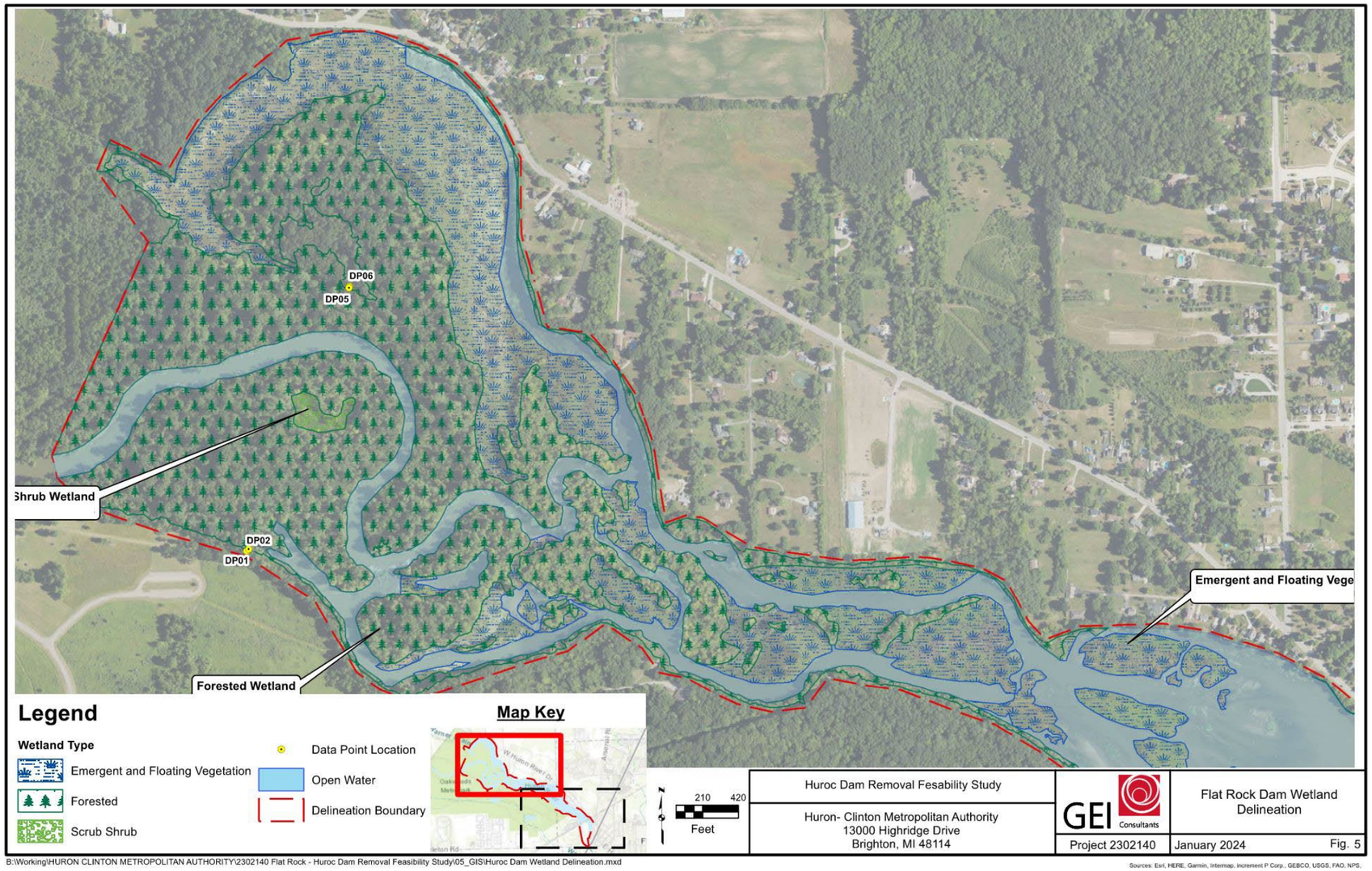

Figure 5: Closeup map of field delineated wetlands at the upstream end of the project site in Flat Rock, Wayne County, Michigan.

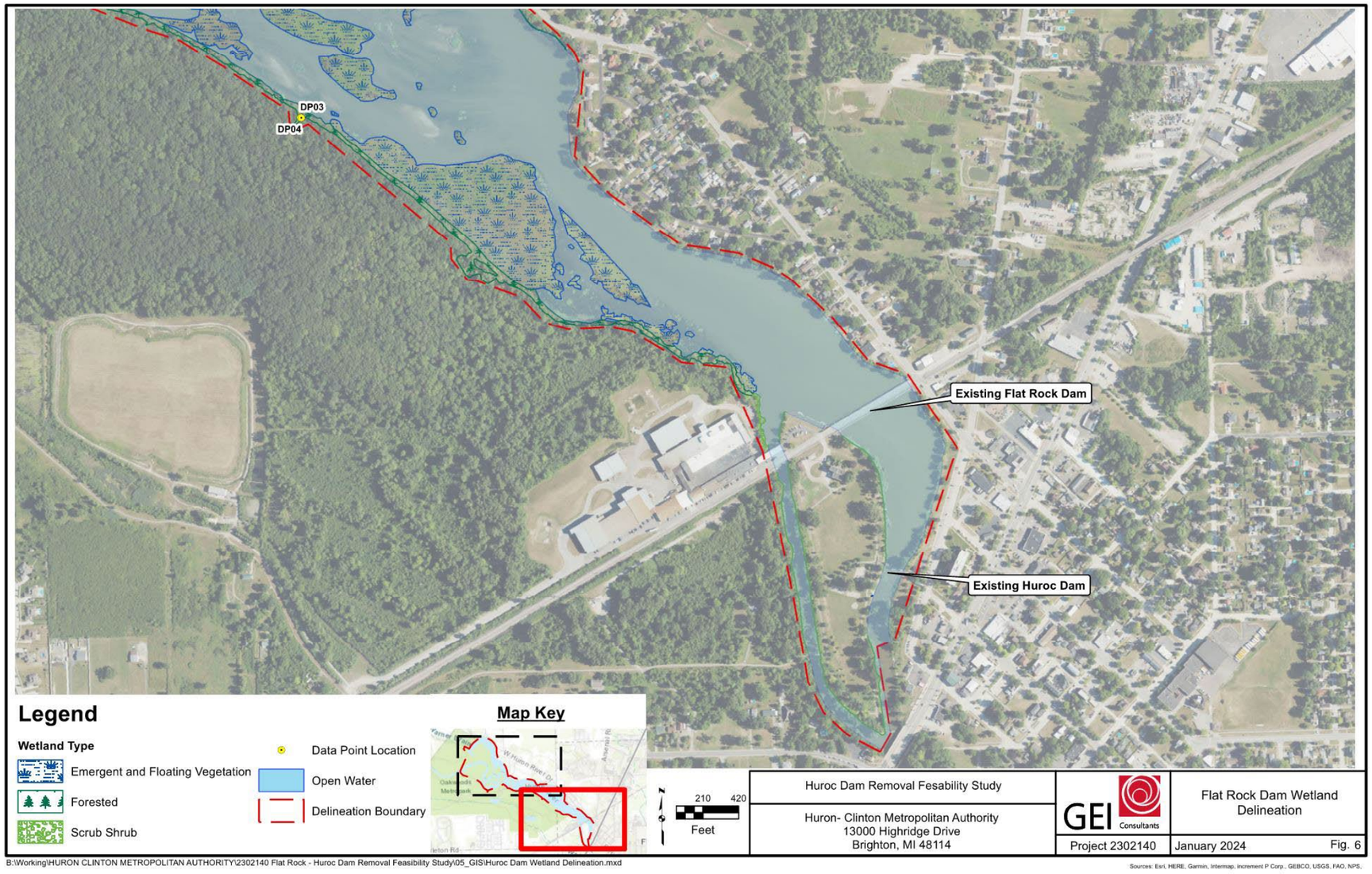

Figure 6: Closeup map of field delineated wetlands at the downstream end of the project site in Flat Rock, Wayne County, Michigan.

Appendix A: MNFI Rare Species Review Letter

MICHIGAN STATE UNIVERSITY | Extension

Zack Pitman
GEI Consultants
4472 Mount Hope Road
Suite A
Williamsburg, MI 49690

June 15, 2023

Re: Rare Species Review #3608 – Huron River - Flat Rock - Dam Removal, Wayne County, MI

Hello:

The location for the proposed project was checked against known localities for rare species and unique natural features, which are recorded in the Michigan Natural Features Inventory (MNFI) natural heritage database. This continuously updated database is a comprehensive source of existing data on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features. Records in the database indicate that a qualified observer has documented the presence of special natural features. The absence of records in the database for a particular site may mean that the site has not been surveyed. The only way to obtain a definitive statement on the status of natural features is to have a competent biologist perform a complete field survey.

Under Act 451 of 1994, the Natural Resources and Environmental Protection Act, Part 365, Endangered Species Protection, "a person shall not take, possess, transport, …fish, plants, and wildlife indigenous to the state and determined to be endangered or threatened," unless first receiving an Endangered Species Permit from the Michigan Department of Natural Resources (MDNR), Wildlife Division. Responsibility to protect endangered and threatened species is not limited to the lists below. Other species may be present that have not been recorded in the database.

Several at-risk species and/or natural communities have been documented within 1.5 miles of the project location and it is possible that adverse impacts will occur. This response reflects a desktop review of the database and MNFI cannot fully evaluate this project without visiting the area. MNFI offers several levels of Rare Species Reviews, including field surveys which I would be happy to discuss with you.

Sincerely,

Michael Sanders

Michael Sanders
Environmental Review Specialist/Zoologist
Michigan Natural Features Inventory

MSU EXTENSION

Michigan Natural Features Inventory

PO Box 13036
Lansing MI 48901

(517) 284-6200
Fax (517) 373-9566

mnfi.anr.msu.edu

Comments for Rare Species Review #3608:
It is important to note that it is the applicant's responsibility to comply with both state and federal threatened and endangered species legislation. Therefore, if a state listed species occurs at a project site, and you think you need an endangered species permit please contact: Casey Reitz, DNR-Wildlife Division, 517-284-6210, or ReitzC@michigan.gov. If a federally listed species is involved and, you think a permit is needed, please contact Jessica Pruden, U.S. Fish and Wildlife Service, East Lansing office, 517-351-8316, or Jessica_Pruden@fws.gov.

NOTE: special concern species and natural communities are not protected under endangered species legislation, but efforts should be taken to minimize any or all impacts. Please consult MNFI's Rare Species Explorer for additional information on Michigan's rare plants and animals.

NOTE: Michigan rivers and streams have been grouped according to existing information of mussel distribution and individual species conservation status. This stretch of the **Huron River is a Group 3 mussel stream**, which means that federally threatened and endangered mussel species occur/may occur certain relocation and monitoring may apply. I encourage you to review the ***Michigan Freshwater Mussel Survey Protocols and Relocation Procedures*** publication if in-stream work and/or land clearing activities occur that result in streambed disturbance and erosion and sedimentation into the river. A copy of the publication can be found at: https://mnfi.anr.msu.edu/resources/michigan-mussels

NOTE: Freshwater mussels (*Unionida*) require a fish host to complete their life cycle. Eggs are fertilized and develop into larvae within the gills of the female mussel. These larvae, called glochidia, are released into the water and must attach to a suitable fish host to survive and transform into the adult mussel. As zebra mussel (*Dreissena polymorpha*) infestation has led to the extirpation of many native mussel communities, boat hulls and trailers, fishing gear and scuba equipment should be thoroughly cleaned before moving between waterbodies, to prevent the spread of zebra mussel larvae and adults.

Table 1: Occurrences of Threatened & Endangered Species within 1.5 miles of Project Site

Element Category	Scientific Name	Common Name	Federal Status	State Status	G Rank	S Rank	EO Rank	First Observed Date	Last Observed Date
Plant	*Justicia americana*	Water willow		T	G5	S2	AB	1930	2002-07-30
Animal	*Percina shumardi*	River darter		E	G5	S1	H	1941	1941-10-19
Animal	*Cyclonaias tuberculata*	Purple wartyback		T	G5	S2	H	1925-07-10	1932-10-28
Animal	*Percina copelandi*	Channel darter		E	G4	S1	H	1941	1941-10-19
Plant	*Justicia americana*	Water willow		T	G5	S2	H	1943	1943-08-25
Plant	*Nelumbo lutea*	American lotus		T	G4	S2	E		1979
Animal	*Epioblasma triquetra*	Snuffbox	LE	E	G3	S1S2	H		1933-10-29
Animal	*Villosa fabalis*	Rayed bean	LE	E	G2	S1S2	E	1931-05-16	1995-07-13
Plant	*Justicia americana*	Water willow		T	G5	S2	H	1921	1921-06-14
Animal	*Opsopoeodus emiliae*	Pugnose minnow		E	G5	S1	H	1941	1941-10-12
Plant	*Silphium perfoliatum*	Cup plant		T	G5	S2	C	2002-08-01	2002-08-01

Plant	*Diarrhena obovata*	Beak grass		T	G4G5	S2	AB	2002-07-30	2002-07-30
Plant	*Silphium perfoliatum*	Cup plant		T	G5	S2	BC	2000-08-10	2000-08-10
Animal	*Percina copelandi*	Channel darter		E	G4	S1	H	1941-10-19	1941-10-19
Animal	*Sander canadensis*	Sauger		T	G5	S1	H	1993	1993
Animal	*Centronyx henslowii*	Henslow's sparrow		E	G4	S3	D	2005-06-27	2005-06-27
Plant	*Morus rubra*	Red mulberry		T	G5	S2	CD	2006-09-11	2006-09-11
Plant	*Dasistoma macrophylla*	Mullein-foxglove		E	G4	S1	B?	2009-08-18	2009-08-18
Animal	*Ligumia nasuta*	Eastern pondmussel		E	G4	S2	H	1931-04-16	1931-04-16
Animal	*Ligumia nasuta*	Eastern pondmussel		E	G4	S2	H	1931-10-28	1931-10-28
Animal	*Villosa fabalis*	Rayed bean	LE	E	G2	S1S2	H	1931-05-16	1931-05-16
Animal	*Toxolasma parvum*	Lilliput		E	G5	S1	H	1932-10-28	1932-10-28
Animal	*Setophaga cerulea*	Cerulean warbler		T	G4	S3	D	2009-05-30	2009-05-30
Plant	*Juncus brachycarpus*	Short-fruited rush		T	G4G5	S1S2	D	2015-08-18	2015-08-18
Animal	*Pantherophis gloydi*	Eastern fox snake		T	G3	S2	E	2017-06-28	2017-06-28

Table 2: Occurrences of Special Concern Species within 1.5 miles of Project Site

Element Category	Scientific Name	Common Name	Federal Status	State Status	G Rank	S Rank	EO Rank	First Observed Date	Last Observed Date
Plant	*Strophostyles helvula*	Trailing wild bean		SC	G5	S3	H	1911	1930-08-09
Plant	*Carex squarrosa*	Sedge		SC	G4G5	S1	B	1990	1990-05-25
Plant	*Carex squarrosa*	Sedge		SC	G4G5	S1	H	1921	1921-06-14
Plant	*Carex squarrosa*	Sedge		SC	G4G5	S1	C	2002-08-01	2015-08-18
Animal	*Haliaeetus leucocephalus*	Bald eagle		SC	G5	S4	E	2001	2017
Animal	*Spiza americana*	Dickcissel		SC	G5	S3	D	2005-06-27	2005-06-27
Community	*Wet-mesic Flatwoods*				G2G3	S2	C	2003	2015-08-18

Plant	*Quercus shumardii*	Shumard's oak		SC	G5	S2	BC	2006-09-11	2015-08-18
Animal	*Truncilla truncata*	Deertoe		SC	G5	S2S3	H	1931-04-16	1932-10-28
Animal	*Utterbackia imbecillis*	Paper pondshell		SC	G5	S2S3	H	1931-04-16	1932-10-28
Animal	*Alasmidonta marginata*	Elktoe		SC	G4	S3?	H	1932-10-28	1932-10-28
Animal	*Ptychobranchus fasciolaris*	Kidney shell		SC	G4G5	S2	E	1931-04-16	2018-07-16
Animal	*Stylurus plagiatus*	Russet-tipped clubtail		SC	G5	S1	E	2001	2010-08-07
Animal	*Villosa iris*	Rainbow		SC	G5	S3	E	1931-04-16	2018-07-16
Animal	*Lasmigona costata*	Flutedshell		SC	G5	SNR	H	1931-04-16	1932-10-28
Plant	*Chenopodium standleyanum*	Woodland goosefoot		SC	G5	SNR	H	1925-07-29	1925-07-29
Plant	*Carex squarrosa*	Sedge		SC	G4G5	S1	E	2017-09-11	2017-09-11
Animal	*Lithobates palustris*	Pickerel frog		SC	G5	S3S4	E	2005-05-13	2005-06-10
Animal	*Moxostoma duquesnei*	Black Redhorse		SC	G5	S2	E	2017	2017

Comments for Table 1:

Cup plant (Silphium perfoliatum)

Habitat

Known to occur in the area, the state threatened cup-plant is found in river floodplains in forest openings and edges.

Management Recommendations

Conserve hydrology of river system and corresponding cyclical floodplain regime. Maintain healthy intact, mature floodplain forests and minimize forest fragmentation. When possible, leave large tracts of unharvested forests and allow natural processes to operate unhindered.

For more information, see the *Silphium perfoliatum* species page on the MNFI website.

Water willow (Justicia americana)

Habitat

Known to occur in the project area, water willowmMostly occurring in large river systems and less commonly in lakes. It is almost always found along muddy banks at the edge of the shore.

Management Recommendations

Water-willow requires the protection of hydrology. Do not change the course of rivers or add impoundments. Agricultural run-off also likely has negative impacts.

For more information, see the *Justicia americana* species page on the MNFI website.

Snuffbox (Epioblasma triquetra)

Habitat

Known to occur in the Huron River, the state and federally endangered snuffbox inhabits sand, gravel, or cobble substrates in swift small and medium-sized rivers. Individuals are often buried deep in the sediment.

Management Recommendations

The Snuffbox mussel is sensitive to river impoundment, siltation and disturbance, due to its requirement for clean, swift current and relative immobility as an adult. In order to maintain the current populations in Michigan, rivers need to be protected to reduce silt loading and run-off. Maintaining or establishing vegetated riparian buffers can aid in controlling many of the threats to mussels. Control of zebra mussels is critical to preserving native mussels. And as with all mussels, protection of their hosts habitat is also crucial. Because the life cycle of the snuffbox is inherently linked with that of the logperch in Michigan, conservation and management of this fish species is needed to insure that of the Snuffbox.

For more information, see the *Epioblasma triquetra* species page on the MNFI website.

Comments for Table 2

Kidney shell (Ptychobranchus fasciolaris)

Habitat

Known to occur in the Huron River, the special concern kidney shell occurs in high water quality creeks, rivers and lakes with moderate to swift currents and a sand or gravel substrate (Watters et al. 2009).

Management Recommendations

The kidney shell experiences an especially high mortality rate in low dissolved oxygen conditions (Teztloff 2001). Limiting agricultural and urban runoff, wastewater treatment discharge, and other sources of point and non-point source pollution which contribute to such conditions will benefit this species. As zebra mussel infestation has lead to the extirpation of many native mussel communities, boat hulls and trailers, fishing gear and scuba equipment should be thoroughly cleaned before moving between waterbodies, in order to prevent the spread of zebra mussel larvae and adults. Construction projects such as bridge replacements and dam removals should plan for monitoring and mitigation measures to limit the impacts on mussel poplutions. A number of different fish species serve as hosts to Kidney shell glochidia. Healthy populations of host fish, as well as open water systems that allow for their movement, must be maintained.

For more information, see the *Ptychobranchus fasciolaris* species page on the MNFI website.

Black redhorse (Moxostoma duquesnei)

Habitat

Known to occur in the Huron River, the special concern black redhorse inhabits swift flowing areas in medium- to large-sized rivers with clear water and sand, gravel, and rock substrates. Black redhorse is less tolerant of turbid water, low gradient rivers, and siltation than golden redhorse. Young black redhorse feed in schools near emergent aquatic vegetation by the edge of pools. Adults typically feed in schools just upstream or downstream of riffles. This fish eats microcrustaceans, aquatic insects, detritus, and algae. Eggs are buried in a substrate of fine rubble, sand, and gravel in water 15 to 60 cm deep, typically at the upstream or downstream end of a riffle. Black redhorse spawn when water temperatures reach 13 to 17°C (55-62°F).

Management Recommendations

Maintaining and creating riparian buffers along rivers is an important method of mitigating non-point source impacts such as excessive sedimentation and turbidity. Black redhorse are very sensitive to these impacts because many species of microcrustaceans and aquatic insects they rely on for food require clean water and substrates. Avoiding impacts to headwater streams and wetlands benefits all downstream habitats and species like black redhorse that rely on clear water and river substrates. Black redhorse populations are particularly vulnerable to the loss of habitat used by young-of-the-year fish, given current levels of habitat availability. The blockage of migratory routes by dams and reservoirs with degraded tailwater habitats have contributed to the decline of black redhorse populations in the U.S. Remove barriers to fish migration such as dams that are no longer functioning and/or are not economically viable, and restore natural river flow to impounded areas.

For more information, see the *Moxostoma duquesnei* species page on the MNFI website.

Bald eagle (Haliaeetus leucocephalus)

Habitat

Known to nest in the area. Bald eagles will nest in a wide variety of habitats that provide suitable nest sites close to open water. Nests may be placed in snags or large live trees as well as on constructed platforms or utility poles. They are resident (stay year round) as long as there is open water where they can forage.

Management Recommendations

Bald eagles are extremely sensitive to human activity during the first 12 weeks of the breeding season. Maintain a quarter mile buffer zone around the nest from mid-March through the end of June. Schedule maintenance and construction activities within the buffer zone to occur between August and February.

For more information, see the *Haliaeetus leucocephalus* species page on the MNFI website.

Codes to accompany table

State Protection Status Code Definitions (SPROT)
E = Endangered
T = Threatened
SC = Special concern

Federal Protection Status Code Definitions (USESA)
LE = listed endangered
LT = listed threatened
LELT = partly listed endangered and partly listed threatened
PDL = proposed delist
E(S/A) = endangered based on similarities/appearance
PS = partial status (federally listed in only part of its range)
C = species being considered for federal status

Global Heritage Status Rank Definitions (GRANK)
The priority assigned by NatureServe's national office for data collection and protection based upon the element's status throughout its entire world-wide range. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.
G1 = critically imperiled globally because of extreme rarity (5 or fewer occurrences range-wide or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.
G2 = imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.
G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g. a single western state, a physiographic region in the East) or because of other factor(s) making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.
G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
Q = Taxonomy uncertain

State Heritage Status Rank Definitions (SRANK)
The priority assigned by the Michigan Natural Features Inventory for data collection and protection based upon the element's status within the state. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.
S1 = Critically imperiled in the state because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation in the state.
S2 = Imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state.
S3 = Rare or uncommon in state (on the order of 21 to 100 occurrences). S4 = apparently secure in state, with many occurrences.
S5 = demonstrably secure in state and essentially ineradicable under present conditions.
SX = apparently extirpated from state.

EO Rank Codes

Element Occurrence (EO) ranks refer to the viability or ecological integrity of the occurrence; they provide an assessment of the likelihood that if current conditions prevail the EO will persist for a defined period of time, typically 20-100 years.

A - Excellent estimated viability/ecological integrity
A? - Possibly excellent estimated viability/ecological integrity
AB - Excellent or good estimated viability/ecological integrity
AC - Excellent, good, or fair estimated viability/ecological integrity
B - Good estimated viability/ecological integrity
B? - Possibly good estimated viability/ecological integrity
BC - Good or fair estimated viability/ecological integrity
BD - Good, fair, or poor estimated viability/ecological integrity
C - Fair estimated viability/ecological integrity
C? - Possibly fair estimated viability/ecological integrity
CD - Fair or poor estimated viability/ecological integrity
D - Poor estimated viability/ecological integrity
D? - Possibly poor estimated viability/ecological integrity
E - Verified extant (viability/ecological integrity not assessed)
F - Failed to find
F? - Possibly failed to find
H - Historical
H? - Possibly historical
X - Extirpated
X? - Possibly extirpated
U - Unrankable
NR - Not ranked

Appendix B: USACE Wetland Determination Forms

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Flat Rock Huroc Dam City/County: Flat Rock/Wayne Sampling Date: 7/11/2023

Applicant/Owner: Huron Clinton Metro Authority State: MI Sampling Point: DP01

Investigator(s): Daniel Kowalski Section, Township, Range S26 T4S R9E

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): concave Slope %: 0-3

Subregion (LRR or MLRA): LRR L, MLRA 99 Lat: 42.108864 Long: -83.326668 Datum: WGS84

Soil Map Unit Name: MI163 NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, e

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	X Water-Stained Leaves (B9)	Secondary Indicators (minimum of two required)
X High Water Table (A2)	___ Aquatic Fauna (B13)	X Drainage Patterns (B10)
X Saturation (A3)	___ Marl Deposits (B15)	___ Moss Trim Lines (B16)
X Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)	___ Dry-Season Water Table (C2)
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)	X Crayfish Burrows (C8)
X Drift Deposits (B3)	X Presence of Reduced Iron (C4)	___ Saturation Visible on Aerial Imagery (C9)
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)	___ Stunted or Stressed Plants (D1)
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)	X Geomorphic Position (D2)
___ Inundation Visible on Aerial Imagery (B7	___ Other (Explain in Remarks)	___ Shallow Aquitard (D3)
X Sparsely Vegetated Concave Surface (B8)		___ Microtopographic Relief (D4)
		X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____	
Water Table Present?	Yes X	No ____	Depth (inches): 1	
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 6	**Wetland Hydrology Present?** **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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VEGETATION – Use scientific names of plants. Sampling Point: DP01

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	15	Yes	FAC
2. *Acer rubrum*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	25	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Rhamnus cathartica*	5	Yes	FAC
2. *Ostrya virginiana*	10	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	15	=Total Cover	
Herb Stratum (Plot size: 1m)			
1. *Bidens frondosa*	5	No	FACW
2. *Boehmeria cylindrica*	10	Yes	OBL
3. *Phragmites australis*	15	Yes	FACW
4. *Iris virginica*	5	No	OBL
5. *Phalaris arundinacea*	20	Yes	FACW
6. *Sparganium americanum*	10	Yes	OBL
7. *Carex lupuliformis*	5	No	OBL
8.			
9.			
10.			
11.			
12.			
	70	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 87.5% (A/B

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	40	x 2 =	80
FAC species	30	x 3 =	90
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	110	(A)	240 (B

Prevalence Index = B/A = 2.18

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide support data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology mus be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

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SOIL Sampling Point DP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/1	100					Mucky Loam/Clay	
2-4	10YR 3/2	100					Mucky Loam/Clay	
4-10	10YR 3/1	90	7.5YR 6/8	10	RM	PL/M	Mucky Loam/Clay	
10-16	10YR 3/1	80	7.5YR 6/8	20	RM	PL/M	Mucky Loam/Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L**)
- X Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ____

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Flat Rock Huroc Dam City/County: Flat Rock/Wayne Sampling Date: 7/11/2023

Applicant/Owner: Huron Clinton Metro Authority State: MI Sampling Point: DP02

Investigator(s): Daniel Kowalski Section, Township, Range S26 T4S R9E

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): concave Slope %: 0-3

Subregion (LRR or MLRA): LRR L, MLRA 99 Lat: 42.108834 Long: -83.3261708 Datum: WGS84

Soil Map Unit Name: MI163 NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, e

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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VEGETATION – Use scientific names of plants. Sampling Point: DP02

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tilia americana*	15	Yes	FACU
2. *Fraxinus pennsylvanica*	10	Yes	FACW
3. *Ulmus americana*	10	Yes	FACW
4. *Quercus rubra*	5	No	FACU
5. *Quercus alba*	5	No	FACU
6. *Celtis occidentalis*	5	No	FAC
7.			
	50	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Rosa multiflora*	10	Yes	FACU
2. *Rhamnus cathartica*	5	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	15	=Total Cover	
Herb Stratum (Plot size: 1m)			
1. *Smilacina stellata*	5	No	FAC
2. *Fragaria virginiana*	20	Yes	FACU
3. *Amphicarpaea bracteata*	15	Yes	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40	=Total Cover	
Woody Vine Stratum (Plot size:)			
1. *Celastrus orbiculatus*	20	Yes	UPL
2.			
3.			
4.			
	20	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	20	x 2 =	40
FAC species	30	x 3 =	90
FACU species	55	x 4 =	220
UPL species	20	x 5 =	100
Column Totals:	125	(A)	450 (B

Prevalence Index = B/A = 3.60

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide support data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology mus be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)

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SOIL Sampling Point DP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/4	100					Loamy/Clayey	
7-16	10YR 4/3	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

US Army Corps of Engineers Northcentral and Northeast Region – Version 2.0

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Flat Rock Huroc Dam City/County: Flat Rock/Wayne Sampling Date: 7/11/2023

Applicant/Owner: Huron Clinton Metro Authority State: MI Sampling Point: DP03

Investigator(s): Daniel Kowalski Section, Township, Range S36 T4S R9E

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): concave Slope %: 0-3

Subregion (LRR or MLRA): LRR L, MLRA 99 Lat: 42.104618 Long: -83.307962 Datum: WGS84

Soil Map Unit Name: MI163 NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, e

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X No ____	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		___ Surface Soil Cracks (B6)
___ Surface Water (A1)	X Water-Stained Leaves (B9)	X Drainage Patterns (B10)
X High Water Table (A2)	___ Aquatic Fauna (B13)	___ Moss Trim Lines (B16)
X Saturation (A3)	___ Marl Deposits (B15)	___ Dry-Season Water Table (C2)
X Water Marks (B1)	___ Hydrogen Sulfide Odor (C1)	X Crayfish Burrows (C8)
___ Sediment Deposits (B2)	___ Oxidized Rhizospheres on Living Roots (C3)	___ Saturation Visible on Aerial Imagery (C9)
X Drift Deposits (B3)	X Presence of Reduced Iron (C4)	___ Stunted or Stressed Plants (D1)
___ Algal Mat or Crust (B4)	___ Recent Iron Reduction in Tilled Soils (C6)	X Geomorphic Position (D2)
___ Iron Deposits (B5)	___ Thin Muck Surface (C7)	___ Shallow Aquitard (D3)
___ Inundation Visible on Aerial Imagery (B7	___ Other (Explain in Remarks)	___ Microtopographic Relief (D4)
X Sparsely Vegetated Concave Surface (B8)		X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____	
Water Table Present?	Yes X	No ____	Depth (inches): 12	
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 10	**Wetland Hydrology Present?** **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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VEGETATION – Use scientific names of plants. Sampling Point: DP03

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	10	Yes	FAC
2. *Acer rubrum*	5	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	15	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Ostrya virginiana*	5	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	5	=Total Cover	
Herb Stratum (Plot size: 1m)			
1. *Leersia oryzoides*	15	Yes	OBL
2. *Boehmeria cylindrica*	10	No	OBL
3. *Amphicarpaea bracteata*	5	No	FAC
4. *Iris virginica*	5	No	OBL
5. *Phalaris arundinacea*	15	Yes	FACW
6. *Symplocarpus foetidus*	15	Yes	OBL
7. *Laportea canadensis*	10	No	FACW
8. *Myosotis scorpioides*	5	No	OBL
9.			
10.			
11.			
12.			
	80	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83.3% (A/B

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	50	x 1 =	50
FACW species	25	x 2 =	50
FAC species	20	x 3 =	60
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	100	(A)	180 (B

Prevalence Index = B/A = 1.80

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide support data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology mus be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

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SOIL Sampling Point DP03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100					Mucky Loam/Clay	
3-16	10YR 2/2	95	7.5YR 6/8	5	RM	PL/M	Mucky Loam/Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L**)
- X Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ____

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Flat Rock Huroc Dam City/County: Flat Rock/Wayne Sampling Date: 7/11/2023

Applicant/Owner: Huron Clinton Metro Authority State: MI Sampling Point: DP04

Investigator(s): Daniel Kowalski Section, Township, Range S36 T4S R9E

Landform (hillside, terrace, etc.): Hillside Local relief (concave, convex, none): concave Slope %: 0-3

Subregion (LRR or MLRA): LRR L, MLRA 99 Lat: 42.104615 Long: -83.307939 Datum: WGS84

Soil Map Unit Name: MI163 NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, e

Hydrophytic Vegetation Present?	Yes ____ No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____ No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____ No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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VEGETATION – Use scientific names of plants. Sampling Point: DP04

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Carya glabra*	15	Yes	FACU
2. *Carya ovata*	10	Yes	FACU
3. *Ulmus americana*	5	No	FACW
4. *Quercus rubra*	10	Yes	FACU
5.			
6.			
7.			
	40	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Lindera benzoin*	5	Yes	FACW
2. *Rhamnus cathartica*	5	Yes	FAC
3. *Ligustrum ovalifolium*	15	Yes	UPL
4.			
5.			
6.			
7.			
	25	=Total Cover	
Herb Stratum (Plot size: 1m)			
1. *Aster pilosus*	10	Yes	FACU
2. *Galium aparine*	5	Yes	FACU
3. *Ribes rubrum*	10	Yes	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	25	=Total Cover	
Woody Vine Stratum (Plot size:)			
1. *Celastrus orbiculatus*	10	Yes	UPL
2.			
3.			
4.			
	10	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 10 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 20.0% (A/B

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	5	x 3 =	15
FACU species	50	x 4 =	200
UPL species	35	x 5 =	175
Column Totals:	100	(A)	410 (B

Prevalence Index = B/A = 4.10

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide support data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology mus be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)

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SOIL Sampling Point DP04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	100					Sandy	
10-16	10YR 3/2	60	10YR 4/3	40			Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Huroc Dam City/County: Flat Rock/Wayne County Sampling Date: 7/11/23

Applicant/Owner: Huron-Clinton Metroparks State: MI Sampling Point: DP05

Investigator(s): Zack Pitman Section, Township, Range: S28, T4S, R9E

Landform (hillside, terrace, etc.): toe of slight slope Local relief (concave, convex, none): None Slope %: 2

Subregion (LRR or MLRA): LRR L Lat: 42.113088 Long: -83.324460 Datum: NAD

Soil Map Unit Name: Sloan silt loam, wet NWI classification: PFO1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- X Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 7

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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VEGETATION – Use scientific names of plants. Sampling Point: DP05

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Carya cordiformis*	10	Yes	FAC
2. *Sassafras albidum*	5	No	FACU
3. *Platanus occidentalis*	10	Yes	FACW
4. *Quercus bicolor*	5	No	FACW
5. *Acer saccharinum*	30	Yes	FACW
6.			
7.			
	60	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Lindera benzoin*	25	Yes	FACW
2. *Fraxinus pennsylvanica*	2	No	FACW
3.			
4.			
5.			
6.			
7.			
	27	=Total Cover	
Herb Stratum (Plot size: 30)			
1. *Persicaria virginiana*	25	Yes	FAC
2. *Carex intumescens*	5	No	FACW
3. *Glyceria striata*	15	Yes	OBL
4. *Podophyllum peltatum*	10	No	FACU
5. *Lindera benzoin*	15	Yes	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70	=Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	92	x 2 =	184
FAC species	35	x 3 =	105
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	157 (A)		364 (B)

Prevalence Index = B/A = 2.32

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

_X_ 2 - Dominance Test is >50%

_X_ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _X_ **No** ____

Remarks: (Include photo numbers here or on a separate sheet.)

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SOIL Sampling Point: DP05

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/1	100					Loamy/Clayey	
7-16	10YR 3/1	98	10YR 4/4	2	C	M	Loamy/Clayey	
16-18	10YR 4/2	98	10YR 4/4	2	C	M	Loamy/Clayey	Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ____

Remarks:

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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Huroc Dam City/County: Flat Rock/Wayne County Sampling Date: 7/11/23

Applicant/Owner: Huron-Clinton Metroparks State: MI Sampling Point: DP06

Investigator(s): Zack Pitman Section, Township, Range: S28, T4S, R9E

Landform (hillside, terrace, etc.): terrace Local relief (concave, convex, none): None Slope %: 4

Subregion (LRR or MLRA): LRR L Lat: 42.113088 Long: -83.324460 Datum: NAD

Soil Map Unit Name: Sloan silt loam, wet NWI classification: PFO1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Slight terrace/plateau surrounded by wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 15

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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VEGETATION – Use scientific names of plants. Sampling Point: DP06

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Carya cordiformis*	15	Yes	FAC
2. *Sassafras albidum*	30	Yes	FACU
3. *Juglans nigra*	10	No	FACU
4.			
5.			
6.			
7.			
	55	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Lindera benzoin*	15	Yes	FACW
2. *Ligustrum obtusifolium*	5	Yes	UPL
3.			
4.			
5.			
6.			
7.			
	20	=Total Cover	
Herb Stratum (Plot size: 30)			
1. *Podophyllum peltatum*	10	No	FACU
2. *Parthenocissus quinquefolia*	15	Yes	FACU
3. *Desmodium glutinosum*	25	Yes	UPL
4. *Persicaria virginiana*	5	No	FAC
5. *Circaea canadensis*	15	Yes	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70	=Total Cover	
Woody Vine Stratum (Plot size: 30)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 28.6% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	20	x 3 =	60
FACU species	80	x 4 =	320
UPL species	30	x 5 =	150
Column Totals:	145	(A)	560 (B)

Prevalence Index = B/A = 3.86

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

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SOIL Sampling Point: DP06

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	100					Loamy/Clayey	
4-13	10YR 4/3	100					Loamy/Clayey	
13-18	10YR 4/2	98	10YR 4/4	2	C	M	Loamy/Clayey	Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** X

Remarks:

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Appendix C: Plant List and FQA Forms

Floristic Quality Assessment

Conservation-Based Metrics:	Shoreline Wetlands	Island Wetlands	Shoreline Uplands	Island Uplands	All Wetlands
Total Mean C:	3.6	3.6	3.4	2.9	3.7
Native Mean C:	4.1	4.2	4.1	4.2	4.3
Total FQI:	33.6	34.3	21.2	15.1	39.5
Native FQI:	36.0	37.1	23.2	18.3	42.4

Species Richness:	Shoreline Wetlands	Island Wetlands	Shoreline Uplands	Island Uplands	All Wetlands
Total Species:	87	91	39	27	114
Native Species:	77	78	32	19	97
Non-native Species:	10	13	7	8	17

Shoreline Wetland Plant List

Scientific name	Common name	Native or Non-Native	Coefficient of Conservatism	Wetland Rating	Physiognomy
Acer negundo	box-elder	native	0	0	tree
Acer rubrum	red maple	native	1	0	tree
Acer saccharinum	silver maple	native	2	-3	tree
Agrimonia parviflora	swamp agrimony	native	4	0	forb
Alisma triviale	northern water-plantain	native	1	-5	forb
Amphicarpaea bracteata	hog-peanut	native	5	0	vine
Apocynum cannabinum	indian-hemp	native	3	0	forb
Asclepias incarnata	swamp milkweed	native	6	-5	forb
Asimina triloba	pawpaw	native	9	0	tree
Barbarea vulgaris	yellow rocket	non-native	0	0	forb
Bidens frondosa	common beggar-ticks	native	1	-3	forb
Cabomba caroliniana	fanwort	non-native	0	-5	forb
Calamagrostis canadensis	blue-joint	native	3	-5	grass
Carex bebbii	sedge	native	4	-5	sedge
Carex grayi	sedge	native	6	-3	sedge
Carex intumescens	sedge	native	3	-3	sedge
Carex lacustris	sedge	native	6	-5	sedge
Carex lupulina	sedge	native	4	-5	sedge
Carex stipata	sedge	native	1	-5	sedge
Carex stricta	sedge	native	4	-5	sedge
Carex vulpinoidea	sedge	native	1	-5	sedge
Carpinus caroliniana	blue-beech	native	6	0	tree
Carya laciniosa	shellbark hickory	native	9	-3	tree
Celtis occidentalis	hackberry	native	5	0	tree
Cephalanthus occidentalis	buttonbush	native	7	-5	shrub
Cicuta maculata	water hemlock	native	4	-5	forb
Cornus amomum	silky dogwood	native	2	-3	shrub
Cornus sericea	red-osier	native	2	-3	shrub
Eleocharis erythropoda	spike-rush	native	4	-5	sedge
Elymus virginicus	Virginia wild-rye	native	4	-3	grass
Equisetum arvense	common horsetail	native	0	0	fern
Eutrochium maculatum	Joe-Pye-weed	native	4	-5	forb
Frangula alnus	glossy buckthorn	non-native	0	0	shrub
Fraxinus pennsylvanica	red ash	native	2	-3	tree
Glyceria striata	fowl manna grass	native	4	-5	grass
Helianthus giganteus	tall sunflower	native	5	-3	forb
Impatiens capensis	spotted touch-me-not	native	2	-3	forb
Iris virginica	southern blue flag	native	5	-5	forb
Justicia americana	water-willow	native	9	-5	forb
Laportea canadensis	wood nettle	native	4	-3	forb
Leersia oryzoides	cut grass	native	3	-5	grass
Lemna minor	common duckweed	native	5	-5	forb
Lilium michiganense	Michigan lily	native	5	-3	forb
Lindera benzoin	spicebush	native	7	-3	shrub

Shoreline Wetland Plant List Continued

Scientific name	Common name	Native or Non-Native	Coefficient of Conservatism	Wetland Rating	Physiognomy
Lycopus americanus	common water horehound	native	2	-5	forb
Lysimachia ciliata	fringed loosestrife	native	4	-3	forb
Lysimachia nummularia	moneywort	non-native	0	-3	forb
Lythrum salicaria	purple loosestrife	non-native	0	-5	forb
Menispermum canadense	moonseed	native	5	0	vine
Mentha canadensis	wild mint	native	3	-3	forb
Nuphar variegata	yellow pond-lily	native	7	-5	forb
Nymphaea odorata	sweet-scented waterlily	native	6	-5	forb
Penthorum sedoides	ditch stonecrop	native	3	-5	forb
Persicaria amphibia	water smartweed	native	6	-5	forb
Persicaria hydropiper	water-pepper	native	1	-5	forb
Persicaria virginiana	jumpseed	native	4	0	forb
Phalaris arundinacea	reed canary grass	native	0	-3	grass
Phyla lanceolata	fog-fruit	native	6	-5	forb
Pilea pumila	clearweed	native	5	-3	forb
Platanus occidentalis	sycamore	native	7	-3	tree
Poa palustris	fowl meadow grass	native	3	-3	grass
Populus deltoides	cottonwood	native	1	0	tree
Potamogeton crispus	pondweed	non-native	0	-5	forb
Quercus bicolor	swamp white oak	native	8	-3	tree
Ranunculus acris	tall buttercup	non-native	0	0	forb
Rhamnus cathartica	common buckthorn	non-native	0	0	tree
Ribes americanum	wild black currant	native	6	-3	shrub
Rorippa palustris	yellow cress	native	1	-5	forb
Rudbeckia laciniata	cut-leaf coneflower	native	6	-3	forb
Rumex crispus	curly dock	non-native	0	0	forb
Rumex verticillatus	water dock	native	7	-5	forb
Sagittaria latifolia	common arrowhead	native	4	-5	forb
Salix nigra	black willow	native	5	-5	tree
Schoenoplectus pungens	threesquare	native	5	-5	sedge
Sium suave	water-parsnip	native	5	-5	forb
Smilax rotundifolia	common greenbrier	native	6	0	vine
Solanum dulcamara	bittersweet nightshade	non-native	0	0	vine
Solidago gigantea	late goldenrod	native	3	-3	forb
Sparganium eurycarpum	common bur-reed	native	5	-5	forb
Staphylea trifolia	bladdernut	native	9	0	shrub
Symphyotrichum lanceolatum	panicled aster	native	2	-3	forb
Teucrium canadense	wood-sage	native	4	-3	forb
Toxicodendron radicans	poison-ivy	native	2	0	vine
Ulmus americana	American elm	native	1	-3	tree
Urtica dioica	stinging nettle	native	1	0	forb
Verbesina alternifolia	wing-stem	native	4	-3	forb
Vitis riparia	riverbank grape	native	3	0	vine

Island Wetland Plant List

Scientific name	Common name	Native or Non-Native	Coefficient of Conservatism	Wetland Rating	Physiognomy
Acer negundo	box-elder	native	0	0	tree
Acer rubrum	red maple	native	1	0	tree
Acer saccharinum	silver maple	native	2	-3	tree
Agrimonia parviflora	swamp agrimony	native	4	0	forb
Alisma triviale	northern water-plantain	native	1	-5	forb
Amphicarpaea bracteata	hog-peanut	native	5	0	vine
Apocynum cannabinum	indian-hemp	native	3	0	forb
Arisaema dracontium	green dragon	native	8	-3	forb
Asclepias incarnata	swamp milkweed	native	6	-5	forb
Bidens frondosa	common beggar-ticks	native	1	-3	forb
Boehmeria cylindrica	false nettle	native	5	-5	forb
Bolboschoenus fluviatilis	bulrush	native	6	-5	sedge
Calamagrostis canadensis	blue-joint	native	3	-5	grass
Calystegia sepium	hedge bindweed	native	2	0	vine
Carex bebbii	sedge	native	4	-5	sedge
Carex grayi	sedge	native	6	-3	sedge
Carex intumescens	sedge	native	3	-3	sedge
Carex lupulina	sedge	native	4	-5	sedge
Carex retrorsa	sedge	native	3	-5	sedge
Carex stipata	sedge	native	1	-5	sedge
Carex stricta	sedge	native	4	-5	sedge
Carex vulpinoidea	sedge	native	1	-5	sedge
Carya cordiformis	bitternut hickory	native	5	0	tree
Carya laciniosa	shellbark hickory	native	9	-3	tree
Celtis occidentalis	hackberry	native	5	0	tree
Cephalanthus occidentalis	buttonbush	native	7	-5	shrub
Cercis canadensis	redbud	native	8	3	tree
Cicuta maculata	water hemlock	native	4	-5	forb
Cornus sericea	red-osier	native	2	-3	shrub
Diarrhena obovata	beak grass	native	9	-3	grass
Elaeagnus umbellata	autumn-olive	non-native	0	3	shrub
Eleocharis erythropoda	spike-rush	native	4	-5	sedge
Elymus virginicus	Virginia wild-rye	native	4	-3	grass
Equisetum arvense	common horsetail	native	0	0	fern
Eutrochium maculatum	Joe-Pye-weed	native	4	-5	forb
Frangula alnus	glossy buckthorn	non-native	0	0	shrub
Fraxinus pennsylvanica	red ash	native	2	-3	tree
Galium obtusum	wild madder	native	5	-3	forb
Gleditsia triacanthos	honey locust	native	8	0	tree
Glyceria striata	fowl manna grass	native	4	-5	grass
Iris pseudacorus	yellow flag	non-native	0	-5	forb
Iris virginica	southern blue flag	native	5	-5	forb
Justicia americana	water-willow	native	9	-5	forb
Laportea canadensis	wood nettle	native	4	-3	forb
Leersia oryzoides	cut grass	native	3	-5	grass

Island Wetland Plant List Continued

Scientific name	Common name	Native or Non-Native	Coefficient of Conservatism	Wetland Rating	Physiognomy
Leersia virginica	white grass	native	5	-3	grass
Ligustrum obtusifolium	border privet	non-native	0	3	shrub
Lindera benzoin	spicebush	native	7	-3	shrub
Lysimachia ciliata	fringed loosestrife	native	4	-3	forb
Lysimachia nummularia	moneywort	non-native	0	-3	forb
Lythrum salicaria	purple loosestrife	non-native	0	-5	forb
Menispermum canadense	moonseed	native	5	0	vine
Mentha canadensis	wild mint	native	3	-3	forb
Myosotis scorpioides	forget-me-not	non-native	0	-5	forb
Nuphar variegata	yellow pond-lily	native	7	-5	forb
Onoclea sensibilis	sensitive fern	native	2	-3	fern
Persicaria amphibia	water smartweed	native	6	-5	forb
Persicaria virginiana	jumpseed	native	4	0	forb
Phalaris arundinacea	reed canary grass	native	0	-3	grass
Phragmites australis	reed	non-native	0	-3	grass
Phyla lanceolata	fog-fruit	native	6	-5	forb
Pilea pumila	clearweed	native	5	-3	forb
Platanus occidentalis	sycamore	native	7	-3	tree
Poa palustris	fowl meadow grass	native	3	-3	grass
Populus deltoides	cottonwood	native	1	0	tree
Potamogeton crispus	pondweed	non-native	0	-5	forb
Quercus bicolor	swamp white oak	native	8	-3	tree
Quercus palustris	pin oak	native	8	-3	tree
Rhamnus cathartica	common buckthorn	non-native	0	0	tree
Rosa multiflora	multiflora rose	non-native	0	3	shrub
Rudbeckia laciniata	cut-leaf coneflower	native	6	-3	forb
Rumex crispus	curly dock	non-native	0	0	forb
Sagittaria latifolia	common arrowhead	native	4	-5	forb
Salix nigra	black willow	native	5	-5	tree
Sanicula odorata	black snakeroot	native	2	0	forb
Saururus cernuus	lizard's-tail	native	9	-5	forb
Schoenoplectus tabernaemontani	softstem bulrush	native	4	-5	sedge
Scirpus atrovirens	bulrush	native	3	-5	sedge
Sium suave	water-parsnip	native	5	-5	forb
Solidago gigantea	late goldenrod	native	3	-3	forb
Sparganium eurycarpum	common bur-reed	native	5	-5	forb
Symphyotrichum lateriflorum	calico aster	native	2	0	forb
Symplocarpus foetidus	skunk-cabbage	native	6	-5	forb
Teucrium canadense	wood-sage	native	4	-3	forb
Tilia americana	basswood	native	5	3	tree
Toxicodendron radicans	poison-ivy	native	2	0	vine
Typha angustifolia	narrow-leaved cattail	non-native	0	-5	forb
Ulmus americana	American elm	native	1	-3	tree
Urtica dioica	stinging nettle	native	1	0	forb
Verbesina alternifolia	wing-stem	native	4	-3	forb
Vitis riparia	riverbank grape	native	3	0	vine

Shoreline Upland Plant List

Scientific name	Common name	Native or Non-Native	Coefficient of Conservatism	Wetland Rating	Physiognomy
Arctium minus	common burdock	non-native	0	3	forb
Asarum canadense	wild-ginger	native	5	5	forb
Carex blanda	sedge	native	1	0	sedge
Carpinus caroliniana	blue-beech	native	6	0	tree
Carya glabra	pignut hickory	native	5	3	tree
Carya ovata	shagbark hickory	native	5	3	tree
Cercis canadensis	redbud	native	8	3	tree
Circaea canadensis	enchanter's-nightshade	native	2	3	forb
Desmodium paniculatum	panicled tick-trefoil	native	4	3	forb
Dianthus armeria	deptford pink	non-native	0	5	forb
Elaeagnus umbellata	autumn-olive	non-native	0	3	shrub
Erigeron philadelphicus	Philadelphia fleabane	native	2	0	forb
Euonymus alatus	winged euonymus	non-native	0	5	shrub
Hepatica acutiloba	sharp-lobed hepatica	native	8	5	forb
Juglans nigra	black walnut	native	5	3	tree
Juncus tenuis	path rush	native	1	0	rush
Lonicera x bella	hybrid honeysuckle	non-native	0	3	shrub
Maianthemum stellatum	starry false Solomon-seal	native	5	0	forb
Osmunda claytoniana	interrupted fern	native	6	0	fern
Ostrya virginiana	ironwood	native	5	3	tree
Oxalis stricta	yellow wood-sorrel	native	0	3	forb
Parthenocissus quinquefolia	Virginia creeper	native	5	3	vine
Podophyllum peltatum	may-apple	native	3	3	forb
Potentilla simplex	old-field cinquefoil	native	2	3	forb
Prunella vulgaris	self-heal	native	0	0	forb
Prunus serotina	wild black cherry	native	2	3	tree
Quercus alba	white oak	native	5	3	tree
Quercus ellipsoidalis	Hill's oak	native	4	5	tree
Quercus macrocarpa	bur oak	native	5	3	tree
Quercus rubra	red oak	native	5	3	tree
Rhamnus cathartica	common buckthorn	non-native	0	0	tree
Rosa multiflora	multiflora rose	non-native	0	3	shrub
Sanguinaria canadensis	bloodroot	native	5	3	forb
Sanicula marilandica	black snakeroot	native	4	3	forb
Sassafras albidum	sassafras	native	5	3	tree
Thalictrum dioicum	early meadow-rue	native	6	3	forb
Tilia americana	basswood	native	5	3	tree
Toxicodendron radicans	poison-ivy	native	2	0	vine
Triosteum perfoliatum	horse-gentian	native	5	5	forb

Island Upland Plant List

Scientific name	Common name	Native or Non-Native	Coefficient of Conservatism	Wetland Rating	Physiognomy
Berberis vulgaris	common barberry	non-native	0	3	shrub
Carya ovata	shagbark hickory	native	5	3	tree
Cercis canadensis	redbud	native	8	3	tree
Circaea canadensis	enchanter's-nightshade	native	2	3	forb
Elaeagnus umbellata	autumn-olive	non-native	0	3	shrub
Festuca rubra	red fescue	non-native	0	3	grass
Helianthus divaricatus	woodland sunflower	native	5	5	forb
Hylodesmum glutinosum	clustered-leaved tick-trefoil	native	5	5	forb
Juglans nigra	black walnut	native	5	3	tree
Ligustrum obtusifolium	border privet	non-native	0	3	shrub
Parthenocissus quinquefolia	Virginia creeper	native	5	3	vine
Persicaria virginiana	jumpseed	native	4	0	forb
Plantago major	common plantain	non-native	0	3	forb
Poa pratensis	Kentucky bluegrass	non-native	0	3	grass
Podophyllum peltatum	may-apple	native	3	3	forb
Prunella vulgaris	self-heal	native	0	0	forb
Prunus serotina	wild black cherry	native	2	3	tree
Quercus alba	white oak	native	5	3	tree
Quercus rubra	red oak	native	5	3	tree
Rhamnus cathartica	common buckthorn	non-native	0	0	tree
Rosa multiflora	multiflora rose	non-native	0	3	shrub
Sanicula odorata	black snakeroot	native	2	0	forb
Sassafras albidum	sassafras	native	5	3	tree
Staphylea trifolia	bladdernut	native	9	0	shrub
Toxicodendron radicans	poison-ivy	native	2	0	vine
Verbesina alternifolia	wing-stem	native	4	-3	forb
Zanthoxylum americanum	prickly-ash	native	3	3	shrub

All Wetlands Plant List

Scientific name	Common name	Native or Non-Native	Coefficient of Conservatism	Wetland Rating	Physiognomy
Acer negundo	box-elder	native	0	0	tree
Acer rubrum	red maple	native	1	0	tree
Acer saccharinum	silver maple	native	2	-3	tree
Agrimonia parviflora	swamp agrimony	native	4	0	forb
Alisma triviale	northern water-plantain	native	1	-5	forb
Amphicarpaea bracteata	hog-peanut	native	5	0	vine
Apocynum cannabinum	indian-hemp	native	3	0	forb
Arisaema dracontium	green dragon	native	8	-3	forb
Asclepias incarnata	swamp milkweed	native	6	-5	forb
Asimina triloba	pawpaw	native	9	0	tree
Barbarea vulgaris	yellow rocket	non-native	0	0	forb
Bidens frondosa	common beggar-ticks	native	1	-3	forb
Boehmeria cylindrica	false nettle	native	5	-5	forb
Bolboschoenus fluviatilis	bulrush	native	6	-5	sedge
Cabomba caroliniana	fanwort	non-native	0	-5	forb
Calamagrostis canadensis	blue-joint	native	3	-5	grass
Calystegia sepium	hedge bindweed	native	2	0	vine
Carex bebbii	sedge	native	4	-5	sedge
Carex grayi	sedge	native	6	-3	sedge
Carex intumescens	sedge	native	3	-3	sedge
Carex lacustris	sedge	native	6	-5	sedge
Carex lupulina	sedge	native	4	-5	sedge
Carex retrorsa	sedge	native	3	-5	sedge
Carex stipata	sedge	native	1	-5	sedge
Carex stricta	sedge	native	4	-5	sedge
Carex vulpinoidea	sedge	native	1	-5	sedge
Carpinus caroliniana	blue-beech	native	6	0	tree
Carya cordiformis	bitternut hickory	native	5	0	tree
Carya laciniosa	shellbark hickory	native	9	-3	tree
Celtis occidentalis	hackberry	native	5	0	tree
Cephalanthus occidentalis	buttonbush	native	7	-5	shrub
Cercis canadensis	redbud	native	8	3	tree
Cicuta maculata	water hemlock	native	4	-5	forb
Cornus amomum	silky dogwood	native	2	-3	shrub
Cornus sericea	red-osier	native	2	-3	shrub
Diarrhena obovata	beak grass	native	9	-3	grass
Elaeagnus umbellata	autumn-olive	non-native	0	3	shrub
Eleocharis erythropoda	spike-rush	native	4	-5	sedge

All Wetlands Plant List Continued

Scientific name	Common name	Native or Non-Native	Coefficient of Conservatism	Wetland Rating	Physiognomy
Elymus virginicus	Virginia wild-rye	native	4	-3	grass
Equisetum arvense	common horsetail	native	0	0	fern
Eutrochium maculatum	Joe-Pye-weed	native	4	-5	forb
Frangula alnus	glossy buckthorn	non-native	0	0	shrub
Fraxinus pennsylvanica	red ash	native	2	-3	tree
Galium obtusum	wild madder	native	5	-3	forb
Gleditsia triacanthos	honey locust	native	8	0	tree
Glyceria striata	fowl manna grass	native	4	-5	grass
Helianthus giganteus	tall sunflower	native	5	-3	forb
Impatiens capensis	spotted touch-me-not	native	2	-3	forb
Iris pseudacorus	yellow flag	non-native	0	-5	forb
Iris virginica	southern blue flag	native	5	-5	forb
Justicia americana	water-willow	native	9	-5	forb
Laportea canadensis	wood nettle	native	4	-3	forb
Leersia oryzoides	cut grass	native	3	-5	grass
Leersia virginica	white grass	native	5	-3	grass
Lemna minor	common duckweed	native	5	-5	forb
Ligustrum obtusifolium	border privet	non-native	0	3	shrub
Lilium michiganense	Michigan lily	native	5	-3	forb
Lindera benzoin	spicebush	native	7	-3	shrub
Lycopus americanus	common water horehound	native	2	-5	forb
Lysimachia ciliata	fringed loosestrife	native	4	-3	forb
Lysimachia nummularia	moneywort	non-native	0	-3	forb
Lythrum salicaria	purple loosestrife	non-native	0	-5	forb
Menispermum canadense	moonseed	native	5	0	vine
Mentha canadensis	wild mint	native	3	-3	forb
Myosotis scorpioides	forget-me-not	non-native	0	-5	forb
Nuphar variegata	yellow pond-lily	native	7	-5	forb
Nymphaea odorata	sweet-scented waterlily	native	6	-5	forb
Onoclea sensibilis	sensitive fern	native	2	-3	fern
Penthorum sedoides	ditch stonecrop	native	3	-5	forb
Persicaria amphibia	water smartweed	native	6	-5	forb
Persicaria hydropiper	water-pepper	native	1	-5	forb
Persicaria virginiana	jumpseed	native	4	0	forb
Phalaris arundinacea	reed canary grass	native	0	-3	grass
Phragmites australis	reed	non-native	0	-3	grass
Phyla lanceolata	fog-fruit	native	6	-5	forb
Pilea pumila	clearweed	native	5	-3	forb
Platanus occidentalis	sycamore	native	7	-3	tree
Poa palustris	fowl meadow grass	native	3	-3	grass

All Wetlands Plant List Continued

Scientific name	Common name	Native or Non-Native	Coefficient of Conservatism	Wetland Rating	Physiognomy
Populus deltoides	cottonwood	native	1	0	tree
Potamogeton crispus	pondweed	non-native	0	-5	forb
Quercus bicolor	swamp white oak	native	8	-3	tree
Quercus palustris	pin oak	native	8	-3	tree
Ranunculus acris	tall buttercup	non-native	0	0	forb
Rhamnus cathartica	common buckthorn	non-native	0	0	tree
Ribes americanum	wild black currant	native	6	-3	shrub
Rorippa palustris	yellow cress	native	1	-5	forb
Rosa multiflora	multiflora rose	non-native	0	3	shrub
Rudbeckia laciniata	cut-leaf coneflower	native	6	-3	forb
Rumex crispus	curly dock	non-native	0	0	forb
Rumex verticillatus	water dock	native	7	-5	forb
Sagittaria latifolia	common arrowhead	native	4	-5	forb
Salix nigra	black willow	native	5	-5	tree
Sanicula odorata	black snakeroot	native	2	0	forb
Saururus cernuus	lizard's-tail	native	9	-5	forb
Schoenoplectus pungens	threesquare	native	5	-5	sedge
Schoenoplectus tabernaemontani	softstem bulrush	native	4	-5	sedge
Scirpus atrovirens	bulrush	native	3	-5	sedge
Sium suave	water-parsnip	native	5	-5	forb
Smilax rotundifolia	common greenbrier	native	6	0	vine
Solanum dulcamara	bittersweet nightshade	non-native	0	0	vine
Solidago gigantea	late goldenrod	native	3	-3	forb
Sparganium eurycarpum	common bur-reed	native	5	-5	forb
Staphylea trifolia	bladdernut	native	9	0	shrub
Symphyotrichum lanceolatum	panicled aster	native	2	-3	forb
Symphyotrichum lateriflorum	calico aster	native	2	0	forb
Symplocarpus foetidus	skunk-cabbage	native	6	-5	forb
Teucrium canadense	wood-sage	native	4	-3	forb
Tilia americana	basswood	native	5	3	tree
Toxicodendron radicans	poison-ivy	native	2	0	vine
Typha angustifolia	narrow-leaved cattail	non-native	0	-5	forb
Ulmus americana	American elm	native	1	-3	tree
Urtica dioica	stinging nettle	native	1	0	forb
Verbesina alternifolia	wing-stem	native	4	-3	forb
Vitis riparia	riverbank grape	native	3	0	vine

Appendix D: Representative Site Photographs

Photograph 1: View south of disturbed uplands extending to the edge of the former tailrace east of Huroc Park at the far downstream end of the assessment area.

Photograph 2: View north of concrete walls/steps extending to the edge of the Huron River downstream of the Flat Rock Dam.

Photograph 3: View upstream of metal seawall along the north bank of the Huron River upstream of the Flat Rock Dam.

Photograph 4: View upstream of wetland fringe along the north bank of the Huron River upstream of the Flat Rock Dam.

Photograph 5: View upstream of forested wetland fringe along the south bank of the Huron River upstream of the Flat Rock Dam.

Photograph 6: View south of an emergent wetland island within the main channel of the Huron River upstream of the Flat Rock Dam.

Photograph 7: View southeast of floating wetland vegetation along the north bank of the Huron River upstream of the Flat Rock Dam.

Photograph 8: View east of forested wetland fringe along the south bank of the Huron River upstream of the Flat Rock Dam.

Photograph 9: View south of forested wetlands on an island in the main channel of the Huron River upstream of the Flat Rock Dam.

Photograph 10: View east of wetland fringe including state threatened water willow (*Justicia americana*) along the north bank of the Huron River upstream of the Flat Rock Dam.

Photograph 11: Closeup view of threatened water willow (*Justicia americana*) flowering along the south bank of the Huron River.

Photograph 12: View west of forested and floating wetlands along a backwater of the Huron River upstream of the Flat Rock Dam.

Photograph 13: View southeast of wetlands at the bottom of a steep slope along the south bank of the Huron River upstream of the Flat Rock Dam.

Photograph 14: View north of a patch of threatened water willow (*Justicia americana*) flowering along the south bank of the Huron River.

Photograph 15: View north of floating wetland vegetation and forested wetland islands (background) from the south bank of the Huron River upstream of the Flat Rock Dam.

Photograph 16: View west of forested wetlands along the south bank of the Huron River upstream of the Flat Rock Dam.

Photograph 17: View north of forested wetlands along the south bank of the Huron River upstream of the Flat Rock Dam.

Photograph 18: View east of forested wetlands along the south bank of the Huron River upstream of the Flat Rock Dam.

Photograph 19: View north of a small opening within forested wetland on an island in the Huron River upstream of the Flat Rock Dam.

Photograph 20: View west of forested wetlands on an island in the Huron River upstream of the Flat Rock Dam.

Photograph 21: View south of forested wetlands on a large peninsula in the Huron River upstream of the Flat Rock Dam.

Photograph 22: View west of a small backwater of the Huron River and the highly conservative plant, lizard's-tail (*Saururus cernuus*), from an isolated peninsula.

Photograph 23: View west of forested wetlands on a large peninsula in the Huron River upstream of the Flat Rock Dam.

Photograph 24: View north of isolated upland forest on a large peninsula within the Huron River upstream of the Flat Rock Dam.

Photograph 25: View upstream towards floating wetland vegetation in a backwater of the Huron River at the far upstream end of the assessment area.

Photograph 26: View downstream towards open water in a backwater of the Huron River at the far upstream end of the assessment area.

Photograph 27: View east of floating wetland vegetation in a backwater of the Huron River at the far upstream end of the assessment area.

Photograph 28: View north of a steep upland ridge leading down to wetland and the Huron River at the far upstream end of the assessment area.