APPENDIX D:
Michigan Rapid Assessment Method for Wetlands (MiRAM) Field Forms

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DNRE

MiRAM Version 2.1

Rating Form

July 23, 2010

MICHIGAN RAPID ASSESSMENT METHOD FOR WETLANDS (MIRAM)

Department of Natural Resources and Environment
Land and Water Management Division

The Michigan Rapid Assessment Method for Wetlands (MiRAM) is a tool to determine the "functional value" of a particular wetland and to assign a rating level to that wetland as compared to other wetlands. The goal of this rating system is to assess individual wetlands on an equal scale regardless of ecological type. MiRAM offers a relatively rapid assessment of wetland functions and values, but it is not intended to replace more detailed quantitative measures of ecosystem function, such as Indices of Biological Integrity (IBI), Floristic Quality Assessment (FQA), or other detailed ecological studies.

The initial step of MiRAM is the proper identification of the Wetland Evaluation Area (Wetland) using the MiRAM Boundary Guidelines in the *MiRAM User's Manual*. The MiRAM evaluation contains two rating systems: the **Narrative Rating,** and the **Quantitative Rating**. First, the Evaluator is required to complete the Narrative Rating, which relies on accurate identification of several types of wetlands with significant ecological values, which automatically rates the Wetland as having high functional value. If the Wetland is not identified as having high functional value by the Narrative Rating, the Evaluator must complete the Quantitative Rating. The Quantitative Rating is a series of metrics regarding the Wetland. The Quantitative Rating is designed to provide a numeric score that reflects the functional value of a Wetland, which includes a Wetland's ecological condition (integrity) and its potential to provide ecological and societal services (functions and values).

The MiRAM requires a knowledge and understanding of wetlands and is designed to be used by Michigan Department of Natural Resources and Environment (DNRE) staff and other wetland professionals. Although the MiRAM rating form has been designed to provide sufficient information for a trained Evaluator to properly complete, it is highly recommended that the Evaluator read and understand the *MiRAM User's Manual,* as it provides additional explanations and examples.

The MiRAM was designed to be used during times when adequate plant growth allows for proper identification of most plant species within the Wetland. Typically, this follows the growing season for a particular region. MiRAM evaluations conducted outside the growing season will receive an additional 10 points due to the inability to properly identify all wetland features during this time of year. MiRAM is not designed to be used in times of snow cover.

If the Wetland and/or buffer areas have been impacted (cutting, mowing, development, etc.) during the past five years, the DNRE may rate the Wetland as if those impacts have not occurred and will presume that the impacted areas were of the best/highest quality possible for that type of wetland.

It is not the intent of MiRAM to modify the existing regulatory process in Michigan. Instead, it is intended that the MiRAM will supplement the existing process by providing additional information. The numeric score obtained from the MiRAM is not, and should not be considered, an absolute number with intrinsic meaning, but should be considered in light of other available information. It should be noted that the MiRAM is an assessment of "functional value" and is different from the determination of whether a particular location *is* a wetland (i.e., jurisdictional wetland).

The most recent version of this document and the *MiRAM User's Manual* are posted at:

www.michigan.gov/wetlands

Background Information

Wetland

Proposed Project Site Name or DNRE File #:
I-275, WC004
Date of Evaluation: 7/23/2012
County: Wayne
Township: Canton
Town: 2S
Range: 8E
Section: 21
Decimal Lat/Long: 42.3339, -83.4429

Evaluator

Name: S. Kogge, R. Roos		
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Is a Wetland Delineation Report available?
☐ YES ☒ NO Date Completed:_____
If "YES", completed by (name of person/firm/agency):

Check (√) each box below when item is complete.

☒ **MiRAM Boundary**. See *MiRAM User's Manual* for more information
Size of the Wetland Evaluation Area: 0.3 acres

☒ **Location Map**. A county road map showing the location of the Wetland Evaluation Area, north arrow, map scale information, roads, landmarks, etc. *Attach* a map to the end of this document.

☒ **Color Photographs**. Photos should show the wetland vegetation components, habitat/community types, hydrologic features, and any other pertinent site features. *Attach* to the end of this document.

☒ **Landscape Sketch or Aerial Photograph**.

1. Clearly label the Proposed Project Site and Wetland Evaluation Area. Indicate the location of the MiRAM Boundary.
2. Label and indicate the extent of all general wetland community types identified within the Wetland Evaluation Area. Examples include: marsh, wet meadow, hardwood swamp, conifer swamp, shrub swamp, etc. Some wetland communities may be further classified as natural communities. Natural communities are predominantly structured by natural processes rather than modern anthropogenic disturbances. Examples include: bog, prairie fen, muskeg, wet prairie, southern wet meadow, etc.
3. Identify and label all hydrologic features, such as: streams, 100-year floodplains, ponds, vernal pools, and small patches of open water within a marsh or swamp.
4. Identify and label surrounding upland features.
5. Include north arrow and map scale information.
6. *Attach* the landscape sketch or aerial photo to the end of this document.

Comments: List any important site features or apparent disturbance events that have occurred within or near the Wetland Evaluation Area.

WC004 is between bike path and I-275.

Field Datasheet

List plant species observed within the Wetland. *Attach* additional sheets as necessary.
Nomenclature will follow Voss (1972,1985,1996) or Gleason and Cronquist (1991).

Forest Overstory Stratum (woody plants 3 inches or more DBH, regardless of height)

none observed	

Shrub/Sapling Stratum (woody plants less than 3 inches DBH and greater than 3.28 feet tall)

Fraxinus pennsylvanica	
Rhamnus frangula	
Ulmus americana	

Herbaceous Stratum (non-woody plants, regardless of size, and woody plants less than 3.28 feet tall)

Aster lanceolatus	Saponaria officinalis
Calystegia sepium	Solidago gigantea
Elymus virginicus	Teucrium canadense
Lycopus americanus	Typha angustifolia
Phalaris arundinacea	Vitis riparis
Phragmites australis	
Polygonum persicaria	
Rumex crispus	

Checklist of features and conditions to observe during the field inspection:

- ☐ Hydrologic Condition and Interactions
- ☐ Hydrologic Alterations
- ☐ Substrate/Soil Disturbances
- ☐ Habitat Structure Development
- ☐ Habitat Alterations
- ☐ Habitat/Wetland Condition
- ☐ Amphibian Breeding Pools
- ☐ Vegetation Diversity
- ☐ Vegetation Condition
- ☐ Amount of Open Water
- ☐ Percent of Invasive/Non-native Species
- ☐ Community Interspersion
- ☐ Vertical/Horizontal Structure
- ☐ S1, S2, or S3 Natural Community

Approximately how much of the Wetland Evaluation Area was reviewed during the field inspection? 90 %

Has vegetation within the Wetland Evaluation Area been altered and/or buffer areas impacted <u>within the past 5 years</u>? ☒ YES ☐ NO

Please Note: The Wetland Evaluation Area (encompassed by the MiRAM Boundary) is simply referred to as the "Wetland" throughout the remainder of this document.

Narrative Rating

Completion of the Narrative Rating allows the Evaluator to quickly identify whether the Wetland is one of several wetland types that typically have exceptional ecological value. If any of the metrics are answered affirmatively, the Wetland has *exceptional ecological value and is automatically rated as having high functional value* and completion of the Quantitative Rating is not necessary. If none of the metrics are answered affirmatively, proceed to the Quantitative Rating.

Answer all of the following metrics.

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat.

Is any part of the Wetland located within an area designated as Critical Habitat and does the Wetland *actually* contain habitat suitable for either species listed below?

Piping Plover (*Charadrius melodus*) Critical Habitat Units are designated only within the following counties: Alger, Benzie, Charlevoix, Cheboygan, Chippewa, Emmet, Iosco, Leelanau, Luce, Mackinac, Mason, Muskegon, Presque Isle, and Schoolcraft. See URL below for Unit locations.
www.fws.gov/midwest/endangered/pipingplover/final_rule.pdf

Hines's Emerald Dragonfly (*Somatochlora Hineana*) Critical Habitat Units are designated only within the following counties: Alpena, Mackinac, and Presque Isle. See URL below for Unit locations.
www.fws.gov/midwest/endangered/insects/hed/pdf/hinesfCH_FR.pdf

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

2. Threatened or Endangered (T/E) Species.

Do federal/state-listed T/E plant or animal species occur within the Wetland? Complete the following questions to answer this metric.

a. ☐YES ☒NO Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c.

b. ☐YES ☒NO Does the T/E survey indicate T/E species present within the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric.

c. ☐YES ☒NO Has the Evaluator (or others known to the Evaluator) observed any T/E species within the Wetland? If "Yes," answer "Yes" to this metric. If "No," go to question d.

d. ☐YES ☒NO Does the DNRE Endangered Species Assessment (ESA) web site interactive map, **www.mcgi.state.mi.us/esa,** indicate that there is a potential for unique natural features at or near your site of interest"?" If "No," answer "No" to this metric. If "Yes," request a DNRE formal review by submitting the online form. Type "MiRAM" within the "Project Information" field on the form. Go to question e.

e. ☐YES ☒NO Did the DNRE review confirm potential T/E occurrence in the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric. **The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE**.

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

3. Rare Wetland Natural Community Type.

Are more than 5 acres *or* more than 25% of the Wetland comprised of a Rare Wetland Natural Community Type*? Check (√) all Rare Wetland Natural Community Types

☐ **S1 or S2 Natural Community Type.**
Has the Wetland been identified by the Evaluator — *or other persons* — as being an S1 or S2 natural community type as defined by the Michigan Natural Features Inventory (MNFI)? See the *MiRAM User's Manual* for more information.

☐ **Southern Bog**, defined as any bog occurring below the northern limit of Michigan's Floristic Tension Zone (see figure for approximate location).

☐ **Old-Growth/Mature Forested Wetland.** Lacks evidence of any significant harvesting. Dominated by large, overstory trees (mean overstory DBH ≥20 inches, including at least two trees/acre having DBH ≥28 inches) and the canopy is multi-aged and multi-layered. Aggregations of canopy trees are interspersed with canopy gaps and large snags. Large nursery logs and tip-up mounds litter the forest floor. Does the forested Wetland have all/most of these characteristics?

*If the Rare Wetland Community Type is less than 5 acres *and* less than 25% of the Wetland, the rare community should be split off and evaluated separately.

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

4. Great Lakes Coastal Wetland.

Is any part of the Wetland within 1,000 feet of the ordinary high water mark of any of the Great Lakes, including Lake St. Clair?

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

Quantitative Rating

Completion of the Quantitative Rating assists the Evaluator in recognizing the functional value of the Wetland. Complete all metrics by completing all sections, circling the correct point value(s), and assigning a score.

Metric 1. Wetland Size and Distribution

Maximum 9 points.

1a. Wetland Size Estimate the size of the Wetland (i.e., Wetland Evaluation Area). Select a size class. **Maximum 6 points.**			**Score**
50	acres	Select this option if the wetland's actual size ≥ 50 acres.	6 pts
25	acres to <50 acres		5 pts
10	acres to <25 acres		4 pts
3	acres to <10 acres		3 pts
¼	acre to <3 acres		2 pts
less than ¼ acre			0 pt

0.0

1b. Wetland Scarcity Utilize the USFWS National Wetlands Inventory (NWI) maps to estimate percentage of wetland area remaining within a 2-mile radius from the Wetland's center. For the purpose of this submetric, areas of open water within the Great Lakes, inland lakes, streams, etc., should be excluded from the wetland percentage. Select the most appropriate percentage category. **Maximum 3 points.**		**Score**
0 to 20% of surrounding 2-mile radius is wetland	3 pts	3.0
>20 to 80% of surrounding 2-mile radius is wetland	2 pts	
>80% of surrounding 2-mile radius is wetland	1 pt	

3.0	**Metric 1 Total** add 1a & 1b **(9 points max.)**

Metric 2. Upland Buffers and Intensity of Surrounding Land Use

Maximum 12 points.

2a. Average Buffer Width around the Wetland's Perimeter

Step 1: Using the most recent aerial photograph available, sketch a 150-foot wide "buffer zone" around the Wetland.
Step 2: Estimate the buffer widths from the Wetland's edge to any non-buffer areas (up to 150 feet).
Step 3: Average the buffer widths along the Wetland's perimeter.
Step 4: Select the buffer width that is most appropriate. **Maximum 6 points**.

Buffers Include:

- shrubland, young forest, natural grassland, prairie
- abandoned row crop field (vegetated & naturalizing)
- hay field (non-row crop), lightly grazed pasture
- lightly managed forest (selectively logged)
- designated wildlife area, lightly managed parkland
- other wetland, lake, river

Non-Buffers Include:

- lawns, golf courses, manicured parkland
- residential, commercial, industrial
- roadways (including shoulders), parking lots
- row crop field
- conservation tillage, heavily grazed pasture
- clear-cutting, mining, construction activity

			Score
Wide Buffer Width:	≥150 feet around the perimeter	6 pts	0.0
Medium Buffer Width:	75 to <150 feet around the perimeter	4 pts	
Narrow Buffer Width:	25 to <75 feet around the perimeter	2 pt	
Very Narrow Buffer Width:	0 (no buffer) to <25 feet around the perimeter	0 pt	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland

Step 1: Using the most recent aerial photograph available, sketch a 1,000-foot wide "land use zone" around the Wetland.

Step 2: Estimate percent coverages comprised by each of the four types of land use listed below.

Step 3: If any land use type comprises more than 25% of the total land use, it is considered to be a "dominant" land use type for the purposes of MiRAM and will receive points. Sum the available points from all dominant land use types and then average the score. Round to the nearest 0.5 increment. **Maximum 6 points**.

Type of Land Use	Examples within each Type of Land Use			Score
Very Low Intensity:	• maturing forest • natural grassland, prairie	• designated wildlife area • other wetland, lake, river	6 pts	1.0
Low Intensity:	• shrubland/young forest • recent selective logging • hay field (non-row crop)	• lightly managed parkland • old field, lightly grazed pasture • one-lane road/two track	4 pts	
Moderately High Intensity:	• residential & lawns • manicured parkland • golf course	• conservation tillage • recent clear-cut (<10 years) • two-lane road	2 pts	
High Intensity:	• commercial, industrial • high-density residential • heavily grazed pasture • row crop field	• multi-lane paved roadway • construction activity • parking lot • mining	1 pt	

1.0	**Metric 2 Total** add 2a & 2b **(12 points max.)**

Metric 3. Hydrology

Limited to 26 points.

3a. Sources of Water: Select all that apply. **Maximum 8 points**.		Score
Precipitation: Directly and/or as runoff from upland areas.	1 pt	1.0
Groundwater: Seeps or evidence, such as significant amounts of skunk cabbage (*Symplocarpus foetidus*) or other fen-adapted species.	2 pts	0.0
Seasonal/Intermittent Surface Water: Seasonal inundation from a lake, pond, or stream. (A Wetland can only receive points for this source of water or the next, not both.)	2 pts	0.0
Perennial Surface Water: Perennial inundation from a lake, stream or pond.	5 pts	0.0

3b. Connectivity: Select all that apply. **Maximum 8 points**.		Score
100-Year Floodplain. As defined in the Floodplain Authority under Part 31 of the NREPA.	2 pts	2.0
Between a Stream/Lake/Pond and Human Land Use. The Wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the Wetland before it discharges into the surface waterbody.	2 pts	2.0
Wetland/Upland Complex. The Wetland is part of a large scale (10+ acres) non-linear complex of wetlands with small areas of unmanicured/undeveloped vegetated uplands that do not restrict movement of organisms between the wetland areas.	2 pts	0.0
Riparian Corridor. The Wetland is part of a linear *riparian* corridor that provides organism movement along a stream/river. Typically, these corridors should exceed 100 feet in width and extend at least one half mile.	2 pts	0.0

3c. Duration of Inundation/Saturation Select the option(s) from below that best describe(s) the dominant hydrologic characteristic of the Wetland. For the purposes of this submetric, "dominant" is defined as comprising at least 25% of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, select all that apply and average the points. Round to the nearest 0.5 increment. **Maximum 4 points.**		**Score**
Permanently Inundated	4 pts	1.0
Permanently Saturated to Regularly Inundated	3 pts	
Regularly Saturated to Seasonally Inundated	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil	1 pt	

3d. Alterations to Natural Hydrologic Regime

This submetric evaluates the intactness of the natural hydrologic regime of the Wetland.
Check (√) all forms of past or ongoing hydrologic alteration(s) that are potentially influencing the Wetland.

- ☒ ditch(es) in or near the wetland
- ☐ tile(s) in or near the wetland
- ☐ dike(s) in or near the wetland
- ☐ weir(s) in or near the wetland
- ☐ stormwater inputs (addition of water)
- ☐ stream channelization
- ☐ point source discharge(s) (non-stormwater)
- ☐ filling/grading activities in or near the wetland
- ☒ road bed(s)/RR grades(s) in or near the wetland
- ☐ dredging activities in or near the wetland
- ☐ other (specify)
- ☐ other (specify)

Evaluate whether an alteration is significant or minor in relation to the Wetland's overall area and hydrologic regime. For this submetric, "significant" is defined as affecting approximately 10% or greater of the Wetland. "Minor" is defined as affecting less than approximately 10% of the Wetland. A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).

Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's natural hydrologic regime. If uncertain, select adjoining options and average the available points. Round to the nearest 0.5 increment. If the Wetland's natural hydrologic regime has been significantly altered, it shall receive no more than 6 points for this submetric. **Maximum 8 points.**			**Score**
No Hydrologic Alterations Apparent:	There has been no significant alteration(s) to the Wetland's natural hydrologic regime, and/or ongoing minor alteration(s) is/are rare.	8 pts	4.0
Recovered:	Significant hydrologic alteration(s) occurred more than 20 years prior to the assessment, and/or ongoing minor hydrologic alteration(s) is/are only occasional.	6 pts	
Recovering:	A single significant hydrologic alteration occurred within 20 years prior to the assessment, and/or ongoing minor hydrologic alteration(s) is/are frequent.	4 pts	
Recent or No Recovery:	Multiple significant hydrologic alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt	

10.0	**Metric 3 Total** add 3a – 3d **(26 points max.)**

Metric 4. Habitat Alteration and Habitat Structure Development
Maximum 20 Points.

4a. Substrate/Soil Disturbance

This submetric evaluates the intactness or lack of disturbance to the Wetland's substrate and soil. Check (√) all possible forms of past or ongoing substrate/soil disturbance that are observed within the Wetland.

- ☒ human-induced erosion or exposure
- ☒ human-induced sedimentation or burial
- ☐ filling
- ☐ grading
- ☐ dredging
- ☐ plowing, disking
- ☐ intensive grazing (hooves)
- ☐ off-road vehicle use
- ☒ construction vehicle use
- ☐ other (specify)

Evaluate whether a disturbance is significant or minor in relation to the Wetland's overall area. For this submetric, "significant" is defined as affecting approximately 10% or greater of the Wetland. "Minor" is defined as affecting less than approximately 10% of the Wetland. A substrate disturbance may also be an alteration of the natural hydrologic regime (Submetric 3d) and/or an alteration of habitat (Submetric 4b).

Select an option below that best describes the extent of (or lack of) disturbances to the Wetland's substrate. If uncertain, select adjoining options and average the points. Round to the nearest 0.5 increment. If the Wetland's substrate has been significantly altered, it should receive no more than 3 points. **Maximum 4 points.**

			Score
No Substrate Disturbance Apparent:	There has been no significant disturbance to the Wetland's substrate and/or ongoing minor disturbance events are rare.	4 pts	1.0
Recovered:	Significant substrate disturbance occurred more than 20 years prior to the assessment, and/or ongoing minor substrate disturbance events are only occasional (e.g., light sedimentation from a nearby dirt road).	3 pts	
Recovering:	A single significant substrate disturbance event occurred within 20 years prior to the assessment, and/or ongoing minor substrate disturbance events are frequent.	2 pts	
Recent or No Recovery:	Multiple significant substrate disturbance events have occurred in the 20 years prior to the assessment, and/or significant disturbance is ongoing.	1 pt	

4b. Habitat Alteration

This submetric evaluates the intactness of the natural habitat within the Wetland. A "significant" alteration is defined as affecting 10% or greater of the Wetland. "Minor" alternation affects less than 10% of the Wetland. Check (√) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland.

- ☒ barriers such as road bed(s)/RR grades(s)
- ☐ selective cutting
- ☐ clearcutting
- ☒ mowing or shrub removal
- ☐ coarse woody debris (CWD) removal
- ☐ intensive grazing
- ☐ nutrient enrichment, e.g., nuisance algae
- ☐ herbicide/chemical treatment
- ☐ sedimentation
- ☐ dredging
- ☐ filling/grading
- ☐ plowing/disking/farming
- ☒ other (specify)

Utilize aerial photography and field evidence to determine if any habitat alterations occurred prior to approximately 20 years ago. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes, such as large, woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc. Disregard changes that can be attributed to wetland community succession or other natural processes. A habitat alteration may also be an alteration of the natural hydrologic regime (Submetric 3d) and/or a substrate disturbance (Submetric 4a).

Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's habitat. If unclear, select adjoining options and average the available points. Round to the nearest 0.5 increment. **Maximum 9 points**.

			Score
No Habitat Alterations Apparent:	There has been no significant alteration to the Wetland's natural habitat, and/or ongoing minor alteration(s) is/are rare.	9 pts	3.0
Recovered:	Significant habitat alteration(s) occurred more than 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are only occasional.	6 pts	
Recovering:	A single, significant habitat alteration occurred within 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are frequent.	3 pts	
Recent or No Recovery:	Multiple significant habitat alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt	

4c. Habitat Structure Development

Determine an overall qualitative rating of how well developed the Wetland is in comparison to the best of its type. For this submetric, a wetland's type is defined as any ecologically and/or hydrogeomorphically similar wetland habitat typical of the region. Well-developed communities, regardless of successional state, often exhibit many of the following habitat characteristics:

- Quality vertical habitat, such as hummocks, organic debris, and diverse plant height ranges.
- Quality horizontal habitat, such as varying vegetation density and patchiness, moderate ratios of open space to cover, plant species diversity, and a wide range of plant ages.
- Other ecological attributes, such as a diverse assortment of the following: breeding areas, rearing areas, feeding areas, niche space, etc.

Select an option below that best describes the Wetland's habitat structure development. If unclear, select adjoining options and average the points. Round to the nearest 0.5 increment.
Maximum 7 points.

			Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	2.0
Good:	Wetland appears to be a good example of its type but because of past or present disturbance, or other reasons, is not excellent.	5 pts	
Fair:	Wetland appears to be a moderately good example of its type but because of past or present disturbance, or other reasons, is not good.	3 pts	
Poor:	Wetland is a poor example of its type because of past or present disturbance, or other reasons.	1 pt	

6.0 **Metric 4 Total** add 4a – 4c **(20 points max.)**

Metric 5. Special Situations

Refer to the Narrative Rating for definitions and the *User's Manual* for guidance, **Limited to 10 points**

5a. High Ecological Value. See Narrative Rating for definitions of each.
10 points for each that apply.

☐ 1. Contains USFWS-designated Critical Habitat
☐ 2. Federal or State-listed T/E Plant or Animal Species
☐ 3. S1, S2, or S3 Natural Community Type (at least 5 acres or 25% of the Wetland)
☐ 4. Southern Bog (at least 5 acres or 25% of the Wetland)
☐ 5. Old-Growth/Mature Forested Wetland (at least 5 acres or 25% of the Wetland)
☐ 6. Great Lakes Coastal Wetland

Score: 0.0

5b. Forested Wetland. **5 points**.
Exhibits combined canopy cover from any group(s) of trees. Stem DBH must be at least 3 inches to qualify as a tree. Total area must comprise at least 5 acres or 25% of the Wetland. Does not qualify if most of the trees are ungrouped and widely scattered (e.g., a savanna), or located only thinly along the Wetland's margin.

Score: 0.0

5c. Urban/Suburban Wetland. **5 points**.
Greater than 50% of the surrounding landscape (1,000 foot radius) is comprised of low-permeability surfaces, such as roads, lawns, parking lots, buildings, sidewalks, etc.

Score: 5.0

5d. Low-Quality Wetland. Negative 10 points.
The Wetland is less than 1 acre and non-contiguous as defined in Part 303 and either: *1)* a stormwater pond that was excavated from upland and constructed for stormwater treatment in conjunction with a development project *or 2)* more than 75% covered by highly-invasive vegetation. See Submetric 6c for a list of highly-invasive species.

Score: 0.0

5 **Metric 5 Total** **(10 points max.)** ***Can be negative***

Metric 6. Vegetation, Interspersion, and Habitat Features
Maximum 20 points.

6a. Wetland Vegetation Components

Determine the Qualitative Cover Score of each Vegetation Component (Herbaceous, Shrub/Sapling, Forest Overstory). Using the Qualitative Cover Scoring Table, start on the left and proceed to the right, until a point value is obtained for each Vegetation Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include widely-scattered trees, lone shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c to aid in the proper identification of broad-leaved cattail (*Typha latifolia*), a non-invasive, native species.

Qualitative Cover Scoring Table

Vegetation Component ► is >¼ acre	>25% of Wetland area ►	Native species dominate the coverage ►	High native diversity ►	3 pts
			Moderate to low native diversity ►	2 pts
		Invasive or non-native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
	<25% of Wetland area ►	Native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
		Invasive or non-native species dominate the coverage ►	Moderate native diversity ►	1 pt
			Low native diversity ►	0 pt
Vegetation Component is <¼ acre ►	>25% of Wetland area ►	Native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
		Invasive or non-native species dominate the coverage ►		0 pt
	<25% of Wetland area ►			0 pt

Forest Overstory Component, qualitative cover score derived from table **maximum 3 points**. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height. The Wetland does not have a forested component if the trees are widely scattered (e.g., a savanna), located only thinly along the Wetland's margin, or if it is clear that most of the trees are actually located on upland around the perimeter of the Wetland.	**Score** 0.0
Shrub/Sapling Component, qualitative cover score derived from table **maximum 3 points**. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	**Score** 0.0
Herbaceous Component, qualitative cover score derived from table **maximum 3 points**. Herbaceous wetlands are areas dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. The MiRAM includes the robust-stemmed yellow pond lily (*Nuphar advena*) and American lotus (*Nelumbo lutea*) within the herbaceous component because of their tendency to hold their stems and leaves well above the water. All floating-leaf species (including *Nymphaea* spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	**Score** 1.0

6b. Open Water Component

Open water is an unobstructed, inundated area of water containing few or no rooted emergent or woody plant species. It can occur as a distinct zone along a river or lake or as a combination of small ponds, streams, or pools (e.g., within a marsh or swamp) and as an "understory" below a forest canopy (e.g., a forested vernal pool).

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds, streams, and pools**.
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life.
- **Aquatic bed areas**, also known as submergent marsh or submerged aquatic vegetation (SAV). Aquatic bed is dominated by plants that grow at or below the surface of the water for most of the growing season in most years. The MiRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the MiRAM, all floating-leaf aquatic taxa, such as water lilies (*Nymphaea* spp.), are included in the definition of aquatic bed and, therefore, are also included in the definition of open water.
- **100-foot wide strip of open water along a lake or river** (see Boundary Guidelines in the *User's Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see MiRAM Boundary Determination Guidelines). Simply divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake's open water included within the Wetland would be calculated as: 200/400 = 0.5 acre.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).

Estimate the total open water coverage. **Maximum 3 points**.			**Score**
High:	2.5 acres or more	3 pts	0.0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pt	

6c. Coverage of Highly-Invasive Plant Species

Estimate the combined total coverage of any of the species listed below. Assign points based on a range from virtually absent (1 point) to extensive (negative 5 points).

- common reed (*Phragmites australis)*
- purple loosestrife (*Lythrum salicaria*)
- reed canary grass (*Phalaris arundinacea*)
- common buckthorn (*Rhamnus cathartica*)
- glossy buckthorn (*Rhamnus frangula*)
- narrow-leaved cattail (*Typha angustifolia*)
- hybrid cattail (*Typha x glauca*)
- marsh thistle (*Cirsium palustre*)
- multiflora rose (*Rosa multiflora*)
- non-native honeysuckle (*Lonicera spp.*)

Key to Aid in Identification of Invasive and Non-Invasive Cattail (Typha) Species

Native, non-invasive: Male and female portions of the flower spike are not separated (or only slightly separated) on most of the stems within the same local stand. Female flower spikes are light brown and are 0.8-1.2 inches thick at maturity (before expanding when dried). Most leaf blades are approximately 0.5 to1 inch wide at widest part. Typically, not tightly packed into an area (non-invasive). .....**broad-leaved cattail (*T. latifolia)***

Non-native, Invasive: Male and female portions of the flower spike are separated on most of the stems within the same local stand. Female flower spikes are dark brown and less than 0.8 inch thick at maturity (before expanding when dried). Most leaf blades are less than 0.5 inch wide at widest part. Typically, tightly packed within an area, crowding out other plant species (invasive). .....**narrow-leaved cattail (*T. angustifolia)***

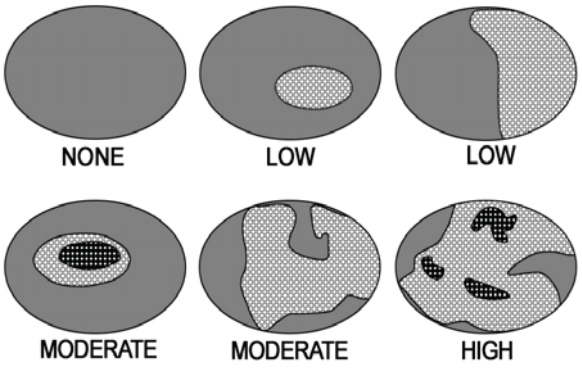
Non-native, Invasive: Hybridization may have occurred if most plants within the same local stand do not cleanly fit the characteristics of either pure species described above. The gap between the male and female portions of the flower spikes is highly variable, with many plants within the same local stand having no gap, and many having relatively wide gaps. Typically, extremely vigorous and often tightly packed within an area, crowding out other plant species (invasive).....**hybrid cattail (*T. x glauca)***

Estimate the total coverage. **Maximum 1 point**.			**Score**
Virtually Absent:	<1% aerial coverage of highly-invasive species	1 pt	-5.0
Nearly Absent:	1% to <5% aerial coverage of highly-invasive species	0 pt	
Low:	5% to <25% aerial coverage of highly-invasive species	-1 pt	
Moderate:	25% to <75% aerial coverage of highly-invasive species	-3 pts	
Extensive:	≥75% aerial coverage of highly-invasive species	-5 pts	

6d. Horizontal (Plan View) Interspersion

Evaluate the Wetland from a "plan view," i.e., as if you are looking down upon it. The graphic shows hypothetical wetlands for estimating degree of interspersion.

Select only one option. **Maximum 5 points**.



		Score
Wetland has a high degree of interspersion	5 pts	1.0
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pt	

6e. Habitat Features

Determine the amount of each habitat feature that is present in the Wetland. **Maximum 3 points for each habitat feature.**

1. Hummocks/Tussocks/Tree Mounds, e.g., sedge/grass tussocks, decaying nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of all raised features (hummocks/tussocks/tree mounds) and includes the depressional matrix within any group of raised features.

				Score
Virtually Absent: 0 pt <5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	0

2. Coarse Woody Debris (CWD). Per log, average width ≥6 inches; each at least 10 feet long. e.g., fallen trees and/or large branches, etc.

				Score
Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	0.0

3. Large Standing Trees, Living or Dead (≥12 inches DBH).

				Score
Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	1.0

4. Amphibian Breeding/Nursery Habitat, e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat.

				Score
Virtually Absent: 0 pt < 5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	1.0

-1	**Metric 6 Total** add 6a – 6f **(20 points max.)**

Metric 7. Scenic, Recreational, and Cultural Value

Maximum 3 points.

Select all that apply. Maximum 1 point per submetric.		Score
7a. Scenic: The public can view the Wetland from a public road or public land OR the Wetland has significant scenic value (assign 1 point).	1 pt	0.0
7b. Recreational: The general public has access to the Wetland or the Wetland is assumed to be used for recreational activities (assign 1 point).	1 pt	0.0
7c. Cultural/Historical: The Wetland, or any part of the Wetland, has been recognized as having important cultural or historic value (assign 1 point).	1 pt.	0.0

0.0 **Metric 7 Total**
(3 points max.)

MiRAM Summary

Narrative Rating

Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat	☐YES ☒NO
Question 2: Threatened or Endangered (T/E) Species Habitat	☐YES ☒NO
Question 3: Rare Wetland Natural Community Type	☐YES ☒NO
Question 4: Great Lakes Coastal Wetland	☐YES ☒NO

Quantitative Rating

	Score	Maximum
Metric 1: Wetland Size and Distribution	3	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	1	12
Metric 3: Hydrology	10	26
Metric 4: Habitat Alteration and Habitat Structure Development	6	20
Metric 5: Special Situations	5	10
Metric 6: Vegetation, Interspersion, and Habitat Features	-1	20
Metric 7: Scenic, Recreational, and Cultural Value	0	3
Seasonally Adjusted Score (add 10 pts if outside the growing season)	0	10

Grand Total
Add totals from all seven metrics

24 **100 Max.**

Scoring comments: WC004 is within 50' of a stream. Adjacent to a wooded area.

Background Information

Wetland

Proposed Project Site Name or DNRE File #: I-275, WC017
Date of Evaluation: 7/23/2012
County: Wayne
Township: Canton
Town: 2S
Range: 8E
Section: 12
Decimal Lat/Long: 42.3292, -83.4429

Evaluator

Name: S. Kogge, R. Roos
Address: 11181 Marwill Ave
City: West Olive State: MI Zip: 49460
Phone: 616-847-1680
Email: stu.kogge@cardno.com

Is a Wetland Delineation Report available?
☐ YES ☒ NO Date Completed:_____
If "YES", completed by (name of person/firm/agency):

Check (√) each box below when item is complete.

☒ **MiRAM Boundary**. See *MiRAM User's Manual* for more information
Size of the Wetland Evaluation Area: 0.4 acres

☒ **Location Map**. A county road map showing the location of the Wetland Evaluation Area, north arrow, map scale information, roads, landmarks, etc. *Attach* a map to the end of this document.

☒ **Color Photographs**. Photos should show the wetland vegetation components, habitat/community types, hydrologic features, and any other pertinent site features. *Attach* to the end of this document.

☒ **Landscape Sketch or Aerial Photograph**.

1. Clearly label the Proposed Project Site and Wetland Evaluation Area. Indicate the location of the MiRAM Boundary.
2. Label and indicate the extent of all general wetland community types identified within the Wetland Evaluation Area. Examples include: marsh, wet meadow, hardwood swamp, conifer swamp, shrub swamp, etc. Some wetland communities may be further classified as natural communities. Natural communities are predominantly structured by natural processes rather than modern anthropogenic disturbances. Examples include: bog, prairie fen, muskeg, wet prairie, southern wet meadow, etc.
3. Identify and label all hydrologic features, such as: streams, 100-year floodplains, ponds, vernal pools, and small patches of open water within a marsh or swamp.
4. Identify and label surrounding upland features.
5. Include north arrow and map scale information.
6. *Attach* the landscape sketch or aerial photo to the end of this document.

Comments: List any important site features or apparent disturbance events that have occurred within or near the Wetland Evaluation Area.

WC017 is between bike path and I-275.

Field Datasheet

List plant species observed within the Wetland. *Attach* additional sheets as necessary.
Nomenclature will follow Voss (1972,1985,1996) or Gleason and Cronquist (1991).

Forest Overstory Stratum (woody plants 3 inches or more DBH, regardless of height)

none observed	

Shrub/Sapling Stratum (woody plants less than 3 inches DBH and greater than 3.28 feet tall)

Populus deltoides	
Rhamnus cathartica	
Salix exigua	
Salix fragilis	

Herbaceous Stratum (non-woody plants, regardless of size, and woody plants less than 3.28 feet tall)

Apocynum sibiricum	Lythrum salicaria
Asclepias incarnata	Phragmites australis
Cirseium arvense	Polygonum persicaria
Carex stipata	Rumex crispis
Carex cristatella	Schoenoplectus tabernaemontani
Carex vulpinoidea	Scirpus atrovirens
Juncus dudleyi	Solidago sempervirens
Juncus effusus	Typha x glauca

Checklist of features and conditions to observe during the field inspection:

- ☐ Hydrologic Condition and Interactions
- ☐ Hydrologic Alterations
- ☐ Substrate/Soil Disturbances
- ☐ Habitat Structure Development
- ☐ Habitat Alterations
- ☐ Habitat/Wetland Condition
- ☐ Amphibian Breeding Pools
- ☐ Vegetation Diversity
- ☐ Vegetation Condition
- ☐ Amount of Open Water
- ☐ Percent of Invasive/Non-native Species
- ☐ Community Interspersion
- ☐ Vertical/Horizontal Structure
- ☐ S1, S2, or S3 Natural Community

Approximately how much of the Wetland Evaluation Area was reviewed during the field inspection? 90 %

Has vegetation within the Wetland Evaluation Area been altered and/or buffer areas impacted <u>within the past 5 years</u>? ☒ YES ☐ NO

Please Note: The Wetland Evaluation Area (encompassed by the MiRAM Boundary) is simply referred to as the "Wetland" throughout the remainder of this document.

Narrative Rating

Completion of the Narrative Rating allows the Evaluator to quickly identify whether the Wetland is one of several wetland types that typically have exceptional ecological value. If any of the metrics are answered affirmatively, the Wetland has *exceptional ecological value and is automatically rated as having high functional value* and completion of the Quantitative Rating is not necessary. If none of the metrics are answered affirmatively, proceed to the Quantitative Rating.

Answer all of the following metrics.

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat.

Is any part of the Wetland located within an area designated as Critical Habitat and does the Wetland *actually* contain habitat suitable for either species listed below?

Piping Plover (*Charadrius melodus*) Critical Habitat Units are designated only within the following counties: Alger, Benzie, Charlevoix, Cheboygan, Chippewa, Emmet, Iosco, Leelanau, Luce, Mackinac, Mason, Muskegon, Presque Isle, and Schoolcraft. See URL below for Unit locations.
www.fws.gov/midwest/endangered/pipingplover/final_rule.pdf

Hines's Emerald Dragonfly (*Somatochlora Hineana*) Critical Habitat Units are designated only within the following counties: Alpena, Mackinac, and Presque Isle. See URL below for Unit locations.
www.fws.gov/midwest/endangered/insects/hed/pdf/hinesfCH_FR.pdf

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

2. Threatened or Endangered (T/E) Species.

Do federal/state-listed T/E plant or animal species occur within the Wetland? Complete the following questions to answer this metric.

a. ☐YES ☒NO Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c.

b. ☐YES ☒NO Does the T/E survey indicate T/E species present within the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric.

c. ☐YES ☒NO Has the Evaluator (or others known to the Evaluator) observed any T/E species within the Wetland? If "Yes," answer "Yes" to this metric. If "No," go to question d.

d. ☐YES ☒NO Does the DNRE Endangered Species Assessment (ESA) web site interactive map, **www.mcgi.state.mi.us/esa,** indicate that there is a potential for unique natural features at or near your site of interest"?" If "No," answer "No" to this metric. If "Yes," request a DNRE formal review by submitting the online form. Type "MiRAM" within the "Project Information" field on the form. Go to question e.

e. ☐YES ☒NO Did the DNRE review confirm potential T/E occurrence in the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric. **The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE**.

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

3. Rare Wetland Natural Community Type.

Are more than 5 acres *or* more than 25% of the Wetland comprised of a Rare Wetland Natural Community Type*? Check (√) all Rare Wetland Natural Community Types

☐ **S1 or S2 Natural Community Type.**
Has the Wetland been identified by the Evaluator — *or other persons* — as being an S1 or S2 natural community type as defined by the Michigan Natural Features Inventory (MNFI)? See the *MiRAM User's Manual* for more information.

☐ **Southern Bog**, defined as any bog occurring below the northern limit of Michigan's Floristic Tension Zone (see figure for approximate location).

☐ **Old-Growth/Mature Forested Wetland.** Lacks evidence of any significant harvesting. Dominated by large, overstory trees (mean overstory DBH ≥20 inches, including at least two trees/acre having DBH ≥28 inches) and the canopy is multi-aged and multi-layered. Aggregations of canopy trees are interspersed with canopy gaps and large snags. Large nursery logs and tip-up mounds litter the forest floor. Does the forested Wetland have all/most of these characteristics?

*If the Rare Wetland Community Type is less than 5 acres *and* less than 25% of the Wetland, the rare community should be split off and evaluated separately.

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

4. Great Lakes Coastal Wetland.

Is any part of the Wetland within 1,000 feet of the ordinary high water mark of any of the Great Lakes, including Lake St. Clair?

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

Quantitative Rating

Completion of the Quantitative Rating assists the Evaluator in recognizing the functional value of the Wetland. Complete all metrics by completing all sections, circling the correct point value(s), and assigning a score.

Metric 1. Wetland Size and Distribution

Maximum 9 points.

1a. Wetland Size Estimate the size of the Wetland (i.e., Wetland Evaluation Area). Select a size class. **Maximum 6 points.**			**Score**
50	acres	Select this option if the wetland's actual size ≥ 50 acres.	6 pts
25	acres to <50 acres		5 pts
10	acres to <25 acres		4 pts
3	acres to <10 acres		3 pts
¼	acre to <3 acres		2 pts
less than ¼ acre			0 pt

2.0

1b. Wetland Scarcity Utilize the USFWS National Wetlands Inventory (NWI) maps to estimate percentage of wetland area remaining within a 2-mile radius from the Wetland's center. For the purpose of this submetric, areas of open water within the Great Lakes, inland lakes, streams, etc., should be excluded from the wetland percentage. Select the most appropriate percentage category. **Maximum 3 points.**		**Score**
0 to 20% of surrounding 2-mile radius is wetland	3 pts	3.0
>20 to 80% of surrounding 2-mile radius is wetland	2 pts	
>80% of surrounding 2-mile radius is wetland	1 pt	

5.0

Metric 1 Total
add 1a & 1b
(9 points max.)

Metric 2. Upland Buffers and Intensity of Surrounding Land Use

Maximum 12 points.

2a. Average Buffer Width around the Wetland's Perimeter

Step 1: Using the most recent aerial photograph available, sketch a 150-foot wide "buffer zone" around the Wetland.
Step 2: Estimate the buffer widths from the Wetland's edge to any non-buffer areas (up to 150 feet).
Step 3: Average the buffer widths along the Wetland's perimeter.
Step 4: Select the buffer width that is most appropriate. **Maximum 6 points**.

Buffers Include:

- shrubland, young forest, natural grassland, prairie
- abandoned row crop field (vegetated & naturalizing)
- hay field (non-row crop), lightly grazed pasture
- lightly managed forest (selectively logged)
- designated wildlife area, lightly managed parkland
- other wetland, lake, river

Non-Buffers Include:

- lawns, golf courses, manicured parkland
- residential, commercial, industrial
- roadways (including shoulders), parking lots
- row crop field
- conservation tillage, heavily grazed pasture
- clear-cutting, mining, construction activity

			Score
Wide Buffer Width:	≥150 feet around the perimeter	6 pts	0.0
Medium Buffer Width:	75 to <150 feet around the perimeter	4 pts	
Narrow Buffer Width:	25 to <75 feet around the perimeter	2 pt	
Very Narrow Buffer Width:	0 (no buffer) to <25 feet around the perimeter	0 pt	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland

Step 1: Using the most recent aerial photograph available, sketch a 1,000-foot wide "land use zone" around the Wetland.

Step 2: Estimate percent coverages comprised by each of the four types of land use listed below.

Step 3: If any land use type comprises more than 25% of the total land use, it is considered to be a "dominant" land use type for the purposes of MiRAM and will receive points. Sum the available points from all dominant land use types and then average the score. Round to the nearest 0.5 increment. **Maximum 6 points**.

Type of Land Use	Examples within each Type of Land Use			Score
Very Low Intensity:	• maturing forest • natural grassland, prairie	• designated wildlife area • other wetland, lake, river	6 pts	1.0
Low Intensity:	• shrubland/young forest • recent selective logging • hay field (non-row crop)	• lightly managed parkland • old field, lightly grazed pasture • one-lane road/two track	4 pts	
Moderately High Intensity:	• residential & lawns • manicured parkland • golf course	• conservation tillage • recent clear-cut (<10 years) • two-lane road	2 pts	
High Intensity:	• commercial, industrial • high-density residential • heavily grazed pasture • row crop field	• multi-lane paved roadway • construction activity • parking lot • mining	1 pt	

1.0	**Metric 2 Total** add 2a & 2b **(12 points max.)**

Metric 3. Hydrology

Limited to 26 points.

3a. Sources of Water: Select all that apply. **Maximum 8 points**.		Score
Precipitation: Directly and/or as runoff from upland areas.	1 pt	1.0
Groundwater: Seeps or evidence, such as significant amounts of skunk cabbage (*Symplocarpus foetidus*) or other fen-adapted species.	2 pts	0.0
Seasonal/Intermittent Surface Water: Seasonal inundation from a lake, pond, or stream. (A Wetland can only receive points for this source of water or the next, not both.)	2 pts	0.0
Perennial Surface Water: Perennial inundation from a lake, stream or pond.	5 pts	0.0

3b. Connectivity: Select all that apply. **Maximum 8 points**.		Score
100-Year Floodplain. As defined in the Floodplain Authority under Part 31 of the NREPA.	2 pts	0.0
Between a Stream/Lake/Pond and Human Land Use. The Wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the Wetland before it discharges into the surface waterbody.	2 pts	0.0
Wetland/Upland Complex. The Wetland is part of a large scale (10+ acres) non-linear complex of wetlands with small areas of unmanicured/undeveloped vegetated uplands that do not restrict movement of organisms between the wetland areas.	2 pts	0.0
Riparian Corridor. The Wetland is part of a linear *riparian* corridor that provides organism movement along a stream/river. Typically, these corridors should exceed 100 feet in width and extend at least one half mile.	2 pts	0.0

3c. Duration of Inundation/Saturation Select the option(s) from below that best describe(s) the dominant hydrologic characteristic of the Wetland. For the purposes of this submetric, "dominant" is defined as comprising at least 25% of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, select all that apply and average the points. Round to the nearest 0.5 increment. **Maximum 4 points.**		**Score**
Permanently Inundated	4 pts	2.0
Permanently Saturated to Regularly Inundated	3 pts	
Regularly Saturated to Seasonally Inundated	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil	1 pt	

3d. Alterations to Natural Hydrologic Regime

This submetric evaluates the intactness of the natural hydrologic regime of the Wetland.
Check (√) all forms of past or ongoing hydrologic alteration(s) that are potentially influencing the Wetland.

- ☒ ditch(es) in or near the wetland
- ☐ tile(s) in or near the wetland
- ☐ dike(s) in or near the wetland
- ☐ weir(s) in or near the wetland
- ☐ stormwater inputs (addition of water)
- ☐ stream channelization
- ☐ point source discharge(s) (non-stormwater)
- ☐ filling/grading activities in or near the wetland
- ☒ road bed(s)/RR grades(s) in or near the wetland
- ☐ dredging activities in or near the wetland
- ☐ other (specify)
- ☐ other (specify)

Evaluate whether an alteration is significant or minor in relation to the Wetland's overall area and hydrologic regime. For this submetric, "significant" is defined as affecting approximately 10% or greater of the Wetland. "Minor" is defined as affecting less than approximately 10% of the Wetland. A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).

Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's natural hydrologic regime. If uncertain, select adjoining options and average the available points. Round to the nearest 0.5 increment. If the Wetland's natural hydrologic regime has been significantly altered, it shall receive no more than 6 points for this submetric. **Maximum 8 points.**			**Score**
No Hydrologic Alterations Apparent:	There has been no significant alteration(s) to the Wetland's natural hydrologic regime, and/or ongoing minor alteration(s) is/are rare.	8 pts	6.0
Recovered:	Significant hydrologic alteration(s) occurred more than 20 years prior to the assessment, and/or ongoing minor hydrologic alteration(s) is/are only occasional.	6 pts	
Recovering:	A single significant hydrologic alteration occurred within 20 years prior to the assessment, and/or ongoing minor hydrologic alteration(s) is/are frequent.	4 pts	
Recent or No Recovery:	Multiple significant hydrologic alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt	

9.0	**Metric 3 Total** add 3a – 3d **(26 points max.)**

Metric 4. Habitat Alteration and Habitat Structure Development
Maximum 20 Points.

4a. Substrate/Soil Disturbance

This submetric evaluates the intactness or lack of disturbance to the Wetland's substrate and soil. Check (√) all possible forms of past or ongoing substrate/soil disturbance that are observed within the Wetland.

- ☒ human-induced erosion or exposure
- ☒ human-induced sedimentation or burial
- ☒ filling
- ☒ grading
- ☐ dredging
- ☐ plowing, disking
- ☐ intensive grazing (hooves)
- ☐ off-road vehicle use
- ☐ construction vehicle use
- ☐ other (specify)

Evaluate whether a disturbance is significant or minor in relation to the Wetland's overall area. For this submetric, "significant" is defined as affecting approximately 10% or greater of the Wetland. "Minor" is defined as affecting less than approximately 10% of the Wetland. A substrate disturbance may also be an alteration of the natural hydrologic regime (Submetric 3d) and/or an alteration of habitat (Submetric 4b).

Select an option below that best describes the extent of (or lack of) disturbances to the Wetland's substrate. If uncertain, select adjoining options and average the points. Round to the nearest 0.5 increment. If the Wetland's substrate has been significantly altered, it should receive no more than 3 points. **Maximum 4 points.**

			Score
No Substrate Disturbance Apparent:	There has been no significant disturbance to the Wetland's substrate and/or ongoing minor disturbance events are rare.	4 pts	2.0
Recovered:	Significant substrate disturbance occurred more than 20 years prior to the assessment, and/or ongoing minor substrate disturbance events are only occasional (e.g., light sedimentation from a nearby dirt road).	3 pts	
Recovering:	A single significant substrate disturbance event occurred within 20 years prior to the assessment, and/or ongoing minor substrate disturbance events are frequent.	2 pts	
Recent or No Recovery:	Multiple significant substrate disturbance events have occurred in the 20 years prior to the assessment, and/or significant disturbance is ongoing.	1 pt	

4b. Habitat Alteration

This submetric evaluates the intactness of the natural habitat within the Wetland. A "significant" alteration is defined as affecting 10% or greater of the Wetland. "Minor" alternation affects less than 10% of the Wetland. Check (√) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland.

- ☒ barriers such as road bed(s)/RR grades(s)
- ☐ selective cutting
- ☐ clearcutting
- ☒ mowing or shrub removal
- ☐ coarse woody debris (CWD) removal
- ☐ intensive grazing
- ☐ nutrient enrichment, e.g., nuisance algae
- ☒ herbicide/chemical treatment
- ☐ sedimentation
- ☐ dredging
- ☐ filling/grading
- ☐ plowing/disking/farming
- ☐ other (specify)

Utilize aerial photography and field evidence to determine if any habitat alterations occurred prior to approximately 20 years ago. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes, such as large, woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc. Disregard changes that can be attributed to wetland community succession or other natural processes. A habitat alteration may also be an alteration of the natural hydrologic regime (Submetric 3d) and/or a substrate disturbance (Submetric 4a).

Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's habitat. If unclear, select adjoining options and average the available points. Round to the nearest 0.5 increment. **Maximum 9 points**.

			Score
No Habitat Alterations Apparent:	There has been no significant alteration to the Wetland's natural habitat, and/or ongoing minor alteration(s) is/are rare.	9 pts	3.0
Recovered:	Significant habitat alteration(s) occurred more than 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are only occasional.	6 pts	
Recovering:	A single, significant habitat alteration occurred within 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are frequent.	3 pts	
Recent or No Recovery:	Multiple significant habitat alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt	

4c. Habitat Structure Development

Determine an overall qualitative rating of how well developed the Wetland is in comparison to the best of its type. For this submetric, a wetland's type is defined as any ecologically and/or hydrogeomorphically similar wetland habitat typical of the region. Well-developed communities, regardless of successional state, often exhibit many of the following habitat characteristics:

- Quality vertical habitat, such as hummocks, organic debris, and diverse plant height ranges.
- Quality horizontal habitat, such as varying vegetation density and patchiness, moderate ratios of open space to cover, plant species diversity, and a wide range of plant ages.
- Other ecological attributes, such as a diverse assortment of the following: breeding areas, rearing areas, feeding areas, niche space, etc.

Select an option below that best describes the Wetland's habitat structure development. If unclear, select adjoining options and average the points. Round to the nearest 0.5 increment.
Maximum 7 points.

			Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	1.0
Good:	Wetland appears to be a good example of its type but because of past or present disturbance, or other reasons, is not excellent.	5 pts	
Fair:	Wetland appears to be a moderately good example of its type but because of past or present disturbance, or other reasons, is not good.	3 pts	
Poor:	Wetland is a poor example of its type because of past or present disturbance, or other reasons.	1 pt	

6.0 **Metric 4 Total** add 4a – 4c **(20 points max.)**

Metric 5. Special Situations

Refer to the Narrative Rating for definitions and the *User's Manual* for guidance, **Limited to 10 points**

5a. High Ecological Value. See Narrative Rating for definitions of each.
10 points for each that apply.

☐ 1. Contains USFWS-designated Critical Habitat
☐ 2. Federal or State-listed T/E Plant or Animal Species
☐ 3. S1, S2, or S3 Natural Community Type (at least 5 acres or 25% of the Wetland)
☐ 4. Southern Bog (at least 5 acres or 25% of the Wetland)
☐ 5. Old-Growth/Mature Forested Wetland (at least 5 acres or 25% of the Wetland)
☐ 6. Great Lakes Coastal Wetland

Score: 0.0

5b. Forested Wetland. **5 points**.
Exhibits combined canopy cover from any group(s) of trees. Stem DBH must be at least 3 inches to qualify as a tree. Total area must comprise at least 5 acres or 25% of the Wetland. Does not qualify if most of the trees are ungrouped and widely scattered (e.g., a savanna), or located only thinly along the Wetland's margin.

Score: 0.0

5c. Urban/Suburban Wetland. **5 points**.
Greater than 50% of the surrounding landscape (1,000 foot radius) is comprised of low-permeability surfaces, such as roads, lawns, parking lots, buildings, sidewalks, etc.

Score: 0.0

5d. Low-Quality Wetland. Negative 10 points.
The Wetland is less than 1 acre and non-contiguous as defined in Part 303 and either: *1)* a stormwater pond that was excavated from upland and constructed for stormwater treatment in conjunction with a development project *or 2)* more than 75% covered by highly-invasive vegetation. See Submetric 6c for a list of highly-invasive species.

Score: 0.0

0 **Metric 5 Total** **(10 points max.)** ***Can be negative***

Metric 6. Vegetation, Interspersion, and Habitat Features
Maximum 20 points.

6a. Wetland Vegetation Components

Determine the Qualitative Cover Score of each Vegetation Component (Herbaceous, Shrub/Sapling, Forest Overstory). Using the Qualitative Cover Scoring Table, start on the left and proceed to the right, until a point value is obtained for each Vegetation Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include widely-scattered trees, lone shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c to aid in the proper identification of broad-leaved cattail (*Typha latifolia*), a non-invasive, native species.

Qualitative Cover Scoring Table

Vegetation Component ► is >¼ acre	>25% of Wetland area ►	Native species dominate the coverage ►	High native diversity ►	3 pts
			Moderate to low native diversity ►	2 pts
		Invasive or non-native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
	<25% of Wetland area ►	Native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
		Invasive or non-native species dominate the coverage ►	Moderate native diversity ►	1 pt
			Low native diversity ►	0 pt
Vegetation Component is <¼ acre ►	>25% of Wetland area ►	Native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
		Invasive or non-native species dominate the coverage ►		0 pt
	<25% of Wetland area ►			0 pt

Forest Overstory Component, qualitative cover score derived from table **maximum 3 points**. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height. The Wetland does not have a forested component if the trees are widely scattered (e.g., a savanna), located only thinly along the Wetland's margin, or if it is clear that most of the trees are actually located on upland around the perimeter of the Wetland.	**Score** 0.0
Shrub/Sapling Component, qualitative cover score derived from table **maximum 3 points**. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	**Score** 0.0
Herbaceous Component, qualitative cover score derived from table **maximum 3 points**. Herbaceous wetlands are areas dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. The MiRAM includes the robust-stemmed yellow pond lily (*Nuphar advena*) and American lotus (*Nelumbo lutea*) within the herbaceous component because of their tendency to hold their stems and leaves well above the water. All floating-leaf species (including *Nymphaea* spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	**Score** 1.0

6b. Open Water Component

Open water is an unobstructed, inundated area of water containing few or no rooted emergent or woody plant species. It can occur as a distinct zone along a river or lake or as a combination of small ponds, streams, or pools (e.g., within a marsh or swamp) and as an "understory" below a forest canopy (e.g., a forested vernal pool).

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds, streams, and pools**.
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life.
- **Aquatic bed areas**, also known as submergent marsh or submerged aquatic vegetation (SAV). Aquatic bed is dominated by plants that grow at or below the surface of the water for most of the growing season in most years. The MiRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the MiRAM, all floating-leaf aquatic taxa, such as water lilies (*Nymphaea* spp.), are included in the definition of aquatic bed and, therefore, are also included in the definition of open water.
- **100-foot wide strip of open water along a lake or river** (see Boundary Guidelines in the *User's Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see MiRAM Boundary Determination Guidelines). Simply divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake's open water included within the Wetland would be calculated as: 200/400 = 0.5 acre.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).

Estimate the total open water coverage. **Maximum 3 points**.			**Score**
High:	2.5 acres or more	3 pts	0.0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pt	

6c. Coverage of Highly-Invasive Plant Species

Estimate the combined total coverage of any of the species listed below. Assign points based on a range from virtually absent (1 point) to extensive (negative 5 points).

- common reed (*Phragmites australis)*
- purple loosestrife (*Lythrum salicaria*)
- reed canary grass (*Phalaris arundinacea*)
- common buckthorn (*Rhamnus cathartica*)
- glossy buckthorn (*Rhamnus frangula*)
- narrow-leaved cattail (*Typha angustifolia*)
- hybrid cattail (*Typha x glauca*)
- marsh thistle (*Cirsium palustre*)
- multiflora rose (*Rosa multiflora*)
- non-native honeysuckle (*Lonicera spp.*)

Key to Aid in Identification of Invasive and Non-Invasive Cattail (Typha) Species

Native, non-invasive: Male and female portions of the flower spike are not separated (or only slightly separated) on most of the stems within the same local stand. Female flower spikes are light brown and are 0.8-1.2 inches thick at maturity (before expanding when dried). Most leaf blades are approximately 0.5 to1 inch wide at widest part. Typically, not tightly packed into an area (non-invasive). .....**broad-leaved cattail (*T. latifolia)***

Non-native, Invasive: Male and female portions of the flower spike are separated on most of the stems within the same local stand. Female flower spikes are dark brown and less than 0.8 inch thick at maturity (before expanding when dried). Most leaf blades are less than 0.5 inch wide at widest part. Typically, tightly packed within an area, crowding out other plant species (invasive). .....**narrow-leaved cattail (*T. angustifolia)***

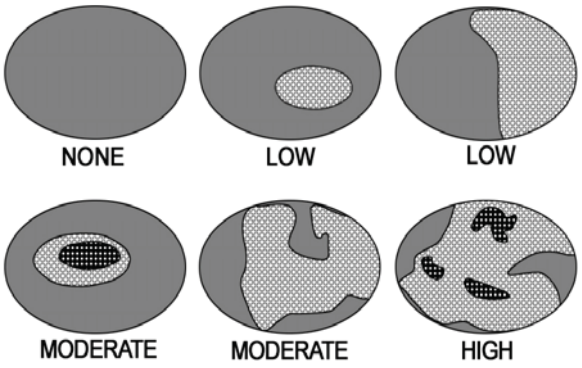
Non-native, Invasive: Hybridization may have occurred if most plants within the same local stand do not cleanly fit the characteristics of either pure species described above. The gap between the male and female portions of the flower spikes is highly variable, with many plants within the same local stand having no gap, and many having relatively wide gaps. Typically, extremely vigorous and often tightly packed within an area, crowding out other plant species (invasive).....**hybrid cattail (*T. x glauca)***

Estimate the total coverage. **Maximum 1 point**.			**Score**
Virtually Absent:	<1% aerial coverage of highly-invasive species	1 pt	-5.0
Nearly Absent:	1% to <5% aerial coverage of highly-invasive species	0 pt	
Low:	5% to <25% aerial coverage of highly-invasive species	-1 pt	
Moderate:	25% to <75% aerial coverage of highly-invasive species	-3 pts	
Extensive:	≥75% aerial coverage of highly-invasive species	-5 pts	

6d. Horizontal (Plan View) Interspersion

Evaluate the Wetland from a "plan view," i.e., as if you are looking down upon it. The graphic shows hypothetical wetlands for estimating degree of interspersion.

Select only one option. **Maximum 5 points**.



		Score
Wetland has a high degree of interspersion	5 pts	0.0
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pt	

6e. Habitat Features

Determine the amount of each habitat feature that is present in the Wetland. **Maximum 3 points for each habitat feature.**

1. Hummocks/Tussocks/Tree Mounds, e.g., sedge/grass tussocks, decaying nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of all raised features (hummocks/tussocks/tree mounds) and includes the depressional matrix within any group of raised features.

				Score
Virtually Absent: 0 pt <5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	0

2. Coarse Woody Debris (CWD). Per log, average width ≥6 inches; each at least 10 feet long. e.g., fallen trees and/or large branches, etc.

				Score
Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	0.0

3. Large Standing Trees, Living or Dead (≥12 inches DBH).

				Score
Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	0.0

4. Amphibian Breeding/Nursery Habitat, e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat.

				Score
Virtually Absent: 0 pt < 5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	1.0

-3	**Metric 6 Total** add 6a – 6f **(20 points max.)**

Metric 7. Scenic, Recreational, and Cultural Value

Maximum 3 points.

Select all that apply. Maximum 1 point per submetric.		Score
7a. Scenic: The public can view the Wetland from a public road or public land OR the Wetland has significant scenic value (assign 1 point).	1 pt	0.0
7b. Recreational: The general public has access to the Wetland or the Wetland is assumed to be used for recreational activities (assign 1 point).	1 pt	0.0
7c. Cultural/Historical: The Wetland, or any part of the Wetland, has been recognized as having important cultural or historic value (assign 1 point).	1 pt.	0.0

0.0 **Metric 7 Total**
(3 points max.)

MiRAM Summary

Narrative Rating

Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat	☐YES ☒NO
Question 2: Threatened or Endangered (T/E) Species Habitat	☐YES ☒NO
Question 3: Rare Wetland Natural Community Type	☐YES ☒NO
Question 4: Great Lakes Coastal Wetland	☐YES ☒NO

Quantitative Rating

	Score	Maximum
Metric 1: Wetland Size and Distribution	5.0	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	1.0	12
Metric 3: Hydrology	9.0	26
Metric 4: Habitat Alteration and Habitat Structure Development	6.0	20
Metric 5: Special Situations	0.0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	-3	20
Metric 7: Scenic, Recreational, and Cultural Value	0	3
Seasonally Adjusted Score (add 10 pts if outside the growing season)	0	10

Grand Total
Add totals from all seven metrics

18.0 **100 Max.**

Scoring comments:

Background Information

Wetland

Proposed Project Site Name or DNRE File #: I-275, WC018
Date of Evaluation: 7/23/2012
County: Wayne
Township: Canton
Town: 2S
Range: 8E
Section: 12
Decimal Lat/Long: 42.3261, -83.4427

Evaluator

Name: S. Kogge, R. Roos
Address: 11181 Marwill Ave
City: West Olive State: MI Zip: 49460
Phone: 616-847-1680
Email: stu.kogge@cardno.com

Is a Wetland Delineation Report available?
☐ YES ☒ NO Date Completed:_____
If "YES", completed by (name of person/firm/agency):

Check (√) each box below when item is complete.

☒ **MiRAM Boundary**. See *MiRAM User's Manual* for more information
Size of the Wetland Evaluation Area: 0.2 acres

☒ **Location Map**. A county road map showing the location of the Wetland Evaluation Area, north arrow, map scale information, roads, landmarks, etc. *Attach* a map to the end of this document.

☒ **Color Photographs**. Photos should show the wetland vegetation components, habitat/community types, hydrologic features, and any other pertinent site features. *Attach* to the end of this document.

☒ **Landscape Sketch or Aerial Photograph**.

1. Clearly label the Proposed Project Site and Wetland Evaluation Area. Indicate the location of the MiRAM Boundary.
2. Label and indicate the extent of all general wetland community types identified within the Wetland Evaluation Area. Examples include: marsh, wet meadow, hardwood swamp, conifer swamp, shrub swamp, etc. Some wetland communities may be further classified as natural communities. Natural communities are predominantly structured by natural processes rather than modern anthropogenic disturbances. Examples include: bog, prairie fen, muskeg, wet prairie, southern wet meadow, etc.
3. Identify and label all hydrologic features, such as: streams, 100-year floodplains, ponds, vernal pools, and small patches of open water within a marsh or swamp.
4. Identify and label surrounding upland features.
5. Include north arrow and map scale information.
6. *Attach* the landscape sketch or aerial photo to the end of this document.

Comments: List any important site features or apparent disturbance events that have occurred within or near the Wetland Evaluation Area.

WC018 is between bike path and I-275. Adjacent to shrub-scrub wetland.

Field Datasheet

List plant species observed within the Wetland. *Attach* additional sheets as necessary.
Nomenclature will follow Voss (1972,1985,1996) or Gleason and Cronquist (1991).

Forest Overstory Stratum (woody plants 3 inches or more DBH, regardless of height)

none observed	

Shrub/Sapling Stratum (woody plants less than 3 inches DBH and greater than 3.28 feet tall)

Acer negundo	
Rhamnus frangula	
Salix exigua	
Ulmus americana	

Herbaceous Stratum (non-woody plants, regardless of size, and woody plants less than 3.28 feet tall)

Agrostis gigantea	Impatiens capensis
Ambrosia trifida	Lythrum salicaria
Apocynum sibiricum	Phalaris arundinacea
Aster lanceolatus	Phragmites australis
Bidens frondosus	Polygonum persicaria
Cirsium arvense	Solidago sempervirens
Carex vulpinoidea	Toxicodendron radicans
Dipsacus laciniatus	Typha x glauca

Checklist of features and conditions to observe during the field inspection:

- ☐ Hydrologic Condition and Interactions
- ☐ Hydrologic Alterations
- ☐ Substrate/Soil Disturbances
- ☐ Habitat Structure Development
- ☐ Habitat Alterations
- ☐ Habitat/Wetland Condition
- ☐ Amphibian Breeding Pools
- ☐ Vegetation Diversity
- ☐ Vegetation Condition
- ☐ Amount of Open Water
- ☐ Percent of Invasive/Non-native Species
- ☐ Community Interspersion
- ☐ Vertical/Horizontal Structure
- ☐ S1, S2, or S3 Natural Community

Approximately how much of the Wetland Evaluation Area was reviewed during the field inspection? 90 %

Has vegetation within the Wetland Evaluation Area been altered and/or buffer areas impacted within the past 5 years? ☒ YES ☐ NO

Please Note: The Wetland Evaluation Area (encompassed by the MiRAM Boundary) is simply referred to as the "Wetland" throughout the remainder of this document.

Narrative Rating

Completion of the Narrative Rating allows the Evaluator to quickly identify whether the Wetland is one of several wetland types that typically have exceptional ecological value. If any of the metrics are answered affirmatively, the Wetland has *exceptional ecological value and is automatically rated as having high functional value* and completion of the Quantitative Rating is not necessary. If none of the metrics are answered affirmatively, proceed to the Quantitative Rating.

Answer all of the following metrics.

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat.

Is any part of the Wetland located within an area designated as Critical Habitat and does the Wetland *actually* contain habitat suitable for either species listed below?

Piping Plover (*Charadrius melodus*) Critical Habitat Units are designated only within the following counties: Alger, Benzie, Charlevoix, Cheboygan, Chippewa, Emmet, Iosco, Leelanau, Luce, Mackinac, Mason, Muskegon, Presque Isle, and Schoolcraft. See URL below for Unit locations.
www.fws.gov/midwest/endangered/pipingplover/final_rule.pdf

Hines's Emerald Dragonfly (*Somatochlora Hineana*) Critical Habitat Units are designated only within the following counties: Alpena, Mackinac, and Presque Isle. See URL below for Unit locations.
www.fws.gov/midwest/endangered/insects/hed/pdf/hinesfCH_FR.pdf

☐ YES ☒ NO

If "**yes"**, the Wetland has ***high functional value***.

2. Threatened or Endangered (T/E) Species.

Do federal/state-listed T/E plant or animal species occur within the Wetland? Complete the following questions to answer this metric.

a. ☐YES ☐NO Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c.

b. ☐YES ☐NO Does the T/E survey indicate T/E species present within the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric.

c. ☐YES ☐NO Has the Evaluator (or others known to the Evaluator) observed any T/E species within the Wetland? If "Yes," answer "Yes" to this metric. If "No," go to question d.

d. ☐YES ☐NO Does the DNRE Endangered Species Assessment (ESA) web site interactive map, **www.mcgi.state.mi.us/esa,** indicate that there is a potential for unique natural features at or near your site of interest"?" If "No," answer "No" to this metric. If "Yes," request a DNRE formal review by submitting the online form. Type "MiRAM" within the "Project Information" field on the form. Go to question e.

e. ☐YES ☐NO Did the DNRE review confirm potential T/E occurrence in the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric. **The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE**.

☐ YES ☒ NO

If "**yes"**, the Wetland has ***high functional value***.

3. Rare Wetland Natural Community Type.

Are more than 5 acres *or* more than 25% of the Wetland comprised of a Rare Wetland Natural Community Type*? Check (√) all Rare Wetland Natural Community Types

☐ **S1 or S2 Natural Community Type.**
Has the Wetland been identified by the Evaluator — *or other persons* — as being an S1 or S2 natural community type as defined by the Michigan Natural Features Inventory (MNFI)? See the *MiRAM User's Manual* for more information.

☐ **Southern Bog**, defined as any bog occurring below the northern limit of Michigan's Floristic Tension Zone (see figure for approximate location).

☐ **Old-Growth/Mature Forested Wetland.** Lacks evidence of any significant harvesting. Dominated by large, overstory trees (mean overstory DBH ≥20 inches, including at least two trees/acre having DBH ≥28 inches) and the canopy is multi-aged and multi-layered. Aggregations of canopy trees are interspersed with canopy gaps and large snags. Large nursery logs and tip-up mounds litter the forest floor. Does the forested Wetland have all/most of these characteristics?

*If the Rare Wetland Community Type is less than 5 acres *and* less than 25% of the Wetland, the rare community should be split off and evaluated separately.

☐ YES ☒ NO

If "**yes"**, the Wetland has ***high functional value***.

4. Great Lakes Coastal Wetland.

Is any part of the Wetland within 1,000 feet of the ordinary high water mark of any of the Great Lakes, including Lake St. Clair?

☐ YES ☒ NO

If "**yes"**, the Wetland has ***high functional value***.

Quantitative Rating

Completion of the Quantitative Rating assists the Evaluator in recognizing the functional value of the Wetland. Complete all metrics by completing all sections, circling the correct point value(s), and assigning a score.

Metric 1. Wetland Size and Distribution

Maximum 9 points.

1a. Wetland Size Estimate the size of the Wetland (i.e., Wetland Evaluation Area). Select a size class. **Maximum 6 points.**			**Score**
50	acres	Select this option if the wetland's actual size ≥ 50 acres.	6 pts
25	acres to <50 acres		5 pts
10	acres to <25 acres		4 pts
3	acres to <10 acres		3 pts
¼	acre to <3 acres		2 pts
less than ¼ acre			0 pt

2.0

1b. Wetland Scarcity Utilize the USFWS National Wetlands Inventory (NWI) maps to estimate percentage of wetland area remaining within a 2-mile radius from the Wetland's center. For the purpose of this submetric, areas of open water within the Great Lakes, inland lakes, streams, etc., should be excluded from the wetland percentage. Select the most appropriate percentage category. **Maximum 3 points.**		**Score**
0 to 20% of surrounding 2-mile radius is wetland	3 pts	3.0
>20 to 80% of surrounding 2-mile radius is wetland	2 pts	
>80% of surrounding 2-mile radius is wetland	1 pt	

5.0

Metric 1 Total
add 1a & 1b
(9 points max.)

Metric 2. Upland Buffers and Intensity of Surrounding Land Use

Maximum 12 points.

2a. Average Buffer Width around the Wetland's Perimeter

Step 1: Using the most recent aerial photograph available, sketch a 150-foot wide "buffer zone" around the Wetland.
Step 2: Estimate the buffer widths from the Wetland's edge to any non-buffer areas (up to 150 feet).
Step 3: Average the buffer widths along the Wetland's perimeter.
Step 4: Select the buffer width that is most appropriate. **Maximum 6 points**.

Buffers Include:

- shrubland, young forest, natural grassland, prairie
- abandoned row crop field (vegetated & naturalizing)
- hay field (non-row crop), lightly grazed pasture
- lightly managed forest (selectively logged)
- designated wildlife area, lightly managed parkland
- other wetland, lake, river

Non-Buffers Include:

- lawns, golf courses, manicured parkland
- residential, commercial, industrial
- roadways (including shoulders), parking lots
- row crop field
- conservation tillage, heavily grazed pasture
- clear-cutting, mining, construction activity

			Score
Wide Buffer Width:	≥150 feet around the perimeter	6 pts	1.0
Medium Buffer Width:	75 to <150 feet around the perimeter	4 pts	
Narrow Buffer Width:	25 to <75 feet around the perimeter	2 pt	
Very Narrow Buffer Width:	0 (no buffer) to <25 feet around the perimeter	0 pt	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland

Step 1: Using the most recent aerial photograph available, sketch a 1,000-foot wide "land use zone" around the Wetland.

Step 2: Estimate percent coverages comprised by each of the four types of land use listed below.

Step 3: If any land use type comprises more than 25% of the total land use, it is considered to be a "dominant" land use type for the purposes of MiRAM and will receive points. Sum the available points from all dominant land use types and then average the score. Round to the nearest 0.5 increment. **Maximum 6 points**.

Type of Land Use	Examples within each Type of Land Use			Score
Very Low Intensity:	• maturing forest • natural grassland, prairie	• designated wildlife area • other wetland, lake, river	6 pts	1.0
Low Intensity:	• shrubland/young forest • recent selective logging • hay field (non-row crop)	• lightly managed parkland • old field, lightly grazed pasture • one-lane road/two track	4 pts	
Moderately High Intensity:	• residential & lawns • manicured parkland • golf course	• conservation tillage • recent clear-cut (<10 years) • two-lane road	2 pts	
High Intensity:	• commercial, industrial • high-density residential • heavily grazed pasture • row crop field	• multi-lane paved roadway • construction activity • parking lot • mining	1 pt	

2.0	**Metric 2 Total** add 2a & 2b **(12 points max.)**

Metric 3. Hydrology

Limited to 26 points.

3a. Sources of Water: Select all that apply. **Maximum 8 points**.		Score
Precipitation: Directly and/or as runoff from upland areas.	1 pt	1.0
Groundwater: Seeps or evidence, such as significant amounts of skunk cabbage (*Symplocarpus foetidus*) or other fen-adapted species.	2 pts	0.0
Seasonal/Intermittent Surface Water: Seasonal inundation from a lake, pond, or stream. (A Wetland can only receive points for this source of water or the next, not both.)	2 pts	0.0
Perennial Surface Water: Perennial inundation from a lake, stream or pond.	5 pts	0.0

3b. Connectivity: Select all that apply. **Maximum 8 points**.		Score
100-Year Floodplain. As defined in the Floodplain Authority under Part 31 of the NREPA.	2 pts	0.0
Between a Stream/Lake/Pond and Human Land Use. The Wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the Wetland before it discharges into the surface waterbody.	2 pts	0.0
Wetland/Upland Complex. The Wetland is part of a large scale (10+ acres) non-linear complex of wetlands with small areas of unmanicured/undeveloped vegetated uplands that do not restrict movement of organisms between the wetland areas.	2 pts	0.0
Riparian Corridor. The Wetland is part of a linear *riparian* corridor that provides organism movement along a stream/river. Typically, these corridors should exceed 100 feet in width and extend at least one half mile.	2 pts	0.0

3c. Duration of Inundation/Saturation Select the option(s) from below that best describe(s) the dominant hydrologic characteristic of the Wetland. For the purposes of this submetric, "dominant" is defined as comprising at least 25% of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, select all that apply and average the points. Round to the nearest 0.5 increment. **Maximum 4 points.**		**Score**
Permanently Inundated	4 pts	2.0
Permanently Saturated to Regularly Inundated	3 pts	
Regularly Saturated to Seasonally Inundated	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil	1 pt	

3d. Alterations to Natural Hydrologic Regime

This submetric evaluates the intactness of the natural hydrologic regime of the Wetland.
Check (√) all forms of past or ongoing hydrologic alteration(s) that are potentially influencing the Wetland.

- ☒ ditch(es) in or near the wetland
- ☐ tile(s) in or near the wetland
- ☐ dike(s) in or near the wetland
- ☐ weir(s) in or near the wetland
- ☐ stormwater inputs (addition of water)
- ☐ stream channelization
- ☐ point source discharge(s) (non-stormwater)
- ☐ filling/grading activities in or near the wetland
- ☒ road bed(s)/RR grades(s) in or near the wetland
- ☐ dredging activities in or near the wetland
- ☐ other (specify)
- ☐ other (specify)

Evaluate whether an alteration is significant or minor in relation to the Wetland's overall area and hydrologic regime. For this submetric, "significant" is defined as affecting approximately 10% or greater of the Wetland. "Minor" is defined as affecting less than approximately 10% of the Wetland. A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).

Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's natural hydrologic regime. If uncertain, select adjoining options and average the available points. Round to the nearest 0.5 increment. If the Wetland's natural hydrologic regime has been significantly altered, it shall receive no more than 6 points for this submetric. **Maximum 8 points.**			**Score**
No Hydrologic Alterations Apparent:	There has been no significant alteration(s) to the Wetland's natural hydrologic regime, and/or ongoing minor alteration(s) is/are rare.	8 pts	6.0
Recovered:	Significant hydrologic alteration(s) occurred more than 20 years prior to the assessment, and/or ongoing minor hydrologic alteration(s) is/are only occasional.	6 pts	
Recovering:	A single significant hydrologic alteration occurred within 20 years prior to the assessment, and/or ongoing minor hydrologic alteration(s) is/are frequent.	4 pts	
Recent or No Recovery:	Multiple significant hydrologic alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt	

9.0	**Metric 3 Total** add 3a – 3d **(26 points max.)**

Metric 4. Habitat Alteration and Habitat Structure Development
Maximum 20 Points.

4a. Substrate/Soil Disturbance

This submetric evaluates the intactness or lack of disturbance to the Wetland's substrate and soil. Check (√) all possible forms of past or ongoing substrate/soil disturbance that are observed within the Wetland.

- ☒ human-induced erosion or exposure
- ☐ human-induced sedimentation or burial
- ☒ filling
- ☒ grading
- ☐ dredging
- ☐ plowing, disking
- ☐ intensive grazing (hooves)
- ☐ off-road vehicle use
- ☐ construction vehicle use
- ☐ other (specify)

Evaluate whether a disturbance is significant or minor in relation to the Wetland's overall area. For this submetric, "significant" is defined as affecting approximately 10% or greater of the Wetland. "Minor" is defined as affecting less than approximately 10% of the Wetland. A substrate disturbance may also be an alteration of the natural hydrologic regime (Submetric 3d) and/or an alteration of habitat (Submetric 4b).

Select an option below that best describes the extent of (or lack of) disturbances to the Wetland's substrate. If uncertain, select adjoining options and average the points. Round to the nearest 0.5 increment. If the Wetland's substrate has been significantly altered, it should receive no more than 3 points. **Maximum 4 points.**

			Score
No Substrate Disturbance Apparent:	There has been no significant disturbance to the Wetland's substrate and/or ongoing minor disturbance events are rare.	4 pts	3.0
Recovered:	Significant substrate disturbance occurred more than 20 years prior to the assessment, and/or ongoing minor substrate disturbance events are only occasional (e.g., light sedimentation from a nearby dirt road).	3 pts	
Recovering:	A single significant substrate disturbance event occurred within 20 years prior to the assessment, and/or ongoing minor substrate disturbance events are frequent.	2 pts	
Recent or No Recovery:	Multiple significant substrate disturbance events have occurred in the 20 years prior to the assessment, and/or significant disturbance is ongoing.	1 pt	

4b. Habitat Alteration

This submetric evaluates the intactness of the natural habitat within the Wetland. A "significant" alteration is defined as affecting 10% or greater of the Wetland. "Minor" alternation affects less than 10% of the Wetland. Check (√) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland.

- ☒ barriers such as road bed(s)/RR grades(s)
- ☐ selective cutting
- ☐ clearcutting
- ☒ mowing or shrub removal
- ☐ coarse woody debris (CWD) removal
- ☐ intensive grazing
- ☐ nutrient enrichment, e.g., nuisance algae
- ☐ herbicide/chemical treatment
- ☐ sedimentation
- ☐ dredging
- ☒ filling/grading
- ☐ plowing/disking/farming
- ☐ other (specify)

Utilize aerial photography and field evidence to determine if any habitat alterations occurred prior to approximately 20 years ago. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes, such as large, woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc. Disregard changes that can be attributed to wetland community succession or other natural processes. A habitat alteration may also be an alteration of the natural hydrologic regime (Submetric 3d) and/or a substrate disturbance (Submetric 4a).

Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's habitat. If unclear, select adjoining options and average the available points. Round to the nearest 0.5 increment. **Maximum 9 points**.

			Score
No Habitat Alterations Apparent:	There has been no significant alteration to the Wetland's natural habitat, and/or ongoing minor alteration(s) is/are rare.	9 pts	6.0
Recovered:	Significant habitat alteration(s) occurred more than 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are only occasional.	6 pts	
Recovering:	A single, significant habitat alteration occurred within 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are frequent.	3 pts	
Recent or No Recovery:	Multiple significant habitat alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt	

4c. Habitat Structure Development

Determine an overall qualitative rating of how well developed the Wetland is in comparison to the best of its type. For this submetric, a wetland's type is defined as any ecologically and/or hydrogeomorphically similar wetland habitat typical of the region. Well-developed communities, regardless of successional state, often exhibit many of the following habitat characteristics:

- Quality vertical habitat, such as hummocks, organic debris, and diverse plant height ranges.
- Quality horizontal habitat, such as varying vegetation density and patchiness, moderate ratios of open space to cover, plant species diversity, and a wide range of plant ages.
- Other ecological attributes, such as a diverse assortment of the following: breeding areas, rearing areas, feeding areas, niche space, etc.

Select an option below that best describes the Wetland's habitat structure development. If unclear, select adjoining options and average the points. Round to the nearest 0.5 increment.
Maximum 7 points.

			Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	4.0
Good:	Wetland appears to be a good example of its type but because of past or present disturbance, or other reasons, is not excellent.	5 pts	
Fair:	Wetland appears to be a moderately good example of its type but because of past or present disturbance, or other reasons, is not good.	3 pts	
Poor:	Wetland is a poor example of its type because of past or present disturbance, or other reasons.	1 pt	

13.0 **Metric 4 Total**
add 4a – 4c
(20 points max.)

Metric 5. Special Situations

Refer to the Narrative Rating for definitions and the *User's Manual* for guidance, **Limited to 10 points**

5a. High Ecological Value. See Narrative Rating for definitions of each.
10 points for each that apply.

☐ 1. Contains USFWS-designated Critical Habitat
☐ 2. Federal or State-listed T/E Plant or Animal Species
☐ 3. S1, S2, or S3 Natural Community Type (at least 5 acres or 25% of the Wetland)
☐ 4. Southern Bog (at least 5 acres or 25% of the Wetland)
☐ 5. Old-Growth/Mature Forested Wetland (at least 5 acres or 25% of the Wetland)
☐ 6. Great Lakes Coastal Wetland

Score: 0.0

5b. Forested Wetland. **5 points**.
Exhibits combined canopy cover from any group(s) of trees. Stem DBH must be at least 3 inches to qualify as a tree. Total area must comprise at least 5 acres or 25% of the Wetland. Does not qualify if most of the trees are ungrouped and widely scattered (e.g., a savanna), or located only thinly along the Wetland's margin.

Score: 0.0

5c. Urban/Suburban Wetland. **5 points**.
Greater than 50% of the surrounding landscape (1,000 foot radius) is comprised of low-permeability surfaces, such as roads, lawns, parking lots, buildings, sidewalks, etc.

Score: 0.0

5d. Low-Quality Wetland. Negative 10 points.
The Wetland is less than 1 acre and non-contiguous as defined in Part 303 and either: *1)* a stormwater pond that was excavated from upland and constructed for stormwater treatment in conjunction with a development project *or 2)* more than 75% covered by highly-invasive vegetation. See Submetric 6c for a list of highly-invasive species.

Score: 0.0

0 **Metric 5 Total**
(10 points max.)
Can be negative

Metric 6. Vegetation, Interspersion, and Habitat Features
Maximum 20 points.

6a. Wetland Vegetation Components

Determine the Qualitative Cover Score of each Vegetation Component (Herbaceous, Shrub/Sapling, Forest Overstory). Using the Qualitative Cover Scoring Table, start on the left and proceed to the right, until a point value is obtained for each Vegetation Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include widely-scattered trees, lone shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c to aid in the proper identification of broad-leaved cattail (*Typha latifolia*), a non-invasive, native species.

Qualitative Cover Scoring Table

Vegetation Component ► is >¼ acre	>25% of Wetland area ►	Native species dominate the coverage ►	High native diversity ►	3 pts
			Moderate to low native diversity ►	2 pts
		Invasive or non-native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
	<25% of Wetland area ►	Native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
		Invasive or non-native species dominate the coverage ►	Moderate native diversity ►	1 pt
			Low native diversity ►	0 pt
Vegetation Component is <¼ acre ►	>25% of Wetland area ►	Native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
		Invasive or non-native species dominate the coverage ►		0 pt
	<25% of Wetland area ►			0 pt

Forest Overstory Component, qualitative cover score derived from table **maximum 3 points**. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height. The Wetland does not have a forested component if the trees are widely scattered (e.g., a savanna), located only thinly along the Wetland's margin, or if it is clear that most of the trees are actually located on upland around the perimeter of the Wetland.	**Score** 0.0
Shrub/Sapling Component, qualitative cover score derived from table **maximum 3 points**. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	**Score** 0.0
Herbaceous Component, qualitative cover score derived from table **maximum 3 points**. Herbaceous wetlands are areas dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. The MiRAM includes the robust-stemmed yellow pond lily (*Nuphar advena*) and American lotus (*Nelumbo lutea*) within the herbaceous component because of their tendency to hold their stems and leaves well above the water. All floating-leaf species (including *Nymphaea* spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	**Score** 1.0

6b. Open Water Component

Open water is an unobstructed, inundated area of water containing few or no rooted emergent or woody plant species. It can occur as a distinct zone along a river or lake or as a combination of small ponds, streams, or pools (e.g., within a marsh or swamp) and as an "understory" below a forest canopy (e.g., a forested vernal pool).

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds, streams, and pools**.
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life.
- **Aquatic bed areas**, also known as submergent marsh or submerged aquatic vegetation (SAV). Aquatic bed is dominated by plants that grow at or below the surface of the water for most of the growing season in most years. The MiRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the MiRAM, all floating-leaf aquatic taxa, such as water lilies (*Nymphaea* spp.), are included in the definition of aquatic bed and, therefore, are also included in the definition of open water.
- **100-foot wide strip of open water along a lake or river** (see Boundary Guidelines in the *User's Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see MiRAM Boundary Determination Guidelines). Simply divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake's open water included within the Wetland would be calculated as: 200/400 = 0.5 acre.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).

Estimate the total open water coverage. **Maximum 3 points**.			**Score**
High:	2.5 acres or more	3 pts	0.0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pt	

6c. Coverage of Highly-Invasive Plant Species

Estimate the combined total coverage of any of the species listed below. Assign points based on a range from virtually absent (1 point) to extensive (negative 5 points).

- common reed (*Phragmites australis)*
- purple loosestrife (*Lythrum salicaria*)
- reed canary grass (*Phalaris arundinacea*)
- common buckthorn (*Rhamnus cathartica*)
- glossy buckthorn (*Rhamnus frangula*)
- narrow-leaved cattail (*Typha angustifolia*)
- hybrid cattail (*Typha x glauca*)
- marsh thistle (*Cirsium palustre*)
- multiflora rose (*Rosa multiflora*)
- non-native honeysuckle (*Lonicera spp.*)

Key to Aid in Identification of Invasive and Non-Invasive Cattail (Typha) Species

Native, non-invasive: Male and female portions of the flower spike are not separated (or only slightly separated) on most of the stems within the same local stand. Female flower spikes are light brown and are 0.8-1.2 inches thick at maturity (before expanding when dried). Most leaf blades are approximately 0.5 to1 inch wide at widest part. Typically, not tightly packed into an area (non-invasive). .....**broad-leaved cattail (*T. latifolia)***

Non-native, Invasive: Male and female portions of the flower spike are separated on most of the stems within the same local stand. Female flower spikes are dark brown and less than 0.8 inch thick at maturity (before expanding when dried). Most leaf blades are less than 0.5 inch wide at widest part. Typically, tightly packed within an area, crowding out other plant species (invasive). .....**narrow-leaved cattail (*T. angustifolia)***

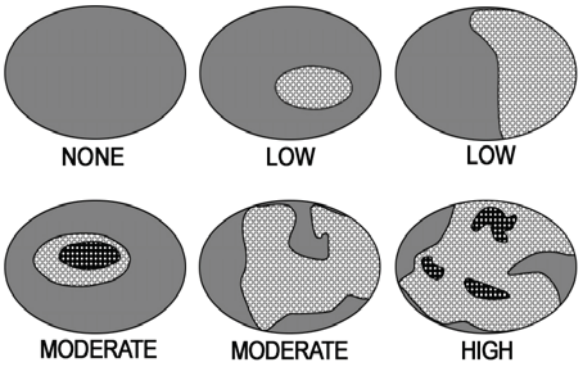
Non-native, Invasive: Hybridization may have occurred if most plants within the same local stand do not cleanly fit the characteristics of either pure species described above. The gap between the male and female portions of the flower spikes is highly variable, with many plants within the same local stand having no gap, and many having relatively wide gaps. Typically, extremely vigorous and often tightly packed within an area, crowding out other plant species (invasive).....**hybrid cattail (*T. x glauca)***

Estimate the total coverage. **Maximum 1 point**.			**Score**
Virtually Absent:	<1% aerial coverage of highly-invasive species	1 pt	-3.0
Nearly Absent:	1% to <5% aerial coverage of highly-invasive species	0 pt	
Low:	5% to <25% aerial coverage of highly-invasive species	-1 pt	
Moderate:	25% to <75% aerial coverage of highly-invasive species	-3 pts	
Extensive:	≥75% aerial coverage of highly-invasive species	-5 pts	

6d. Horizontal (Plan View) Interspersion

Evaluate the Wetland from a "plan view," i.e., as if you are looking down upon it. The graphic shows hypothetical wetlands for estimating degree of interspersion.

Select only one option. **Maximum 5 points**.



		Score
Wetland has a high degree of interspersion	5 pts	1.0
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pt	

6e. Habitat Features

Determine the amount of each habitat feature that is present in the Wetland. **Maximum 3 points for each habitat feature.**

1. Hummocks/Tussocks/Tree Mounds, e.g., sedge/grass tussocks, decaying nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of all raised features (hummocks/tussocks/tree mounds) and includes the depressional matrix within any group of raised features.

				Score
Virtually Absent: 0 pt <5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	0

2. Coarse Woody Debris (CWD). Per log, average width ≥6 inches; each at least 10 feet long. e.g., fallen trees and/or large branches, etc.

				Score
Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	0.0

3. Large Standing Trees, Living or Dead (≥12 inches DBH).

				Score
Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	0.0

4. Amphibian Breeding/Nursery Habitat, e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat.

				Score
Virtually Absent: 0 pt < 5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	1.0

0	**Metric 6 Total** add 6a – 6f **(20 points max.)**

Metric 7. Scenic, Recreational, and Cultural Value

Maximum 3 points.

Select all that apply. Maximum 1 point per submetric.		Score
7a. Scenic: The public can view the Wetland from a public road or public land OR the Wetland has significant scenic value (assign 1 point).	1 pt	0.0
7b. Recreational: The general public has access to the Wetland or the Wetland is assumed to be used for recreational activities (assign 1 point).	1 pt	0.0
7c. Cultural/Historical: The Wetland, or any part of the Wetland, has been recognized as having important cultural or historic value (assign 1 point).	1 pt.	0.0

0.0 **Metric 7 Total**
(3 points max.)

MiRAM Summary

Narrative Rating

Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat	☐YES ☒NO
Question 2: Threatened or Endangered (T/E) Species Habitat	☐YES ☒NO
Question 3: Rare Wetland Natural Community Type	☐YES ☒NO
Question 4: Great Lakes Coastal Wetland	☐YES ☒NO

Quantitative Rating

	Score	Maximum
Metric 1: Wetland Size and Distribution	5.0	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	2.0	12
Metric 3: Hydrology	9.0	26
Metric 4: Habitat Alteration and Habitat Structure Development	13.0	20
Metric 5: Special Situations	0.0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	0.0	20
Metric 7: Scenic, Recreational, and Cultural Value	0.0	3
Seasonally Adjusted Score (add 10 pts if outside the growing season)		10

Grand Total
Add totals from all seven metrics

29.0 **100 Max.**

Scoring comments:

Background Information

Wetland

Proposed Project Site Name or DNRE File #: I-275, WC050
Date of Evaluation: 7/23/2012
County: Wayne
Township: Canton
Town: 2S
Range: 8E
Section: 13
Decimal Lat/Long: 42.3145, -83.4437

Evaluator

Name: S. Kogge, R. Roos
Address: 11181 Marwill Ave
City: West Olive State: MI Zip: 49460
Phone: 616-847-1680
Email: stu.kogge@cardno.com

Is a Wetland Delineation Report available?
☐ YES ☒ NO Date Completed:_____
If "YES", completed by (name of person/firm/agency):

Check (√) each box below when item is complete.

☒ **MiRAM Boundary**. See *MiRAM User's Manual* for more information
Size of the Wetland Evaluation Area: 1 acres

☒ **Location Map**. A county road map showing the location of the Wetland Evaluation Area, north arrow, map scale information, roads, landmarks, etc. *Attach* a map to the end of this document.

☒ **Color Photographs**. Photos should show the wetland vegetation components, habitat/community types, hydrologic features, and any other pertinent site features. *Attach* to the end of this document.

☒ **Landscape Sketch or Aerial Photograph**.

1. Clearly label the Proposed Project Site and Wetland Evaluation Area. Indicate the location of the MiRAM Boundary.
2. Label and indicate the extent of all general wetland community types identified within the Wetland Evaluation Area. Examples include: marsh, wet meadow, hardwood swamp, conifer swamp, shrub swamp, etc. Some wetland communities may be further classified as natural communities. Natural communities are predominantly structured by natural processes rather than modern anthropogenic disturbances. Examples include: bog, prairie fen, muskeg, wet prairie, southern wet meadow, etc.
3. Identify and label all hydrologic features, such as: streams, 100-year floodplains, ponds, vernal pools, and small patches of open water within a marsh or swamp.
4. Identify and label surrounding upland features.
5. Include north arrow and map scale information.
6. *Attach* the landscape sketch or aerial photo to the end of this document.

Comments: List any important site features or apparent disturbance events that have occurred within or near the Wetland Evaluation Area.

WC050 includes ditch along I-275 and adjacent detention basin.

Field Datasheet

List plant species observed within the Wetland. *Attach* additional sheets as necessary.
Nomenclature will follow Voss (1972,1985,1996) or Gleason and Cronquist (1991).

Forest Overstory Stratum (woody plants 3 inches or more DBH, regardless of height)

none observed	

Shrub/Sapling Stratum (woody plants less than 3 inches DBH and greater than 3.28 feet tall)

Rhamnus frangula	

Herbaceous Stratum (non-woody plants, regardless of size, and woody plants less than 3.28 feet tall)

Agrostis gigantea	Juncus tenius
Apocynum cannabinum	Lythrum salicaria
Bidens frondosus	Phragmites australis
Brassica nigra	Poa pratensis
Cirsium arvense	Rumex crispus
Carex vulpinoidea	Scirpus pendulus
Dipsacus laciniatus	Solidago canadensis
Juncus dudleyi	Typha x glauca

Checklist of features and conditions to observe during the field inspection:

- ☐ Hydrologic Condition and Interactions
- ☐ Hydrologic Alterations
- ☐ Substrate/Soil Disturbances
- ☐ Habitat Structure Development
- ☐ Habitat Alterations
- ☐ Habitat/Wetland Condition
- ☐ Amphibian Breeding Pools
- ☐ Vegetation Diversity
- ☐ Vegetation Condition
- ☐ Amount of Open Water
- ☐ Percent of Invasive/Non-native Species
- ☐ Community Interspersion
- ☐ Vertical/Horizontal Structure
- ☐ S1, S2, or S3 Natural Community

Approximately how much of the Wetland Evaluation Area was reviewed during the field inspection? 100 %

Has vegetation within the Wetland Evaluation Area been altered and/or buffer areas impacted within the past 5 years? ☒ YES ☐ NO

Please Note: The Wetland Evaluation Area (encompassed by the MiRAM Boundary) is simply referred to as the "Wetland" throughout the remainder of this document.

Narrative Rating

Completion of the Narrative Rating allows the Evaluator to quickly identify whether the Wetland is one of several wetland types that typically have exceptional ecological value. If any of the metrics are answered affirmatively, the Wetland has *exceptional ecological value and is automatically rated as having high functional value* and completion of the Quantitative Rating is not necessary. If none of the metrics are answered affirmatively, proceed to the Quantitative Rating.

Answer all of the following metrics.

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat.

Is any part of the Wetland located within an area designated as Critical Habitat and does the Wetland *actually* contain habitat suitable for either species listed below?

Piping Plover (*Charadrius melodus*) Critical Habitat Units are designated only within the following counties: Alger, Benzie, Charlevoix, Cheboygan, Chippewa, Emmet, Iosco, Leelanau, Luce, Mackinac, Mason, Muskegon, Presque Isle, and Schoolcraft. See URL below for Unit locations.
www.fws.gov/midwest/endangered/pipingplover/final_rule.pdf

Hines's Emerald Dragonfly (*Somatochlora Hineana*) Critical Habitat Units are designated only within the following counties: Alpena, Mackinac, and Presque Isle. See URL below for Unit locations.
www.fws.gov/midwest/endangered/insects/hed/pdf/hinesfCH_FR.pdf

☐ YES ☒ NO

If "**yes"**, the Wetland has ***high functional value***.

2. Threatened or Endangered (T/E) Species.

Do federal/state-listed T/E plant or animal species occur within the Wetland? Complete the following questions to answer this metric.

a. ☐YES ☐NO Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c.

b. ☐YES ☐NO Does the T/E survey indicate T/E species present within the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric.

c. ☐YES ☐NO Has the Evaluator (or others known to the Evaluator) observed any T/E species within the Wetland? If "Yes," answer "Yes" to this metric. If "No," go to question d.

d. ☐YES ☐NO Does the DNRE Endangered Species Assessment (ESA) web site interactive map, **www.mcgi.state.mi.us/esa,** indicate that there is a potential for unique natural features at or near your site of interest"?" If "No," answer "No" to this metric. If "Yes," request a DNRE formal review by submitting the online form. Type "MiRAM" within the "Project Information" field on the form. Go to question e.

e. ☐YES ☐NO Did the DNRE review confirm potential T/E occurrence in the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric. **The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE**.

☐ YES ☒ NO

If "**yes"**, the Wetland has ***high functional value***.

3. Rare Wetland Natural Community Type.

Are more than 5 acres *or* more than 25% of the Wetland comprised of a Rare Wetland Natural Community Type*? Check (√) all Rare Wetland Natural Community Types

☐ **S1 or S2 Natural Community Type.**
Has the Wetland been identified by the Evaluator — *or other persons* — as being an S1 or S2 natural community type as defined by the Michigan Natural Features Inventory (MNFI)? See the *MiRAM User's Manual* for more information.

☐ **Southern Bog**, defined as any bog occurring below the northern limit of Michigan's Floristic Tension Zone (see figure for approximate location).

☐ **Old-Growth/Mature Forested Wetland.** Lacks evidence of any significant harvesting. Dominated by large, overstory trees (mean overstory DBH ≥20 inches, including at least two trees/acre having DBH ≥28 inches) and the canopy is multi-aged and multi-layered. Aggregations of canopy trees are interspersed with canopy gaps and large snags. Large nursery logs and tip-up mounds litter the forest floor. Does the forested Wetland have all/most of these characteristics?

*If the Rare Wetland Community Type is less than 5 acres *and* less than 25% of the Wetland, the rare community should be split off and evaluated separately.

☐ YES ☒ NO

If "**yes"**, the Wetland has ***high functional value***.

4. Great Lakes Coastal Wetland.

Is any part of the Wetland within 1,000 feet of the ordinary high water mark of any of the Great Lakes, including Lake St. Clair?

☐ YES ☒ NO

If "**yes"**, the Wetland has ***high functional value***.

Quantitative Rating

Completion of the Quantitative Rating assists the Evaluator in recognizing the functional value of the Wetland. Complete all metrics by completing all sections, circling the correct point value(s), and assigning a score.

Metric 1. Wetland Size and Distribution

Maximum 9 points.

1a. Wetland Size Estimate the size of the Wetland (i.e., Wetland Evaluation Area). Select a size class. **Maximum 6 points.**			**Score**
50	acres	Select this option if the wetland's actual size ≥ 50 acres.	6 pts
25	acres to <50 acres		5 pts
10	acres to <25 acres		4 pts
3	acres to <10 acres		3 pts
¼	acre to <3 acres		2 pts
less than ¼ acre			0 pt

0.0

1b. Wetland Scarcity Utilize the USFWS National Wetlands Inventory (NWI) maps to estimate percentage of wetland area remaining within a 2-mile radius from the Wetland's center. For the purpose of this submetric, areas of open water within the Great Lakes, inland lakes, streams, etc., should be excluded from the wetland percentage. Select the most appropriate percentage category. **Maximum 3 points.**		**Score**
0 to 20% of surrounding 2-mile radius is wetland	3 pts	3.0
>20 to 80% of surrounding 2-mile radius is wetland	2 pts	
>80% of surrounding 2-mile radius is wetland	1 pt	

3.0	**Metric 1 Total** add 1a & 1b **(9 points max.)**

Metric 2. Upland Buffers and Intensity of Surrounding Land Use

Maximum 12 points.

2a. Average Buffer Width around the Wetland's Perimeter

Step 1: Using the most recent aerial photograph available, sketch a 150-foot wide "buffer zone" around the Wetland.
Step 2: Estimate the buffer widths from the Wetland's edge to any non-buffer areas (up to 150 feet).
Step 3: Average the buffer widths along the Wetland's perimeter.
Step 4: Select the buffer width that is most appropriate. **Maximum 6 points**.

Buffers Include:

- shrubland, young forest, natural grassland, prairie
- abandoned row crop field (vegetated & naturalizing)
- hay field (non-row crop), lightly grazed pasture
- lightly managed forest (selectively logged)
- designated wildlife area, lightly managed parkland
- other wetland, lake, river

Non-Buffers Include:

- lawns, golf courses, manicured parkland
- residential, commercial, industrial
- roadways (including shoulders), parking lots
- row crop field
- conservation tillage, heavily grazed pasture
- clear-cutting, mining, construction activity

			Score
Wide Buffer Width:	≥150 feet around the perimeter	6 pts	0.0
Medium Buffer Width:	75 to <150 feet around the perimeter	4 pts	
Narrow Buffer Width:	25 to <75 feet around the perimeter	2 pt	
Very Narrow Buffer Width:	0 (no buffer) to <25 feet around the perimeter	0 pt	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland

Step 1: Using the most recent aerial photograph available, sketch a 1,000-foot wide "land use zone" around the Wetland.

Step 2: Estimate percent coverages comprised by each of the four types of land use listed below.

Step 3: If any land use type comprises more than 25% of the total land use, it is considered to be a "dominant" land use type for the purposes of MiRAM and will receive points. Sum the available points from all dominant land use types and then average the score. Round to the nearest 0.5 increment. **Maximum 6 points**.

Type of Land Use	Examples within each Type of Land Use			Score
Very Low Intensity:	• maturing forest • natural grassland, prairie	• designated wildlife area • other wetland, lake, river	6 pts	1.0
Low Intensity:	• shrubland/young forest • recent selective logging • hay field (non-row crop)	• lightly managed parkland • old field, lightly grazed pasture • one-lane road/two track	4 pts	
Moderately High Intensity:	• residential & lawns • manicured parkland • golf course	• conservation tillage • recent clear-cut (<10 years) • two-lane road	2 pts	
High Intensity:	• commercial, industrial • high-density residential • heavily grazed pasture • row crop field	• multi-lane paved roadway • construction activity • parking lot • mining	1 pt	

1.0	**Metric 2 Total** add 2a & 2b **(12 points max.)**

Metric 3. Hydrology

Limited to 26 points.

3a. Sources of Water: Select all that apply. **Maximum 8 points**.		Score
Precipitation: Directly and/or as runoff from upland areas.	1 pt	1.0
Groundwater: Seeps or evidence, such as significant amounts of skunk cabbage (*Symplocarpus foetidus*) or other fen-adapted species.	2 pts	0.0
Seasonal/Intermittent Surface Water: Seasonal inundation from a lake, pond, or stream. (A Wetland can only receive points for this source of water or the next, not both.)	2 pts	0.0
Perennial Surface Water: Perennial inundation from a lake, stream or pond.	5 pts	0.0

3b. Connectivity: Select all that apply. **Maximum 8 points**.		Score
100-Year Floodplain. As defined in the Floodplain Authority under Part 31 of the NREPA.	2 pts	0.0
Between a Stream/Lake/Pond and Human Land Use. The Wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the Wetland before it discharges into the surface waterbody.	2 pts	2.0
Wetland/Upland Complex. The Wetland is part of a large scale (10+ acres) non-linear complex of wetlands with small areas of unmanicured/undeveloped vegetated uplands that do not restrict movement of organisms between the wetland areas.	2 pts	0.0
Riparian Corridor. The Wetland is part of a linear *riparian* corridor that provides organism movement along a stream/river. Typically, these corridors should exceed 100 feet in width and extend at least one half mile.	2 pts	0.0

3c. Duration of Inundation/Saturation Select the option(s) from below that best describe(s) the dominant hydrologic characteristic of the Wetland. For the purposes of this submetric, "dominant" is defined as comprising at least 25% of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, select all that apply and average the points. Round to the nearest 0.5 increment. **Maximum 4 points.**		**Score**
Permanently Inundated	4 pts	3.0
Permanently Saturated to Regularly Inundated	3 pts	
Regularly Saturated to Seasonally Inundated	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil	1 pt	

3d. Alterations to Natural Hydrologic Regime

This submetric evaluates the intactness of the natural hydrologic regime of the Wetland.
Check (√) all forms of past or ongoing hydrologic alteration(s) that are potentially influencing the Wetland.

- ☐ ditch(es) in or near the wetland
- ☐ tile(s) in or near the wetland
- ☐ dike(s) in or near the wetland
- ☒ weir(s) in or near the wetland
- ☒ stormwater inputs (addition of water)
- ☐ stream channelization
- ☐ point source discharge(s) (non-stormwater)
- ☐ filling/grading activities in or near the wetland
- ☐ road bed(s)/RR grades(s) in or near the wetland
- ☐ dredging activities in or near the wetland
- ☐ other (specify)
- ☐ other (specify)

Evaluate whether an alteration is significant or minor in relation to the Wetland's overall area and hydrologic regime. For this submetric, "significant" is defined as affecting approximately 10% or greater of the Wetland. "Minor" is defined as affecting less than approximately 10% of the Wetland. A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).

Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's natural hydrologic regime. If uncertain, select adjoining options and average the available points. Round to the nearest 0.5 increment. If the Wetland's natural hydrologic regime has been significantly altered, it shall receive no more than 6 points for this submetric. **Maximum 8 points.**			**Score**
No Hydrologic Alterations Apparent:	There has been no significant alteration(s) to the Wetland's natural hydrologic regime, and/or ongoing minor alteration(s) is/are rare.	8 pts	6.0
Recovered:	Significant hydrologic alteration(s) occurred more than 20 years prior to the assessment, and/or ongoing minor hydrologic alteration(s) is/are only occasional.	6 pts	
Recovering:	A single significant hydrologic alteration occurred within 20 years prior to the assessment, and/or ongoing minor hydrologic alteration(s) is/are frequent.	4 pts	
Recent or No Recovery:	Multiple significant hydrologic alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt	

12.0	**Metric 3 Total** add 3a – 3d **(26 points max.)**

Metric 4. Habitat Alteration and Habitat Structure Development
Maximum 20 Points.

4a. Substrate/Soil Disturbance

This submetric evaluates the intactness or lack of disturbance to the Wetland's substrate and soil. Check (√) all possible forms of past or ongoing substrate/soil disturbance that are observed within the Wetland.

- ☐ human-induced erosion or exposure
- ☐ human-induced sedimentation or burial
- ☐ filling
- ☐ grading
- ☐ dredging
- ☐ plowing, disking
- ☐ intensive grazing (hooves)
- ☐ off-road vehicle use
- ☐ construction vehicle use
- ☒ other (specify)

Evaluate whether a disturbance is significant or minor in relation to the Wetland's overall area. For this submetric, "significant" is defined as affecting approximately 10% or greater of the Wetland. "Minor" is defined as affecting less than approximately 10% of the Wetland. A substrate disturbance may also be an alteration of the natural hydrologic regime (Submetric 3d) and/or an alteration of habitat (Submetric 4b).

Select an option below that best describes the extent of (or lack of) disturbances to the Wetland's substrate. If uncertain, select adjoining options and average the points. Round to the nearest 0.5 increment. If the Wetland's substrate has been significantly altered, it should receive no more than 3 points. **Maximum 4 points.**

			Score
No Substrate Disturbance Apparent:	There has been no significant disturbance to the Wetland's substrate and/or ongoing minor disturbance events are rare.	4 pts	2.0
Recovered:	Significant substrate disturbance occurred more than 20 years prior to the assessment, and/or ongoing minor substrate disturbance events are only occasional (e.g., light sedimentation from a nearby dirt road).	3 pts	
Recovering:	A single significant substrate disturbance event occurred within 20 years prior to the assessment, and/or ongoing minor substrate disturbance events are frequent.	2 pts	
Recent or No Recovery:	Multiple significant substrate disturbance events have occurred in the 20 years prior to the assessment, and/or significant disturbance is ongoing.	1 pt	

4b. Habitat Alteration

This submetric evaluates the intactness of the natural habitat within the Wetland. A "significant" alteration is defined as affecting 10% or greater of the Wetland. "Minor" alternation affects less than 10% of the Wetland. Check (√) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland.

- ☐ barriers such as road bed(s)/RR grades(s)
- ☒ selective cutting
- ☐ clearcutting
- ☒ mowing or shrub removal
- ☒ coarse woody debris (CWD) removal
- ☒ intensive grazing
- ☒ nutrient enrichment, e.g., nuisance algae
- ☒ herbicide/chemical treatment
- ☐ sedimentation
- ☐ dredging
- ☐ filling/grading
- ☐ plowing/disking/farming
- ☐ other (specify)

Utilize aerial photography and field evidence to determine if any habitat alterations occurred prior to approximately 20 years ago. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes, such as large, woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc. Disregard changes that can be attributed to wetland community succession or other natural processes. A habitat alteration may also be an alteration of the natural hydrologic regime (Submetric 3d) and/or a substrate disturbance (Submetric 4a).

Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's habitat. If unclear, select adjoining options and average the available points. Round to the nearest 0.5 increment. **Maximum 9 points**.

			Score
No Habitat Alterations Apparent:	There has been no significant alteration to the Wetland's natural habitat, and/or ongoing minor alteration(s) is/are rare.	9 pts	1.0
Recovered:	Significant habitat alteration(s) occurred more than 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are only occasional.	6 pts	
Recovering:	A single, significant habitat alteration occurred within 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are frequent.	3 pts	
Recent or No Recovery:	Multiple significant habitat alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt	

4c. Habitat Structure Development

Determine an overall qualitative rating of how well developed the Wetland is in comparison to the best of its type. For this submetric, a wetland's type is defined as any ecologically and/or hydrogeomorphically similar wetland habitat typical of the region. Well-developed communities, regardless of successional state, often exhibit many of the following habitat characteristics:

- Quality vertical habitat, such as hummocks, organic debris, and diverse plant height ranges.
- Quality horizontal habitat, such as varying vegetation density and patchiness, moderate ratios of open space to cover, plant species diversity, and a wide range of plant ages.
- Other ecological attributes, such as a diverse assortment of the following: breeding areas, rearing areas, feeding areas, niche space, etc.

Select an option below that best describes the Wetland's habitat structure development. If unclear, select adjoining options and average the points. Round to the nearest 0.5 increment.
Maximum 7 points.

			Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	1.0
Good:	Wetland appears to be a good example of its type but because of past or present disturbance, or other reasons, is not excellent.	5 pts	
Fair:	Wetland appears to be a moderately good example of its type but because of past or present disturbance, or other reasons, is not good.	3 pts	
Poor:	Wetland is a poor example of its type because of past or present disturbance, or other reasons.	1 pt	

4.0 **Metric 4 Total**
add 4a – 4c
(20 points max.)

Metric 5. Special Situations

Refer to the Narrative Rating for definitions and the *User's Manual* for guidance, **Limited to 10 points**

5a. High Ecological Value. See Narrative Rating for definitions of each.
10 points for each that apply.

☐ 1. Contains USFWS-designated Critical Habitat
☐ 2. Federal or State-listed T/E Plant or Animal Species
☐ 3. S1, S2, or S3 Natural Community Type (at least 5 acres or 25% of the Wetland)
☐ 4. Southern Bog (at least 5 acres or 25% of the Wetland)
☐ 5. Old-Growth/Mature Forested Wetland (at least 5 acres or 25% of the Wetland)
☐ 6. Great Lakes Coastal Wetland

Score: 0.0

5b. Forested Wetland. **5 points**.
Exhibits combined canopy cover from any group(s) of trees. Stem DBH must be at least 3 inches to qualify as a tree. Total area must comprise at least 5 acres or 25% of the Wetland. Does not qualify if most of the trees are ungrouped and widely scattered (e.g., a savanna), or located only thinly along the Wetland's margin.

Score: 0.0

5c. Urban/Suburban Wetland. **5 points**.
Greater than 50% of the surrounding landscape (1,000 foot radius) is comprised of low-permeability surfaces, such as roads, lawns, parking lots, buildings, sidewalks, etc.

Score: 0.0

5d. Low-Quality Wetland. Negative 10 points.
The Wetland is less than 1 acre and non-contiguous as defined in Part 303 and either: *1)* a stormwater pond that was excavated from upland and constructed for stormwater treatment in conjunction with a development project *or 2)* more than 75% covered by highly-invasive vegetation. See Submetric 6c for a list of highly-invasive species.

Score: -10.0

-10 **Metric 5 Total**
(10 points max.)
Can be negative

Metric 6. Vegetation, Interspersion, and Habitat Features
Maximum 20 points.

6a. Wetland Vegetation Components

Determine the Qualitative Cover Score of each Vegetation Component (Herbaceous, Shrub/Sapling, Forest Overstory). Using the Qualitative Cover Scoring Table, start on the left and proceed to the right, until a point value is obtained for each Vegetation Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include widely-scattered trees, lone shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c to aid in the proper identification of broad-leaved cattail (*Typha latifolia*), a non-invasive, native species.

Qualitative Cover Scoring Table

Vegetation Component ► is >¼ acre	>25% of Wetland area ►	Native species dominate the coverage ►	High native diversity ►	3 pts
			Moderate to low native diversity ►	2 pts
		Invasive or non-native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
	<25% of Wetland area ►	Native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
		Invasive or non-native species dominate the coverage ►	Moderate native diversity ►	1 pt
			Low native diversity ►	0 pt
Vegetation Component is <¼ acre ►	>25% of Wetland area ►	Native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
		Invasive or non-native species dominate the coverage ►		0 pt
	<25% of Wetland area ►			0 pt

Forest Overstory Component, qualitative cover score derived from table **maximum 3 points**. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height. The Wetland does not have a forested component if the trees are widely scattered (e.g., a savanna), located only thinly along the Wetland's margin, or if it is clear that most of the trees are actually located on upland around the perimeter of the Wetland.	**Score** 0.0
Shrub/Sapling Component, qualitative cover score derived from table **maximum 3 points**. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	**Score** 0.0
Herbaceous Component, qualitative cover score derived from table **maximum 3 points**. Herbaceous wetlands are areas dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. The MiRAM includes the robust-stemmed yellow pond lily (*Nuphar advena*) and American lotus (*Nelumbo lutea*) within the herbaceous component because of their tendency to hold their stems and leaves well above the water. All floating-leaf species (including *Nymphaea* spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	**Score** 1.0

6b. Open Water Component

Open water is an unobstructed, inundated area of water containing few or no rooted emergent or woody plant species. It can occur as a distinct zone along a river or lake or as a combination of small ponds, streams, or pools (e.g., within a marsh or swamp) and as an "understory" below a forest canopy (e.g., a forested vernal pool).

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds, streams, and pools**.
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life.
- **Aquatic bed areas**, also known as submergent marsh or submerged aquatic vegetation (SAV). Aquatic bed is dominated by plants that grow at or below the surface of the water for most of the growing season in most years. The MiRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the MiRAM, all floating-leaf aquatic taxa, such as water lilies (*Nymphaea* spp.), are included in the definition of aquatic bed and, therefore, are also included in the definition of open water.
- **100-foot wide strip of open water along a lake or river** (see Boundary Guidelines in the *User's Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see MiRAM Boundary Determination Guidelines). Simply divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake's open water included within the Wetland would be calculated as: 200/400 = 0.5 acre.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).

Estimate the total open water coverage. **Maximum 3 points**.			**Score**
High:	2.5 acres or more	3 pts	0.0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pt	

6c. Coverage of Highly-Invasive Plant Species

Estimate the combined total coverage of any of the species listed below. Assign points based on a range from virtually absent (1 point) to extensive (negative 5 points).

- common reed (*Phragmites australis)*
- purple loosestrife (*Lythrum salicaria*)
- reed canary grass (*Phalaris arundinacea*)
- common buckthorn (*Rhamnus cathartica*)
- glossy buckthorn (*Rhamnus frangula*)
- narrow-leaved cattail (*Typha angustifolia*)
- hybrid cattail (*Typha x glauca*)
- marsh thistle (*Cirsium palustre*)
- multiflora rose (*Rosa multiflora*)
- non-native honeysuckle (*Lonicera spp.*)

Key to Aid in Identification of Invasive and Non-Invasive Cattail (Typha) Species

Native, non-invasive: Male and female portions of the flower spike are not separated (or only slightly separated) on most of the stems within the same local stand. Female flower spikes are light brown and are 0.8-1.2 inches thick at maturity (before expanding when dried). Most leaf blades are approximately 0.5 to1 inch wide at widest part. Typically, not tightly packed into an area (non-invasive). .....**broad-leaved cattail (*T. latifolia)***

Non-native, Invasive: Male and female portions of the flower spike are separated on most of the stems within the same local stand. Female flower spikes are dark brown and less than 0.8 inch thick at maturity (before expanding when dried). Most leaf blades are less than 0.5 inch wide at widest part. Typically, tightly packed within an area, crowding out other plant species (invasive). .....**narrow-leaved cattail (*T. angustifolia)***

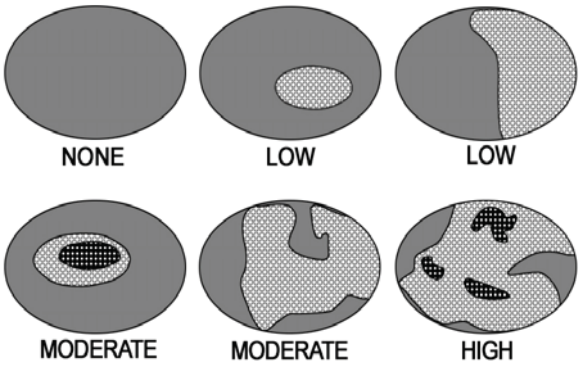
Non-native, Invasive: Hybridization may have occurred if most plants within the same local stand do not cleanly fit the characteristics of either pure species described above. The gap between the male and female portions of the flower spikes is highly variable, with many plants within the same local stand having no gap, and many having relatively wide gaps. Typically, extremely vigorous and often tightly packed within an area, crowding out other plant species (invasive).....**hybrid cattail (*T. x glauca)***

Estimate the total coverage. **Maximum 1 point**.			**Score**
Virtually Absent:	<1% aerial coverage of highly-invasive species	1 pt	1.0
Nearly Absent:	1% to <5% aerial coverage of highly-invasive species	0 pt	
Low:	5% to <25% aerial coverage of highly-invasive species	-1 pt	
Moderate:	25% to <75% aerial coverage of highly-invasive species	-3 pts	
Extensive:	≥75% aerial coverage of highly-invasive species	-5 pts	

6d. Horizontal (Plan View) Interspersion

Evaluate the Wetland from a "plan view," i.e., as if you are looking down upon it. The graphic shows hypothetical wetlands for estimating degree of interspersion.

Select only one option. **Maximum 5 points**.



		Score
Wetland has a high degree of interspersion	5 pts	0.0
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pt	

6e. Habitat Features

Determine the amount of each habitat feature that is present in the Wetland. **Maximum 3 points for each habitat feature.**

1. Hummocks/Tussocks/Tree Mounds, e.g., sedge/grass tussocks, decaying nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of all raised features (hummocks/tussocks/tree mounds) and includes the depressional matrix within any group of raised features.

Virtually Absent: 0 pt <5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	Score
				0

2. Coarse Woody Debris (CWD). Per log, average width ≥6 inches; each at least 10 feet long. e.g., fallen trees and/or large branches, etc.

Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	Score
				0.0

3. Large Standing Trees, Living or Dead (≥12 inches DBH).

Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	Score
				0.0

4. Amphibian Breeding/Nursery Habitat, e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat.

Virtually Absent: 0 pt < 5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	Score
				1.0

3	**Metric 6 Total** add 6a – 6f **(20 points max.)**

Metric 7. Scenic, Recreational, and Cultural Value

Maximum 3 points.

Select all that apply. Maximum 1 point per submetric.		Score
7a. Scenic: The public can view the Wetland from a public road or public land OR the Wetland has significant scenic value (assign 1 point).	1 pt	1.0
7b. Recreational: The general public has access to the Wetland or the Wetland is assumed to be used for recreational activities (assign 1 point).	1 pt	0.0
7c. Cultural/Historical: The Wetland, or any part of the Wetland, has been recognized as having important cultural or historic value (assign 1 point).	1 pt.	0.0

1.0 **Metric 7 Total**
(3 points max.)

MiRAM Summary

Narrative Rating

Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat	☐YES ☒NO
Question 2: Threatened or Endangered (T/E) Species Habitat	☐YES ☒NO
Question 3: Rare Wetland Natural Community Type	☐YES ☒NO
Question 4: Great Lakes Coastal Wetland	☐YES ☒NO

Quantitative Rating

	Score	Maximum
Metric 1: Wetland Size and Distribution	3.0	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	1.0	12
Metric 3: Hydrology	12.0	26
Metric 4: Habitat Alteration and Habitat Structure Development	4.0	20
Metric 5: Special Situations	-10.0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	3.0	20
Metric 7: Scenic, Recreational, and Cultural Value	1.0	3
Seasonally Adjusted Score (add 10 pts if outside the growing season)		10

Grand Total
Add totals from all seven metrics

14.0 **100 Max.**

Scoring comments: Significant canada goose activity at detention basin area.

Background Information

Wetland

Proposed Project Site Name or DNRE File #: I-275, WC058
Date of Evaluation: 7/24/2012
County: Wayne
Township: Canton
Town: 2S
Range: 8E
Section: 13
Decimal Lat/Long: 42.3198, -83.4452

Evaluator

Name: S. Kogge, R. Roos
Address: 11181 Marwill Ave
City: West Olive State: MI Zip: 49460
Phone: 616-847-1680
Email: stu.kogge@cardno.com

Is a Wetland Delineation Report available?
☐ YES ☒ NO Date Completed:_____
If "YES", completed by (name of person/firm/agency):

Check (√) each box below when item is complete.

☒ **MiRAM Boundary**. See *MiRAM User's Manual* for more information
Size of the Wetland Evaluation Area: 2.5 acres

☒ **Location Map**. A county road map showing the location of the Wetland Evaluation Area, north arrow, map scale information, roads, landmarks, etc. *Attach* a map to the end of this document.

☒ **Color Photographs**. Photos should show the wetland vegetation components, habitat/community types, hydrologic features, and any other pertinent site features. *Attach* to the end of this document.

☒ **Landscape Sketch or Aerial Photograph**.

1. Clearly label the Proposed Project Site and Wetland Evaluation Area. Indicate the location of the MiRAM Boundary.
2. Label and indicate the extent of all general wetland community types identified within the Wetland Evaluation Area. Examples include: marsh, wet meadow, hardwood swamp, conifer swamp, shrub swamp, etc. Some wetland communities may be further classified as natural communities. Natural communities are predominantly structured by natural processes rather than modern anthropogenic disturbances. Examples include: bog, prairie fen, muskeg, wet prairie, southern wet meadow, etc.
3. Identify and label all hydrologic features, such as: streams, 100-year floodplains, ponds, vernal pools, and small patches of open water within a marsh or swamp.
4. Identify and label surrounding upland features.
5. Include north arrow and map scale information.
6. *Attach* the landscape sketch or aerial photo to the end of this document.

Comments: List any important site features or apparent disturbance events that have occurred within or near the Wetland Evaluation Area.

WC058 includes detention basin.

Field Datasheet

List plant species observed within the Wetland. *Attach* additional sheets as necessary.
Nomenclature will follow Voss (1972,1985,1996) or Gleason and Cronquist (1991).

Forest Overstory Stratum (woody plants 3 inches or more DBH, regardless of height)

Salix nigra	
Ulmus americana	

Shrub/Sapling Stratum (woody plants less than 3 inches DBH and greater than 3.28 feet tall)

Cornus foemina	
Rhamnus frangula	
Salix discolor	
Salix exigua	
Salix nigra	

Herbaceous Stratum (non-woody plants, regardless of size, and woody plants less than 3.28 feet tall)

Amaranthus blitoides	Phragmites australis
Apocynum cannabinum	Poa pratensis
Cirseim arvense	Polygonum persicaria
Carex cristatella	Scirpus atrovirens
Juncus dudleyi	Solidago canadensis
Lythrum salicaria	Typha x glauca
Nymphaea orodata	Verbena hastata
Parthenocissus quinquefolia	Vitis riparia

Checklist of features and conditions to observe during the field inspection:

- ☐ Hydrologic Condition and Interactions
- ☐ Hydrologic Alterations
- ☐ Substrate/Soil Disturbances
- ☐ Habitat Structure Development
- ☐ Habitat Alterations
- ☐ Habitat/Wetland Condition
- ☐ Amphibian Breeding Pools
- ☐ Vegetation Diversity
- ☐ Vegetation Condition
- ☐ Amount of Open Water
- ☐ Percent of Invasive/Non-native Species
- ☐ Community Interspersion
- ☐ Vertical/Horizontal Structure
- ☐ S1, S2, or S3 Natural Community

Approximately how much of the Wetland Evaluation Area was reviewed during the field inspection? 50 %

Has vegetation within the Wetland Evaluation Area been altered and/or buffer areas impacted <u>within the past 5 years</u>? ☒ YES ☐ NO

Please Note: The Wetland Evaluation Area (encompassed by the MiRAM Boundary) is simply referred to as the "Wetland" throughout the remainder of this document.

Narrative Rating

Completion of the Narrative Rating allows the Evaluator to quickly identify whether the Wetland is one of several wetland types that typically have exceptional ecological value. If any of the metrics are answered affirmatively, the Wetland has *exceptional ecological value and is automatically rated as having high functional value* and completion of the Quantitative Rating is not necessary. If none of the metrics are answered affirmatively, proceed to the Quantitative Rating.

Answer all of the following metrics.

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat.

Is any part of the Wetland located within an area designated as Critical Habitat and does the Wetland *actually* contain habitat suitable for either species listed below?

Piping Plover (*Charadrius melodus*) Critical Habitat Units are designated only within the following counties: Alger, Benzie, Charlevoix, Cheboygan, Chippewa, Emmet, Iosco, Leelanau, Luce, Mackinac, Mason, Muskegon, Presque Isle, and Schoolcraft. See URL below for Unit locations.
www.fws.gov/midwest/endangered/pipingplover/final_rule.pdf

Hines's Emerald Dragonfly (*Somatochlora Hineana*) Critical Habitat Units are designated only within the following counties: Alpena, Mackinac, and Presque Isle. See URL below for Unit locations.
www.fws.gov/midwest/endangered/insects/hed/pdf/hinesfCH_FR.pdf

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

2. Threatened or Endangered (T/E) Species.

Do federal/state-listed T/E plant or animal species occur within the Wetland? Complete the following questions to answer this metric.

a. ☐YES ☒NO Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c.

b. ☐YES ☒NO Does the T/E survey indicate T/E species present within the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric.

c. ☐YES ☒NO Has the Evaluator (or others known to the Evaluator) observed any T/E species within the Wetland? If "Yes," answer "Yes" to this metric. If "No," go to question d.

d. ☐YES ☒NO Does the DNRE Endangered Species Assessment (ESA) web site interactive map, **www.mcgi.state.mi.us/esa,** indicate that there is a potential for unique natural features at or near your site of interest"?" If "No," answer "No" to this metric. If "Yes," request a DNRE formal review by submitting the online form. Type "MiRAM" within the "Project Information" field on the form. Go to question e.

e. ☐YES ☒NO Did the DNRE review confirm potential T/E occurrence in the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric. **The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE**.

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

3. Rare Wetland Natural Community Type.

Are more than 5 acres *or* more than 25% of the Wetland comprised of a Rare Wetland Natural Community Type*? Check (√) all Rare Wetland Natural Community Types

☐ **S1 or S2 Natural Community Type.**
Has the Wetland been identified by the Evaluator — *or other persons* — as being an S1 or S2 natural community type as defined by the Michigan Natural Features Inventory (MNFI)? See the *MiRAM User's Manual* for more information.

☐ **Southern Bog**, defined as any bog occurring below the northern limit of Michigan's Floristic Tension Zone (see figure for approximate location).

☐ **Old-Growth/Mature Forested Wetland.** Lacks evidence of any significant harvesting. Dominated by large, overstory trees (mean overstory DBH ≥20 inches, including at least two trees/acre having DBH ≥28 inches) and the canopy is multi-aged and multi-layered. Aggregations of canopy trees are interspersed with canopy gaps and large snags. Large nursery logs and tip-up mounds litter the forest floor. Does the forested Wetland have all/most of these characteristics?

*If the Rare Wetland Community Type is less than 5 acres *and* less than 25% of the Wetland, the rare community should be split off and evaluated separately.

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

4. Great Lakes Coastal Wetland.

Is any part of the Wetland within 1,000 feet of the ordinary high water mark of any of the Great Lakes, including Lake St. Clair?

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

Quantitative Rating

Completion of the Quantitative Rating assists the Evaluator in recognizing the functional value of the Wetland. Complete all metrics by completing all sections, circling the correct point value(s), and assigning a score.

Metric 1. Wetland Size and Distribution

Maximum 9 points.

1a. Wetland Size Estimate the size of the Wetland (i.e., Wetland Evaluation Area). Select a size class. **Maximum 6 points.**			**Score**
50	acres	Select this option if the wetland's actual size ≥ 50 acres.	6 pts
25	acres to <50 acres		5 pts
10	acres to <25 acres		4 pts
3	acres to <10 acres		3 pts
¼	acre to <3 acres		2 pts
less than ¼ acre			0 pt

3.0

1b. Wetland Scarcity Utilize the USFWS National Wetlands Inventory (NWI) maps to estimate percentage of wetland area remaining within a 2-mile radius from the Wetland's center. For the purpose of this submetric, areas of open water within the Great Lakes, inland lakes, streams, etc., should be excluded from the wetland percentage. Select the most appropriate percentage category. **Maximum 3 points.**		**Score**
0 to 20% of surrounding 2-mile radius is wetland	3 pts	3.0
>20 to 80% of surrounding 2-mile radius is wetland	2 pts	
>80% of surrounding 2-mile radius is wetland	1 pt	

6.0	**Metric 1 Total** add 1a & 1b **(9 points max.)**

Metric 2. Upland Buffers and Intensity of Surrounding Land Use

Maximum 12 points.

2a. Average Buffer Width around the Wetland's Perimeter

Step 1: Using the most recent aerial photograph available, sketch a 150-foot wide "buffer zone" around the Wetland.
Step 2: Estimate the buffer widths from the Wetland's edge to any non-buffer areas (up to 150 feet).
Step 3: Average the buffer widths along the Wetland's perimeter.
Step 4: Select the buffer width that is most appropriate. **Maximum 6 points**.

Buffers Include:

- shrubland, young forest, natural grassland, prairie
- abandoned row crop field (vegetated & naturalizing)
- hay field (non-row crop), lightly grazed pasture
- lightly managed forest (selectively logged)
- designated wildlife area, lightly managed parkland
- other wetland, lake, river

Non-Buffers Include:

- lawns, golf courses, manicured parkland
- residential, commercial, industrial
- roadways (including shoulders), parking lots
- row crop field
- conservation tillage, heavily grazed pasture
- clear-cutting, mining, construction activity

			Score
Wide Buffer Width:	≥150 feet around the perimeter	6 pts	0.0
Medium Buffer Width:	75 to <150 feet around the perimeter	4 pts	
Narrow Buffer Width:	25 to <75 feet around the perimeter	2 pt	
Very Narrow Buffer Width:	0 (no buffer) to <25 feet around the perimeter	0 pt	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland

Step 1: Using the most recent aerial photograph available, sketch a 1,000-foot wide "land use zone" around the Wetland.

Step 2: Estimate percent coverages comprised by each of the four types of land use listed below.

Step 3: If any land use type comprises more than 25% of the total land use, it is considered to be a "dominant" land use type for the purposes of MiRAM and will receive points. Sum the available points from all dominant land use types and then average the score. Round to the nearest 0.5 increment. **Maximum 6 points**.

Type of Land Use	Examples within each Type of Land Use			Score
Very Low Intensity:	• maturing forest • natural grassland, prairie	• designated wildlife area • other wetland, lake, river	6 pts	1.0
Low Intensity:	• shrubland/young forest • recent selective logging • hay field (non-row crop)	• lightly managed parkland • old field, lightly grazed pasture • one-lane road/two track	4 pts	
Moderately High Intensity:	• residential & lawns • manicured parkland • golf course	• conservation tillage • recent clear-cut (<10 years) • two-lane road	2 pts	
High Intensity:	• commercial, industrial • high-density residential • heavily grazed pasture • row crop field	• multi-lane paved roadway • construction activity • parking lot • mining	1 pt	

1.0	**Metric 2 Total** add 2a & 2b **(12 points max.)**

Metric 3. Hydrology

Limited to 26 points.

3a. Sources of Water: Select all that apply. **Maximum 8 points**.		Score
Precipitation: Directly and/or as runoff from upland areas.	1 pt	1.0
Groundwater: Seeps or evidence, such as significant amounts of skunk cabbage (*Symplocarpus foetidus*) or other fen-adapted species.	2 pts	0.0
Seasonal/Intermittent Surface Water: Seasonal inundation from a lake, pond, or stream. (A Wetland can only receive points for this source of water or the next, not both.)	2 pts	0.0
Perennial Surface Water: Perennial inundation from a lake, stream or pond.	5 pts	5.0

3b. Connectivity: Select all that apply. **Maximum 8 points**.		Score
100-Year Floodplain. As defined in the Floodplain Authority under Part 31 of the NREPA.	2 pts	0.0
Between a Stream/Lake/Pond and Human Land Use. The Wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the Wetland before it discharges into the surface waterbody.	2 pts	2.0
Wetland/Upland Complex. The Wetland is part of a large scale (10+ acres) non-linear complex of wetlands with small areas of unmanicured/undeveloped vegetated uplands that do not restrict movement of organisms between the wetland areas.	2 pts	0.0
Riparian Corridor. The Wetland is part of a linear *riparian* corridor that provides organism movement along a stream/river. Typically, these corridors should exceed 100 feet in width and extend at least one half mile.	2 pts	0.0

3c. Duration of Inundation/Saturation Select the option(s) from below that best describe(s) the dominant hydrologic characteristic of the Wetland. For the purposes of this submetric, "dominant" is defined as comprising at least 25% of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, select all that apply and average the points. Round to the nearest 0.5 increment. **Maximum 4 points.**		**Score**
Permanently Inundated	4 pts	3.0
Permanently Saturated to Regularly Inundated	3 pts	
Regularly Saturated to Seasonally Inundated	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil	1 pt	

3d. Alterations to Natural Hydrologic Regime

This submetric evaluates the intactness of the natural hydrologic regime of the Wetland.
Check (√) all forms of past or ongoing hydrologic alteration(s) that are potentially influencing the Wetland.

- ☐ ditch(es) in or near the wetland
- ☐ tile(s) in or near the wetland
- ☐ dike(s) in or near the wetland
- ☒ weir(s) in or near the wetland
- ☒ stormwater inputs (addition of water)
- ☐ stream channelization
- ☒ point source discharge(s) (non-stormwater)
- ☐ filling/grading activities in or near the wetland
- ☒ road bed(s)/RR grades(s) in or near the wetland
- ☐ dredging activities in or near the wetland
- ☐ other (specify)
- ☐ other (specify)

Evaluate whether an alteration is significant or minor in relation to the Wetland's overall area and hydrologic regime. For this submetric, "significant" is defined as affecting approximately 10% or greater of the Wetland. "Minor" is defined as affecting less than approximately 10% of the Wetland. A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).

Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's natural hydrologic regime. If uncertain, select adjoining options and average the available points. Round to the nearest 0.5 increment. If the Wetland's natural hydrologic regime has been significantly altered, it shall receive no more than 6 points for this submetric. **Maximum 8 points.**			**Score**
No Hydrologic Alterations Apparent:	There has been no significant alteration(s) to the Wetland's natural hydrologic regime, and/or ongoing minor alteration(s) is/are rare.	8 pts	6.0
Recovered:	Significant hydrologic alteration(s) occurred more than 20 years prior to the assessment, and/or ongoing minor hydrologic alteration(s) is/are only occasional.	6 pts	
Recovering:	A single significant hydrologic alteration occurred within 20 years prior to the assessment, and/or ongoing minor hydrologic alteration(s) is/are frequent.	4 pts	
Recent or No Recovery:	Multiple significant hydrologic alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt	

17.0	**Metric 3 Total** add 3a – 3d **(26 points max.)**

Metric 4. Habitat Alteration and Habitat Structure Development
Maximum 20 Points.

4a. Substrate/Soil Disturbance

This submetric evaluates the intactness or lack of disturbance to the Wetland's substrate and soil. Check (√) all possible forms of past or ongoing substrate/soil disturbance that are observed within the Wetland.

- ☐ human-induced erosion or exposure
- ☐ human-induced sedimentation or burial
- ☒ filling
- ☒ grading
- ☐ dredging
- ☐ plowing, disking
- ☐ intensive grazing (hooves)
- ☐ off-road vehicle use
- ☐ construction vehicle use
- ☐ other (specify)

Evaluate whether a disturbance is significant or minor in relation to the Wetland's overall area. For this submetric, "significant" is defined as affecting approximately 10% or greater of the Wetland. "Minor" is defined as affecting less than approximately 10% of the Wetland. A substrate disturbance may also be an alteration of the natural hydrologic regime (Submetric 3d) and/or an alteration of habitat (Submetric 4b).

Select an option below that best describes the extent of (or lack of) disturbances to the Wetland's substrate. If uncertain, select adjoining options and average the points. Round to the nearest 0.5 increment. If the Wetland's substrate has been significantly altered, it should receive no more than 3 points. **Maximum 4 points.**

			Score
No Substrate Disturbance Apparent:	There has been no significant disturbance to the Wetland's substrate and/or ongoing minor disturbance events are rare.	4 pts	3.0
Recovered:	Significant substrate disturbance occurred more than 20 years prior to the assessment, and/or ongoing minor substrate disturbance events are only occasional (e.g., light sedimentation from a nearby dirt road).	3 pts	
Recovering:	A single significant substrate disturbance event occurred within 20 years prior to the assessment, and/or ongoing minor substrate disturbance events are frequent.	2 pts	
Recent or No Recovery:	Multiple significant substrate disturbance events have occurred in the 20 years prior to the assessment, and/or significant disturbance is ongoing.	1 pt	

4b. Habitat Alteration

This submetric evaluates the intactness of the natural habitat within the Wetland. A "significant" alteration is defined as affecting 10% or greater of the Wetland. "Minor" alternation affects less than 10% of the Wetland. Check (√) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland.

- ☐ barriers such as road bed(s)/RR grades(s)
- ☒ selective cutting
- ☒ clearcutting
- ☒ mowing or shrub removal
- ☒ coarse woody debris (CWD) removal
- ☐ intensive grazing
- ☒ nutrient enrichment, e.g., nuisance algae
- ☒ herbicide/chemical treatment
- ☐ sedimentation
- ☐ dredging
- ☐ filling/grading
- ☐ plowing/disking/farming
- ☐ other (specify)

Utilize aerial photography and field evidence to determine if any habitat alterations occurred prior to approximately 20 years ago. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes, such as large, woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc. Disregard changes that can be attributed to wetland community succession or other natural processes. A habitat alteration may also be an alteration of the natural hydrologic regime (Submetric 3d) and/or a substrate disturbance (Submetric 4a).

Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's habitat. If unclear, select adjoining options and average the available points. Round to the nearest 0.5 increment. **Maximum 9 points**.

			Score
No Habitat Alterations Apparent:	There has been no significant alteration to the Wetland's natural habitat, and/or ongoing minor alteration(s) is/are rare.	9 pts	6.0
Recovered:	Significant habitat alteration(s) occurred more than 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are only occasional.	6 pts	
Recovering:	A single, significant habitat alteration occurred within 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are frequent.	3 pts	
Recent or No Recovery:	Multiple significant habitat alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt	

4c. Habitat Structure Development

Determine an overall qualitative rating of how well developed the Wetland is in comparison to the best of its type. For this submetric, a wetland's type is defined as any ecologically and/or hydrogeomorphically similar wetland habitat typical of the region. Well-developed communities, regardless of successional state, often exhibit many of the following habitat characteristics:

- Quality vertical habitat, such as hummocks, organic debris, and diverse plant height ranges.
- Quality horizontal habitat, such as varying vegetation density and patchiness, moderate ratios of open space to cover, plant species diversity, and a wide range of plant ages.
- Other ecological attributes, such as a diverse assortment of the following: breeding areas, rearing areas, feeding areas, niche space, etc.

Select an option below that best describes the Wetland's habitat structure development. If unclear, select adjoining options and average the points. Round to the nearest 0.5 increment.
Maximum 7 points.

			Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	3.0
Good:	Wetland appears to be a good example of its type but because of past or present disturbance, or other reasons, is not excellent.	5 pts	
Fair:	Wetland appears to be a moderately good example of its type but because of past or present disturbance, or other reasons, is not good.	3 pts	
Poor:	Wetland is a poor example of its type because of past or present disturbance, or other reasons.	1 pt	

12.0 **Metric 4 Total**
add 4a – 4c
(20 points max.)

Metric 5. Special Situations

Refer to the Narrative Rating for definitions and the *User's Manual* for guidance, **Limited to 10 points**

5a. High Ecological Value. See Narrative Rating for definitions of each.
10 points for each that apply.

☐ 1. Contains USFWS-designated Critical Habitat
☐ 2. Federal or State-listed T/E Plant or Animal Species
☐ 3. S1, S2, or S3 Natural Community Type (at least 5 acres or 25% of the Wetland)
☐ 4. Southern Bog (at least 5 acres or 25% of the Wetland)
☐ 5. Old-Growth/Mature Forested Wetland (at least 5 acres or 25% of the Wetland)
☐ 6. Great Lakes Coastal Wetland

Score 0.0

5b. Forested Wetland. **5 points**.
Exhibits combined canopy cover from any group(s) of trees. Stem DBH must be at least 3 inches to qualify as a tree. Total area must comprise at least 5 acres or 25% of the Wetland. Does not qualify if most of the trees are ungrouped and widely scattered (e.g., a savanna), or located only thinly along the Wetland's margin.

Score 0.0

5c. Urban/Suburban Wetland. **5 points**.
Greater than 50% of the surrounding landscape (1,000 foot radius) is comprised of low-permeability surfaces, such as roads, lawns, parking lots, buildings, sidewalks, etc.

Score 5.0

5d. Low-Quality Wetland. Negative 10 points.
The Wetland is less than 1 acre and non-contiguous as defined in Part 303 and either: *1)* a stormwater pond that was excavated from upland and constructed for stormwater treatment in conjunction with a development project *or 2)* more than 75% covered by highly-invasive vegetation. See Submetric 6c for a list of highly-invasive species.

Score 0.0

5 **Metric 5 Total**
(10 points max.)
Can be negative

Metric 6. Vegetation, Interspersion, and Habitat Features
Maximum 20 points.

6a. Wetland Vegetation Components

Determine the Qualitative Cover Score of each Vegetation Component (Herbaceous, Shrub/Sapling, Forest Overstory). Using the Qualitative Cover Scoring Table, start on the left and proceed to the right, until a point value is obtained for each Vegetation Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include widely-scattered trees, lone shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c to aid in the proper identification of broad-leaved cattail (*Typha latifolia*), a non-invasive, native species.

Qualitative Cover Scoring Table

Vegetation Component ► is >¼ acre	>25% of Wetland area ►	Native species dominate the coverage ►	High native diversity ►	3 pts
			Moderate to low native diversity ►	2 pts
		Invasive or non-native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
	<25% of Wetland area ►	Native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
		Invasive or non-native species dominate the coverage ►	Moderate native diversity ►	1 pt
			Low native diversity ►	0 pt
Vegetation Component is <¼ acre ►	>25% of Wetland area ►	Native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
		Invasive or non-native species dominate the coverage ►		0 pt
	<25% of Wetland area ►			0 pt

Forest Overstory Component, qualitative cover score derived from table **maximum 3 points**. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height. The Wetland does not have a forested component if the trees are widely scattered (e.g., a savanna), located only thinly along the Wetland's margin, or if it is clear that most of the trees are actually located on upland around the perimeter of the Wetland.	**Score** 0.0
Shrub/Sapling Component, qualitative cover score derived from table **maximum 3 points**. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	**Score** 0.0
Herbaceous Component, qualitative cover score derived from table **maximum 3 points**. Herbaceous wetlands are areas dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. The MiRAM includes the robust-stemmed yellow pond lily (*Nuphar advena*) and American lotus (*Nelumbo lutea*) within the herbaceous component because of their tendency to hold their stems and leaves well above the water. All floating-leaf species (including *Nymphaea* spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	**Score** 1.0

6b. Open Water Component

Open water is an unobstructed, inundated area of water containing few or no rooted emergent or woody plant species. It can occur as a distinct zone along a river or lake or as a combination of small ponds, streams, or pools (e.g., within a marsh or swamp) and as an "understory" below a forest canopy (e.g., a forested vernal pool).

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds, streams, and pools**.
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life.
- **Aquatic bed areas**, also known as submergent marsh or submerged aquatic vegetation (SAV). Aquatic bed is dominated by plants that grow at or below the surface of the water for most of the growing season in most years. The MiRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the MiRAM, all floating-leaf aquatic taxa, such as water lilies (*Nymphaea* spp.), are included in the definition of aquatic bed and, therefore, are also included in the definition of open water.
- **100-foot wide strip of open water along a lake or river** (see Boundary Guidelines in the *User's Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see MiRAM Boundary Determination Guidelines). Simply divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake's open water included within the Wetland would be calculated as: 200/400 = 0.5 acre.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).

Estimate the total open water coverage. **Maximum 3 points**.			**Score**
High:	2.5 acres or more	3 pts	2.0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pt	

6c. Coverage of Highly-Invasive Plant Species

Estimate the combined total coverage of any of the species listed below. Assign points based on a range from virtually absent (1 point) to extensive (negative 5 points).

- common reed (*Phragmites australis)*
- purple loosestrife (*Lythrum salicaria*)
- reed canary grass (*Phalaris arundinacea*)
- common buckthorn (*Rhamnus cathartica*)
- glossy buckthorn (*Rhamnus frangula*)
- narrow-leaved cattail (*Typha angustifolia*)
- hybrid cattail (*Typha x glauca*)
- marsh thistle (*Cirsium palustre*)
- multiflora rose (*Rosa multiflora*)
- non-native honeysuckle (*Lonicera spp.*)

Key to Aid in Identification of Invasive and Non-Invasive Cattail (Typha) Species

Native, non-invasive: Male and female portions of the flower spike are not separated (or only slightly separated) on most of the stems within the same local stand. Female flower spikes are light brown and are 0.8-1.2 inches thick at maturity (before expanding when dried). Most leaf blades are approximately 0.5 to1 inch wide at widest part. Typically, not tightly packed into an area (non-invasive). .....**broad-leaved cattail (*T. latifolia)***

Non-native, Invasive: Male and female portions of the flower spike are separated on most of the stems within the same local stand. Female flower spikes are dark brown and less than 0.8 inch thick at maturity (before expanding when dried). Most leaf blades are less than 0.5 inch wide at widest part. Typically, tightly packed within an area, crowding out other plant species (invasive). .....**narrow-leaved cattail (*T. angustifolia)***

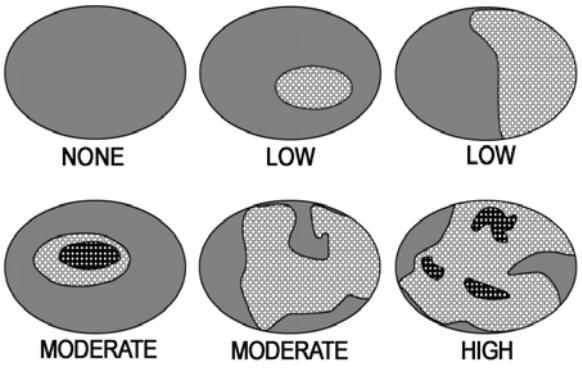
Non-native, Invasive: Hybridization may have occurred if most plants within the same local stand do not cleanly fit the characteristics of either pure species described above. The gap between the male and female portions of the flower spikes is highly variable, with many plants within the same local stand having no gap, and many having relatively wide gaps. Typically, extremely vigorous and often tightly packed within an area, crowding out other plant species (invasive).....**hybrid cattail (*T. x glauca)***

Estimate the total coverage. **Maximum 1 point**.			**Score**
Virtually Absent:	<1% aerial coverage of highly-invasive species	1 pt	-5.0
Nearly Absent:	1% to <5% aerial coverage of highly-invasive species	0 pt	
Low:	5% to <25% aerial coverage of highly-invasive species	-1 pt	
Moderate:	25% to <75% aerial coverage of highly-invasive species	-3 pts	
Extensive:	≥75% aerial coverage of highly-invasive species	-5 pts	

6d. Horizontal (Plan View) Interspersion

Evaluate the Wetland from a "plan view," i.e., as if you are looking down upon it. The graphic shows hypothetical wetlands for estimating degree of interspersion.

Select only one option. **Maximum 5 points**.



		Score
Wetland has a high degree of interspersion	5 pts	1.0
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pt	

6e. Habitat Features

Determine the amount of each habitat feature that is present in the Wetland. **Maximum 3 points for each habitat feature.**

1. Hummocks/Tussocks/Tree Mounds, e.g., sedge/grass tussocks, decaying nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of all raised features (hummocks/tussocks/tree mounds) and includes the depressional matrix within any group of raised features.

				Score
Virtually Absent: 0 pt <5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	0.0

2. Coarse Woody Debris (CWD). Per log, average width ≥6 inches; each at least 10 feet long. e.g., fallen trees and/or large branches, etc.

				Score
Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	1.0

3. Large Standing Trees, Living or Dead (≥12 inches DBH).

				Score
Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	0.0

4. Amphibian Breeding/Nursery Habitat, e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat.

				Score
Virtually Absent: 0 pt < 5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	2.0

2.0	**Metric 6 Total** add 6a – 6f **(20 points max.)**

Metric 7. Scenic, Recreational, and Cultural Value

Maximum 3 points.

Select all that apply. Maximum 1 point per submetric.		Score
7a. Scenic: The public can view the Wetland from a public road or public land OR the Wetland has significant scenic value (assign 1 point).	1 pt	1.0
7b. Recreational: The general public has access to the Wetland or the Wetland is assumed to be used for recreational activities (assign 1 point).	1 pt	0.0
7c. Cultural/Historical: The Wetland, or any part of the Wetland, has been recognized as having important cultural or historic value (assign 1 point).	1 pt.	0.0

1.0 **Metric 7 Total**
(3 points max.)

MiRAM Summary

Narrative Rating

Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat	☐YES ☒NO
Question 2: Threatened or Endangered (T/E) Species Habitat	☐YES ☒NO
Question 3: Rare Wetland Natural Community Type	☐YES ☒NO
Question 4: Great Lakes Coastal Wetland	☐YES ☒NO

Quantitative Rating

	Score	Maximum
Metric 1: Wetland Size and Distribution	6.0	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	1.0	12
Metric 3: Hydrology	17.0	26
Metric 4: Habitat Alteration and Habitat Structure Development	12.0	20
Metric 5: Special Situations	5.0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	2.0	20
Metric 7: Scenic, Recreational, and Cultural Value	1.0	3
Seasonally Adjusted Score (add 10 pts if outside the growing season)		10

Grand Total
Add totals from all seven metrics

44.0 **100 Max.**

Scoring comments:

Background Information

Wetland

Proposed Project Site Name or DNRE File #: I-275, WC067
Date of Evaluation: 7/23/2012
County: Wayne
Township: Canton
Town: 2S
Range: 8E
Section: 12
Decimal Lat/Long: 42.3274, -83.4461

Evaluator

Name: S. Kogge, R. Roos
Address: 11181 Marwill Ave
City: West Olive State: MI Zip: 49460
Phone: 616-847-1680
Email: stu.kogge@cardno.com

Is a Wetland Delineation Report available?
☒ YES ☐ NO Date Completed: 7/16/2012
If "YES", completed by (name of person/firm/agency): Cardno JFNew

Check (√) each box below when item is complete.

☒ **MiRAM Boundary**. See *MiRAM User's Manual* for more information
Size of the Wetland Evaluation Area: 2 acres

☒ **Location Map**. A county road map showing the location of the Wetland Evaluation Area, north arrow, map scale information, roads, landmarks, etc. *Attach* a map to the end of this document.

☒ **Color Photographs**. Photos should show the wetland vegetation components, habitat/community types, hydrologic features, and any other pertinent site features. *Attach* to the end of this document.

☒ **Landscape Sketch or Aerial Photograph**.

1. Clearly label the Proposed Project Site and Wetland Evaluation Area. Indicate the location of the MiRAM Boundary.
2. Label and indicate the extent of all general wetland community types identified within the Wetland Evaluation Area. Examples include: marsh, wet meadow, hardwood swamp, conifer swamp, shrub swamp, etc. Some wetland communities may be further classified as natural communities. Natural communities are predominantly structured by natural processes rather than modern anthropogenic disturbances. Examples include: bog, prairie fen, muskeg, wet prairie, southern wet meadow, etc.
3. Identify and label all hydrologic features, such as: streams, 100-year floodplains, ponds, vernal pools, and small patches of open water within a marsh or swamp.
4. Identify and label surrounding upland features.
5. Include north arrow and map scale information.
6. *Attach* the landscape sketch or aerial photo to the end of this document.

Comments: List any important site features or apparent disturbance events that have occurred within or near the Wetland Evaluation Area.

WC067 includes detention basin.

Field Datasheet

List plant species observed within the Wetland. *Attach* additional sheets as necessary.
Nomenclature will follow Voss (1972,1985,1996) or Gleason and Cronquist (1991).

Forest Overstory Stratum (woody plants 3 inches or more DBH, regardless of height)

Acer negundo	
Salix nigra	

Shrub/Sapling Stratum (woody plants less than 3 inches DBH and greater than 3.28 feet tall)

Acer negundo	
Fraxinus pennsylvanica	
Morus alba	
Rhamnus cathartica	
Rosa multiflora	
Salix nigra	
Cornus foemina	
Populus deltoides	

Herbaceous Stratum (non-woody plants, regardless of size, and woody plants less than 3.28 feet tall)

Aster lanceolatus	Lythrum salicaria
Bidens frondosus	Polygonum pensylvanicum
Brassica nigra	Solidago canadensis
Calystegia sepium	Solanum dulcamara
Eleocharis elliptica	Teucrium canadense
Elynus virginicus	Toxicodendron radicans
Impatiens capensis	Verbena hastata
Lysimachia nummularia	Verbena urticifolia

Checklist of features and conditions to observe during the field inspection:

- ☐ Hydrologic Condition and Interactions
- ☐ Hydrologic Alterations
- ☐ Substrate/Soil Disturbances
- ☐ Habitat Structure Development
- ☐ Habitat Alterations
- ☐ Habitat/Wetland Condition
- ☐ Amphibian Breeding Pools
- ☐ Vegetation Diversity
- ☐ Vegetation Condition
- ☐ Amount of Open Water
- ☐ Percent of Invasive/Non-native Species
- ☐ Community Interspersion
- ☐ Vertical/Horizontal Structure
- ☐ S1, S2, or S3 Natural Community

Approximately how much of the Wetland Evaluation Area was reviewed during the field inspection? 90 %

Has vegetation within the Wetland Evaluation Area been altered and/or buffer areas impacted within the past 5 years? ☒ YES ☐ NO

Please Note: The Wetland Evaluation Area (encompassed by the MiRAM Boundary) is simply referred to as the "Wetland" throughout the remainder of this document.

Narrative Rating

Completion of the Narrative Rating allows the Evaluator to quickly identify whether the Wetland is one of several wetland types that typically have exceptional ecological value. If any of the metrics are answered affirmatively, the Wetland has *exceptional ecological value and is automatically rated as having high functional value* and completion of the Quantitative Rating is not necessary. If none of the metrics are answered affirmatively, proceed to the Quantitative Rating.

Answer all of the following metrics.

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat.

Is any part of the Wetland located within an area designated as Critical Habitat and does the Wetland *actually* contain habitat suitable for either species listed below?

Piping Plover (*Charadrius melodus*) Critical Habitat Units are designated only within the following counties: Alger, Benzie, Charlevoix, Cheboygan, Chippewa, Emmet, Iosco, Leelanau, Luce, Mackinac, Mason, Muskegon, Presque Isle, and Schoolcraft. See URL below for Unit locations.
www.fws.gov/midwest/endangered/pipingplover/final_rule.pdf

Hines's Emerald Dragonfly (*Somatochlora Hineana*) Critical Habitat Units are designated only within the following counties: Alpena, Mackinac, and Presque Isle. See URL below for Unit locations.
www.fws.gov/midwest/endangered/insects/hed/pdf/hinesfCH_FR.pdf

☐ YES ☒ NO

If "**yes"**, the Wetland has ***high functional value***.

2. Threatened or Endangered (T/E) Species.

Do federal/state-listed T/E plant or animal species occur within the Wetland? Complete the following questions to answer this metric.

a. ☐YES ☐NO Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c.

b. ☐YES ☐NO Does the T/E survey indicate T/E species present within the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric.

c. ☐YES ☐NO Has the Evaluator (or others known to the Evaluator) observed any T/E species within the Wetland? If "Yes," answer "Yes" to this metric. If "No," go to question d.

d. ☐YES ☐NO Does the DNRE Endangered Species Assessment (ESA) web site interactive map, **www.mcgi.state.mi.us/esa,** indicate that there is a potential for unique natural features at or near your site of interest"?" If "No," answer "No" to this metric. If "Yes," request a DNRE formal review by submitting the online form. Type "MiRAM" within the "Project Information" field on the form. Go to question e.

e. ☐YES ☐NO Did the DNRE review confirm potential T/E occurrence in the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric. **The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE**.

☐ YES ☒ NO

If "**yes"**, the Wetland has ***high functional value***.

3. Rare Wetland Natural Community Type.

Are more than 5 acres *or* more than 25% of the Wetland comprised of a Rare Wetland Natural Community Type*? Check (√) all Rare Wetland Natural Community Types

☐ **S1 or S2 Natural Community Type.**
Has the Wetland been identified by the Evaluator — *or other persons* — as being an S1 or S2 natural community type as defined by the Michigan Natural Features Inventory (MNFI)? See the *MiRAM User's Manual* for more information.

☐ **Southern Bog**, defined as any bog occurring below the northern limit of Michigan's Floristic Tension Zone (see figure for approximate location).

☐ **Old-Growth/Mature Forested Wetland.** Lacks evidence of any significant harvesting. Dominated by large, overstory trees (mean overstory DBH ≥20 inches, including at least two trees/acre having DBH ≥28 inches) and the canopy is multi-aged and multi-layered. Aggregations of canopy trees are interspersed with canopy gaps and large snags. Large nursery logs and tip-up mounds litter the forest floor. Does the forested Wetland have all/most of these characteristics?

*If the Rare Wetland Community Type is less than 5 acres *and* less than 25% of the Wetland, the rare community should be split off and evaluated separately.

☐ YES ☒ NO

If "**yes"**, the Wetland has ***high functional value***.

4. Great Lakes Coastal Wetland.

Is any part of the Wetland within 1,000 feet of the ordinary high water mark of any of the Great Lakes, including Lake St. Clair?

☐ YES ☒ NO

If "**yes"**, the Wetland has ***high functional value***.

Quantitative Rating

Completion of the Quantitative Rating assists the Evaluator in recognizing the functional value of the Wetland. Complete all metrics by completing all sections, circling the correct point value(s), and assigning a score.

Metric 1. Wetland Size and Distribution

Maximum 9 points.

1a. Wetland Size Estimate the size of the Wetland (i.e., Wetland Evaluation Area). Select a size class. **Maximum 6 points.**			**Score**
50	acres	Select this option if the wetland's actual size ≥ 50 acres.	6 pts
25	acres to <50 acres		5 pts
10	acres to <25 acres		4 pts
3	acres to <10 acres		3 pts
¼	acre to <3 acres		2 pts
less than ¼ acre			0 pt

3.0

1b. Wetland Scarcity Utilize the USFWS National Wetlands Inventory (NWI) maps to estimate percentage of wetland area remaining within a 2-mile radius from the Wetland's center. For the purpose of this submetric, areas of open water within the Great Lakes, inland lakes, streams, etc., should be excluded from the wetland percentage. Select the most appropriate percentage category. **Maximum 3 points.**		**Score**
0 to 20% of surrounding 2-mile radius is wetland	3 pts	3.0
>20 to 80% of surrounding 2-mile radius is wetland	2 pts	
>80% of surrounding 2-mile radius is wetland	1 pt	

6.0

Metric 1 Total
add 1a & 1b
(9 points max.)

Metric 2. Upland Buffers and Intensity of Surrounding Land Use

Maximum 12 points.

2a. Average Buffer Width around the Wetland's Perimeter

Step 1: Using the most recent aerial photograph available, sketch a 150-foot wide "buffer zone" around the Wetland.
Step 2: Estimate the buffer widths from the Wetland's edge to any non-buffer areas (up to 150 feet).
Step 3: Average the buffer widths along the Wetland's perimeter.
Step 4: Select the buffer width that is most appropriate. **Maximum 6 points**.

Buffers Include:

- shrubland, young forest, natural grassland, prairie
- abandoned row crop field (vegetated & naturalizing)
- hay field (non-row crop), lightly grazed pasture
- lightly managed forest (selectively logged)
- designated wildlife area, lightly managed parkland
- other wetland, lake, river

Non-Buffers Include:

- lawns, golf courses, manicured parkland
- residential, commercial, industrial
- roadways (including shoulders), parking lots
- row crop field
- conservation tillage, heavily grazed pasture
- clear-cutting, mining, construction activity

			Score
Wide Buffer Width:	≥150 feet around the perimeter	6 pts	2.0
Medium Buffer Width:	75 to <150 feet around the perimeter	4 pts	
Narrow Buffer Width:	25 to <75 feet around the perimeter	2 pt	
Very Narrow Buffer Width:	0 (no buffer) to <25 feet around the perimeter	0 pt	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland

Step 1: Using the most recent aerial photograph available, sketch a 1,000-foot wide "land use zone" around the Wetland.

Step 2: Estimate percent coverages comprised by each of the four types of land use listed below.

Step 3: If any land use type comprises more than 25% of the total land use, it is considered to be a "dominant" land use type for the purposes of MiRAM and will receive points. Sum the available points from all dominant land use types and then average the score. Round to the nearest 0.5 increment. **Maximum 6 points**.

Type of Land Use	Examples within each Type of Land Use			Score
Very Low Intensity:	• maturing forest • natural grassland, prairie	• designated wildlife area • other wetland, lake, river	6 pts	1.0
Low Intensity:	• shrubland/young forest • recent selective logging • hay field (non-row crop)	• lightly managed parkland • old field, lightly grazed pasture • one-lane road/two track	4 pts	
Moderately High Intensity:	• residential & lawns • manicured parkland • golf course	• conservation tillage • recent clear-cut (<10 years) • two-lane road	2 pts	
High Intensity:	• commercial, industrial • high-density residential • heavily grazed pasture • row crop field	• multi-lane paved roadway • construction activity • parking lot • mining	1 pt	

3.0	**Metric 2 Total** add 2a & 2b **(12 points max.)**

Metric 3. Hydrology

Limited to 26 points.

3a. Sources of Water: Select all that apply. **Maximum 8 points**.		Score
Precipitation: Directly and/or as runoff from upland areas.	1 pt	1.0
Groundwater: Seeps or evidence, such as significant amounts of skunk cabbage (*Symplocarpus foetidus*) or other fen-adapted species.	2 pts	2.0
Seasonal/Intermittent Surface Water: Seasonal inundation from a lake, pond, or stream. (A Wetland can only receive points for this source of water or the next, not both.)	2 pts	0.0
Perennial Surface Water: Perennial inundation from a lake, stream or pond.	5 pts	5.0

3b. Connectivity: Select all that apply. **Maximum 8 points**.		Score
100-Year Floodplain. As defined in the Floodplain Authority under Part 31 of the NREPA.	2 pts	0.0
Between a Stream/Lake/Pond and Human Land Use. The Wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the Wetland before it discharges into the surface waterbody.	2 pts	2.0
Wetland/Upland Complex. The Wetland is part of a large scale (10+ acres) non-linear complex of wetlands with small areas of unmanicured/undeveloped vegetated uplands that do not restrict movement of organisms between the wetland areas.	2 pts	0.0
Riparian Corridor. The Wetland is part of a linear *riparian* corridor that provides organism movement along a stream/river. Typically, these corridors should exceed 100 feet in width and extend at least one half mile.	2 pts	2.0

3c. Duration of Inundation/Saturation Select the option(s) from below that best describe(s) the dominant hydrologic characteristic of the Wetland. For the purposes of this submetric, "dominant" is defined as comprising at least 25% of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, select all that apply and average the points. Round to the nearest 0.5 increment. **Maximum 4 points.**		**Score**
Permanently Inundated	4 pts	2.5
Permanently Saturated to Regularly Inundated	3 pts	
Regularly Saturated to Seasonally Inundated	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil	1 pt	

3d. Alterations to Natural Hydrologic Regime

This submetric evaluates the intactness of the natural hydrologic regime of the Wetland.
Check (√) all forms of past or ongoing hydrologic alteration(s) that are potentially influencing the Wetland.

- ☒ ditch(es) in or near the wetland
- ☐ tile(s) in or near the wetland
- ☐ dike(s) in or near the wetland
- ☐ weir(s) in or near the wetland
- ☒ stormwater inputs (addition of water)
- ☒ stream channelization
- ☐ point source discharge(s) (non-stormwater)
- ☐ filling/grading activities in or near the wetland
- ☒ road bed(s)/RR grades(s) in or near the wetland
- ☐ dredging activities in or near the wetland
- ☐ other (specify)
- ☐ other (specify)

Evaluate whether an alteration is significant or minor in relation to the Wetland's overall area and hydrologic regime. For this submetric, "significant" is defined as affecting approximately 10% or greater of the Wetland. "Minor" is defined as affecting less than approximately 10% of the Wetland. A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).

Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's natural hydrologic regime. If uncertain, select adjoining options and average the available points. Round to the nearest 0.5 increment. If the Wetland's natural hydrologic regime has been significantly altered, it shall receive no more than 6 points for this submetric. **Maximum 8 points.**			**Score**
No Hydrologic Alterations Apparent:	There has been no significant alteration(s) to the Wetland's natural hydrologic regime, and/or ongoing minor alteration(s) is/are rare.	8 pts	4.0
Recovered:	Significant hydrologic alteration(s) occurred more than 20 years prior to the assessment, and/or ongoing minor hydrologic alteration(s) is/are only occasional.	6 pts	
Recovering:	A single significant hydrologic alteration occurred within 20 years prior to the assessment, and/or ongoing minor hydrologic alteration(s) is/are frequent.	4 pts	
Recent or No Recovery:	Multiple significant hydrologic alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt	

18.5	**Metric 3 Total** add 3a – 3d **(26 points max.)**

Metric 4. Habitat Alteration and Habitat Structure Development
Maximum 20 Points.

4a. Substrate/Soil Disturbance

This submetric evaluates the intactness or lack of disturbance to the Wetland's substrate and soil. Check (√) all possible forms of past or ongoing substrate/soil disturbance that are observed within the Wetland.

- ☒ human-induced erosion or exposure
- ☒ human-induced sedimentation or burial
- ☐ filling
- ☐ grading
- ☒ dredging
- ☐ plowing, disking
- ☐ intensive grazing (hooves)
- ☐ off-road vehicle use
- ☐ construction vehicle use
- ☐ other (specify)

Evaluate whether a disturbance is significant or minor in relation to the Wetland's overall area. For this submetric, "significant" is defined as affecting approximately 10% or greater of the Wetland. "Minor" is defined as affecting less than approximately 10% of the Wetland. A substrate disturbance may also be an alteration of the natural hydrologic regime (Submetric 3d) and/or an alteration of habitat (Submetric 4b).

Select an option below that best describes the extent of (or lack of) disturbances to the Wetland's substrate. If uncertain, select adjoining options and average the points. Round to the nearest 0.5 increment. If the Wetland's substrate has been significantly altered, it should receive no more than 3 points. **Maximum 4 points.**

			Score
No Substrate Disturbance Apparent:	There has been no significant disturbance to the Wetland's substrate and/or ongoing minor disturbance events are rare.	4 pts	3.0
Recovered:	Significant substrate disturbance occurred more than 20 years prior to the assessment, and/or ongoing minor substrate disturbance events are only occasional (e.g., light sedimentation from a nearby dirt road).	3 pts	
Recovering:	A single significant substrate disturbance event occurred within 20 years prior to the assessment, and/or ongoing minor substrate disturbance events are frequent.	2 pts	
Recent or No Recovery:	Multiple significant substrate disturbance events have occurred in the 20 years prior to the assessment, and/or significant disturbance is ongoing.	1 pt	

4b. Habitat Alteration

This submetric evaluates the intactness of the natural habitat within the Wetland. A "significant" alteration is defined as affecting 10% or greater of the Wetland. "Minor" alternation affects less than 10% of the Wetland. Check (√) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland.

- ☒ barriers such as road bed(s)/RR grades(s)
- ☐ selective cutting
- ☐ clearcutting
- ☒ mowing or shrub removal
- ☐ coarse woody debris (CWD) removal
- ☐ intensive grazing
- ☒ nutrient enrichment, e.g., nuisance algae
- ☐ herbicide/chemical treatment
- ☐ sedimentation
- ☐ dredging
- ☒ filling/grading
- ☐ plowing/disking/farming
- ☐ other (specify)

Utilize aerial photography and field evidence to determine if any habitat alterations occurred prior to approximately 20 years ago. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes, such as large, woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc. Disregard changes that can be attributed to wetland community succession or other natural processes. A habitat alteration may also be an alteration of the natural hydrologic regime (Submetric 3d) and/or a substrate disturbance (Submetric 4a).

Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's habitat. If unclear, select adjoining options and average the available points. Round to the nearest 0.5 increment. **Maximum 9 points**.

			Score
No Habitat Alterations Apparent:	There has been no significant alteration to the Wetland's natural habitat, and/or ongoing minor alteration(s) is/are rare.	9 pts	6.0
Recovered:	Significant habitat alteration(s) occurred more than 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are only occasional.	6 pts	
Recovering:	A single, significant habitat alteration occurred within 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are frequent.	3 pts	
Recent or No Recovery:	Multiple significant habitat alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt	

4c. Habitat Structure Development

Determine an overall qualitative rating of how well developed the Wetland is in comparison to the best of its type. For this submetric, a wetland's type is defined as any ecologically and/or hydrogeomorphically similar wetland habitat typical of the region. Well-developed communities, regardless of successional state, often exhibit many of the following habitat characteristics:

- Quality vertical habitat, such as hummocks, organic debris, and diverse plant height ranges.
- Quality horizontal habitat, such as varying vegetation density and patchiness, moderate ratios of open space to cover, plant species diversity, and a wide range of plant ages.
- Other ecological attributes, such as a diverse assortment of the following: breeding areas, rearing areas, feeding areas, niche space, etc.

Select an option below that best describes the Wetland's habitat structure development. If unclear, select adjoining options and average the points. Round to the nearest 0.5 increment.
Maximum 7 points.

			Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	4.0
Good:	Wetland appears to be a good example of its type but because of past or present disturbance, or other reasons, is not excellent.	5 pts	
Fair:	Wetland appears to be a moderately good example of its type but because of past or present disturbance, or other reasons, is not good.	3 pts	
Poor:	Wetland is a poor example of its type because of past or present disturbance, or other reasons.	1 pt	

13.0 **Metric 4 Total**
add 4a – 4c
(20 points max.)

Metric 5. Special Situations

Refer to the Narrative Rating for definitions and the *User's Manual* for guidance, **Limited to 10 points**

5a. High Ecological Value. See Narrative Rating for definitions of each.
10 points for each that apply.

☐ 1. Contains USFWS-designated Critical Habitat
☐ 2. Federal or State-listed T/E Plant or Animal Species
☐ 3. S1, S2, or S3 Natural Community Type (at least 5 acres or 25% of the Wetland)
☐ 4. Southern Bog (at least 5 acres or 25% of the Wetland)
☐ 5. Old-Growth/Mature Forested Wetland (at least 5 acres or 25% of the Wetland)
☐ 6. Great Lakes Coastal Wetland

Score: 0.0

5b. Forested Wetland. **5 points**.
Exhibits combined canopy cover from any group(s) of trees. Stem DBH must be at least 3 inches to qualify as a tree. Total area must comprise at least 5 acres or 25% of the Wetland. Does not qualify if most of the trees are ungrouped and widely scattered (e.g., a savanna), or located only thinly along the Wetland's margin.

Score: 0.0

5c. Urban/Suburban Wetland. **5 points**.
Greater than 50% of the surrounding landscape (1,000 foot radius) is comprised of low-permeability surfaces, such as roads, lawns, parking lots, buildings, sidewalks, etc.

Score: 5.0

5d. Low-Quality Wetland. Negative 10 points.
The Wetland is less than 1 acre and non-contiguous as defined in Part 303 and either: *1)* a stormwater pond that was excavated from upland and constructed for stormwater treatment in conjunction with a development project *or 2)* more than 75% covered by highly-invasive vegetation. See Submetric 6c for a list of highly-invasive species.

Score: 0.0

5.0 **Metric 5 Total**
(10 points max.)
Can be negative

Metric 6. Vegetation, Interspersion, and Habitat Features
Maximum 20 points.

6a. Wetland Vegetation Components

Determine the Qualitative Cover Score of each Vegetation Component (Herbaceous, Shrub/Sapling, Forest Overstory). Using the Qualitative Cover Scoring Table, start on the left and proceed to the right, until a point value is obtained for each Vegetation Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include widely-scattered trees, lone shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c to aid in the proper identification of broad-leaved cattail (*Typha latifolia*), a non-invasive, native species.

Qualitative Cover Scoring Table

Vegetation Component ► is >¼ acre	>25% of Wetland area ►	Native species dominate the coverage ►	High native diversity ►	3 pts
			Moderate to low native diversity ►	2 pts
		Invasive or non-native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
	<25% of Wetland area ►	Native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
		Invasive or non-native species dominate the coverage ►	Moderate native diversity ►	1 pt
			Low native diversity ►	0 pt
Vegetation Component is <¼ acre ►	>25% of Wetland area ►	Native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
		Invasive or non-native species dominate the coverage ►		0 pt
	<25% of Wetland area ►			0 pt

Forest Overstory Component, qualitative cover score derived from table **maximum 3 points**. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height. The Wetland does not have a forested component if the trees are widely scattered (e.g., a savanna), located only thinly along the Wetland's margin, or if it is clear that most of the trees are actually located on upland around the perimeter of the Wetland.	**Score** 0.0
Shrub/Sapling Component, qualitative cover score derived from table **maximum 3 points**. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	**Score** 2.0
Herbaceous Component, qualitative cover score derived from table **maximum 3 points**. Herbaceous wetlands are areas dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. The MiRAM includes the robust-stemmed yellow pond lily (*Nuphar advena*) and American lotus (*Nelumbo lutea*) within the herbaceous component because of their tendency to hold their stems and leaves well above the water. All floating-leaf species (including *Nymphaea* spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	**Score** 2.0

6b. Open Water Component

Open water is an unobstructed, inundated area of water containing few or no rooted emergent or woody plant species. It can occur as a distinct zone along a river or lake or as a combination of small ponds, streams, or pools (e.g., within a marsh or swamp) and as an "understory" below a forest canopy (e.g., a forested vernal pool).

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds, streams, and pools**.
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life.
- **Aquatic bed areas**, also known as submergent marsh or submerged aquatic vegetation (SAV). Aquatic bed is dominated by plants that grow at or below the surface of the water for most of the growing season in most years. The MiRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the MiRAM, all floating-leaf aquatic taxa, such as water lilies (*Nymphaea* spp.), are included in the definition of aquatic bed and, therefore, are also included in the definition of open water.
- **100-foot wide strip of open water along a lake or river** (see Boundary Guidelines in the *User's Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see MiRAM Boundary Determination Guidelines). Simply divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake's open water included within the Wetland would be calculated as: 200/400 = 0.5 acre.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).

Estimate the total open water coverage. **Maximum 3 points**.			**Score**
High:	2.5 acres or more	3 pts	2.0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pt	

6c. Coverage of Highly-Invasive Plant Species

Estimate the combined total coverage of any of the species listed below. Assign points based on a range from virtually absent (1 point) to extensive (negative 5 points).

- common reed (*Phragmites australis)*
- purple loosestrife (*Lythrum salicaria*)
- reed canary grass (*Phalaris arundinacea*)
- common buckthorn (*Rhamnus cathartica*)
- glossy buckthorn (*Rhamnus frangula*)
- narrow-leaved cattail (*Typha angustifolia*)
- hybrid cattail (*Typha x glauca*)
- marsh thistle (*Cirsium palustre*)
- multiflora rose (*Rosa multiflora*)
- non-native honeysuckle (*Lonicera spp.*)

Key to Aid in Identification of Invasive and Non-Invasive Cattail (Typha) Species

Native, non-invasive: Male and female portions of the flower spike are not separated (or only slightly separated) on most of the stems within the same local stand. Female flower spikes are light brown and are 0.8-1.2 inches thick at maturity (before expanding when dried). Most leaf blades are approximately 0.5 to1 inch wide at widest part. Typically, not tightly packed into an area (non-invasive). .....**broad-leaved cattail (*T. latifolia)***

Non-native, Invasive: Male and female portions of the flower spike are separated on most of the stems within the same local stand. Female flower spikes are dark brown and less than 0.8 inch thick at maturity (before expanding when dried). Most leaf blades are less than 0.5 inch wide at widest part. Typically, tightly packed within an area, crowding out other plant species (invasive). .....**narrow-leaved cattail (*T. angustifolia)***

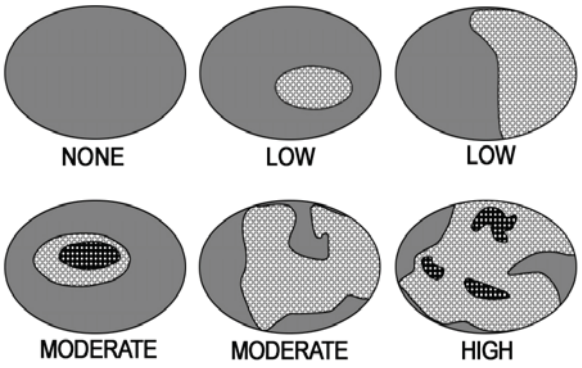
Non-native, Invasive: Hybridization may have occurred if most plants within the same local stand do not cleanly fit the characteristics of either pure species described above. The gap between the male and female portions of the flower spikes is highly variable, with many plants within the same local stand having no gap, and many having relatively wide gaps. Typically, extremely vigorous and often tightly packed within an area, crowding out other plant species (invasive).....**hybrid cattail (*T. x glauca)***

Estimate the total coverage. **Maximum 1 point**.			**Score**
Virtually Absent:	<1% aerial coverage of highly-invasive species	1 pt	-3.0
Nearly Absent:	1% to <5% aerial coverage of highly-invasive species	0 pt	
Low:	5% to <25% aerial coverage of highly-invasive species	-1 pt	
Moderate:	25% to <75% aerial coverage of highly-invasive species	-3 pts	
Extensive:	≥75% aerial coverage of highly-invasive species	-5 pts	

6d. Horizontal (Plan View) Interspersion

Evaluate the Wetland from a "plan view," i.e., as if you are looking down upon it. The graphic shows hypothetical wetlands for estimating degree of interspersion.

Select only one option. **Maximum 5 points**.



		Score
Wetland has a high degree of interspersion	5 pts	1.0
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pt	

6e. Habitat Features

Determine the amount of each habitat feature that is present in the Wetland. **Maximum 3 points for each habitat feature.**

1. Hummocks/Tussocks/Tree Mounds, e.g., sedge/grass tussocks, decaying nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of all raised features (hummocks/tussocks/tree mounds) and includes the depressional matrix within any group of raised features.

				Score
Virtually Absent: 0 pt <5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	0

2. Coarse Woody Debris (CWD). Per log, average width ≥6 inches; each at least 10 feet long. e.g., fallen trees and/or large branches, etc.

				Score
Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	1.0

3. Large Standing Trees, Living or Dead (≥12 inches DBH).

				Score
Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	0.0

4. Amphibian Breeding/Nursery Habitat, e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat.

				Score
Virtually Absent: 0 pt < 5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	2.0

7.0	**Metric 6 Total** add 6a – 6f **(20 points max.)**

Metric 7. Scenic, Recreational, and Cultural Value

Maximum 3 points.

Select all that apply. Maximum 1 point per submetric.		Score
7a. Scenic: The public can view the Wetland from a public road or public land OR the Wetland has significant scenic value (assign 1 point).	1 pt	0.0
7b. Recreational: The general public has access to the Wetland or the Wetland is assumed to be used for recreational activities (assign 1 point).	1 pt	0.0
7c. Cultural/Historical: The Wetland, or any part of the Wetland, has been recognized as having important cultural or historic value (assign 1 point).	1 pt.	0.0

0.0 **Metric 7 Total**
(3 points max.)

MiRAM Summary

Narrative Rating

Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat	☐YES ☒NO
Question 2: Threatened or Endangered (T/E) Species Habitat	☐YES ☒NO
Question 3: Rare Wetland Natural Community Type	☐YES ☒NO
Question 4: Great Lakes Coastal Wetland	☐YES ☒NO

Quantitative Rating

	Score	Maximum
Metric 1: Wetland Size and Distribution	6.0	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	3.0	12
Metric 3: Hydrology	18.5	26
Metric 4: Habitat Alteration and Habitat Structure Development	13.0	20
Metric 5: Special Situations	5.0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	7.0	20
Metric 7: Scenic, Recreational, and Cultural Value	0.0	3
Seasonally Adjusted Score (add 10 pts if outside the growing season)		10

Grand Total
Add totals from all seven metrics

52.5 **100 Max.**

Scoring comments:

Background Information

Wetland

Proposed Project Site Name or DNRE File #: I-275, WC104
Date of Evaluation: 7/23/2012
County: Wayne
Township: Canton
Town: 2S
Range: 8E
Section: 12
Decimal Lat/Long: 42.3307, -83.4408

Evaluator

Name: S. Kogge, R. Roos
Address: 11181 Marwill Ave
City: West Olive State: MI Zip: 49460
Phone: 616-847-1680
Email: stu.kogge@cardno.com

Is a Wetland Delineation Report available?
☒ YES ☐ NO Date Completed: 7/23/12
If "YES", completed by (name of person/firm/agency): Cardno JFNew

Check (√) each box below when item is complete.

☒ **MiRAM Boundary**. See *MiRAM User's Manual* for more information
Size of the Wetland Evaluation Area: 2.2 acres

☒ **Location Map**. A county road map showing the location of the Wetland Evaluation Area, north arrow, map scale information, roads, landmarks, etc. *Attach* a map to the end of this document.

☒ **Color Photographs**. Photos should show the wetland vegetation components, habitat/community types, hydrologic features, and any other pertinent site features. *Attach* to the end of this document.

☒ **Landscape Sketch or Aerial Photograph**.

1. Clearly label the Proposed Project Site and Wetland Evaluation Area. Indicate the location of the MiRAM Boundary.
2. Label and indicate the extent of all general wetland community types identified within the Wetland Evaluation Area. Examples include: marsh, wet meadow, hardwood swamp, conifer swamp, shrub swamp, etc. Some wetland communities may be further classified as natural communities. Natural communities are predominantly structured by natural processes rather than modern anthropogenic disturbances. Examples include: bog, prairie fen, muskeg, wet prairie, southern wet meadow, etc.
3. Identify and label all hydrologic features, such as: streams, 100-year floodplains, ponds, vernal pools, and small patches of open water within a marsh or swamp.
4. Identify and label surrounding upland features.
5. Include north arrow and map scale information.
6. *Attach* the landscape sketch or aerial photo to the end of this document.

Comments: List any important site features or apparent disturbance events that have occurred within or near the Wetland Evaluation Area.

WC104 is a forested wetland within a moderate-quality woodland.

Field Datasheet

List plant species observed within the Wetland. *Attach* additional sheets as necessary.
Nomenclature will follow Voss (1972,1985,1996) or Gleason and Cronquist (1991).

Forest Overstory Stratum (woody plants 3 inches or more DBH, regardless of height)

Acer rubrum	
Acer saccharinum	
Carya glabra	
Fraxinus pennsylvanica	
Populus deltoides	
Quercus rubra	
Ulmus americana	
Platanus occidentalis	

Shrub/Sapling Stratum (woody plants less than 3 inches DBH and greater than 3.28 feet tall)

Acer rubrum	Salix amygdaloides
Carpinus caroliniana	Salix discolor
Fraxinus pennsylvanica	Sambucus canadensis
Ilex verticillata	Ulmus americana
Lindera benzoin	
Rhamnus cathartica	
Rhamnus frangula	
Rubus allegnehiensis	

Herbaceous Stratum (non-woody plants, regardless of size, and woody plants less than 3.28 feet tall)

Agrimonia parviflora	Eupatorium perfoliatum
Asclepias incarnata	Euthamia graminifolia
Aster lanceolatus	Glyceria striata
Boehmeria cylindrica	Impatiens capensis
Cinna arundinacea	Juncus dudleyi
Carex bebii	Onoclea sensibilis
Carex lacustris	Phalaris arundinacea
Carex vulpinoidea	Polygonum virginianum

Checklist of features and conditions to observe during the field inspection:

- ☐ Hydrologic Condition and Interactions
- ☐ Hydrologic Alterations
- ☐ Substrate/Soil Disturbances
- ☐ Habitat Structure Development
- ☐ Habitat Alterations
- ☐ Habitat/Wetland Condition
- ☐ Amphibian Breeding Pools
- ☐ Vegetation Diversity
- ☐ Vegetation Condition
- ☐ Amount of Open Water
- ☐ Percent of Invasive/Non-native Species
- ☐ Community Interspersion
- ☐ Vertical/Horizontal Structure
- ☐ S1, S2, or S3 Natural Community

Approximately how much of the Wetland Evaluation Area was reviewed during the field inspection? 50 %

Has vegetation within the Wetland Evaluation Area been altered and/or buffer areas impacted <u>within the past 5 years</u>? ☐ YES ☒ NO

Please Note: The Wetland Evaluation Area (encompassed by the MiRAM Boundary) is simply referred to as the "Wetland" throughout the remainder of this document.

Narrative Rating

Completion of the Narrative Rating allows the Evaluator to quickly identify whether the Wetland is one of several wetland types that typically have exceptional ecological value. If any of the metrics are answered affirmatively, the Wetland has *exceptional ecological value and is automatically rated as having high functional value* and completion of the Quantitative Rating is not necessary. If none of the metrics are answered affirmatively, proceed to the Quantitative Rating.

Answer all of the following metrics.

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat.

Is any part of the Wetland located within an area designated as Critical Habitat and does the Wetland *actually* contain habitat suitable for either species listed below?

Piping Plover (*Charadrius melodus*) Critical Habitat Units are designated only within the following counties: Alger, Benzie, Charlevoix, Cheboygan, Chippewa, Emmet, Iosco, Leelanau, Luce, Mackinac, Mason, Muskegon, Presque Isle, and Schoolcraft. See URL below for Unit locations.
www.fws.gov/midwest/endangered/pipingplover/final_rule.pdf

Hines's Emerald Dragonfly (*Somatochlora Hineana*) Critical Habitat Units are designated only within the following counties: Alpena, Mackinac, and Presque Isle. See URL below for Unit locations.
www.fws.gov/midwest/endangered/insects/hed/pdf/hinesfCH_FR.pdf

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

2. Threatened or Endangered (T/E) Species.

Do federal/state-listed T/E plant or animal species occur within the Wetland? Complete the following questions to answer this metric.

a. ☐YES ☒NO Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c.

b. ☐YES ☒NO Does the T/E survey indicate T/E species present within the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric.

c. ☐YES ☒NO Has the Evaluator (or others known to the Evaluator) observed any T/E species within the Wetland? If "Yes," answer "Yes" to this metric. If "No," go to question d.

d. ☐YES ☒NO Does the DNRE Endangered Species Assessment (ESA) web site interactive map, **www.mcgi.state.mi.us/esa,** indicate that there is a potential for unique natural features at or near your site of interest"?" If "No," answer "No" to this metric. If "Yes," request a DNRE formal review by submitting the online form. Type "MiRAM" within the "Project Information" field on the form. Go to question e.

e. ☐YES ☒NO Did the DNRE review confirm potential T/E occurrence in the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric. **The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE**.

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

3. Rare Wetland Natural Community Type.

Are more than 5 acres *or* more than 25% of the Wetland comprised of a Rare Wetland Natural Community Type*? Check (√) all Rare Wetland Natural Community Types

☐ **S1 or S2 Natural Community Type.**
Has the Wetland been identified by the Evaluator — *or other persons* — as being an S1 or S2 natural community type as defined by the Michigan Natural Features Inventory (MNFI)? See the *MiRAM User's Manual* for more information.

☐ **Southern Bog**, defined as any bog occurring below the northern limit of Michigan's Floristic Tension Zone (see figure for approximate location).

☐ **Old-Growth/Mature Forested Wetland.** Lacks evidence of any significant harvesting. Dominated by large, overstory trees (mean overstory DBH ≥20 inches, including at least two trees/acre having DBH ≥28 inches) and the canopy is multi-aged and multi-layered. Aggregations of canopy trees are interspersed with canopy gaps and large snags. Large nursery logs and tip-up mounds litter the forest floor. Does the forested Wetland have all/most of these characteristics?

*If the Rare Wetland Community Type is less than 5 acres *and* less than 25% of the Wetland, the rare community should be split off and evaluated separately.

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

4. Great Lakes Coastal Wetland.

Is any part of the Wetland within 1,000 feet of the ordinary high water mark of any of the Great Lakes, including Lake St. Clair?

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

Quantitative Rating

Completion of the Quantitative Rating assists the Evaluator in recognizing the functional value of the Wetland. Complete all metrics by completing all sections, circling the correct point value(s), and assigning a score.

Metric 1. Wetland Size and Distribution

Maximum 9 points.

1a. Wetland Size Estimate the size of the Wetland (i.e., Wetland Evaluation Area). Select a size class. **Maximum 6 points.**			**Score**
50	acres	Select this option if the wetland's actual size ≥ 50 acres.	6 pts
25	acres to <50 acres		5 pts
10	acres to <25 acres		4 pts
3	acres to <10 acres		3 pts
¼	acre to <3 acres		2 pts
less than ¼ acre			0 pt

3.0

1b. Wetland Scarcity Utilize the USFWS National Wetlands Inventory (NWI) maps to estimate percentage of wetland area remaining within a 2-mile radius from the Wetland's center. For the purpose of this submetric, areas of open water within the Great Lakes, inland lakes, streams, etc., should be excluded from the wetland percentage. Select the most appropriate percentage category. **Maximum 3 points.**		**Score**
0 to 20% of surrounding 2-mile radius is wetland	3 pts	3.0
>20 to 80% of surrounding 2-mile radius is wetland	2 pts	
>80% of surrounding 2-mile radius is wetland	1 pt	

6.0	**Metric 1 Total** add 1a & 1b **(9 points max.)**

Metric 2. Upland Buffers and Intensity of Surrounding Land Use

Maximum 12 points.

2a. Average Buffer Width around the Wetland's Perimeter

Step 1: Using the most recent aerial photograph available, sketch a 150-foot wide "buffer zone" around the Wetland.
Step 2: Estimate the buffer widths from the Wetland's edge to any non-buffer areas (up to 150 feet).
Step 3: Average the buffer widths along the Wetland's perimeter.
Step 4: Select the buffer width that is most appropriate. **Maximum 6 points**.

Buffers Include:

- shrubland, young forest, natural grassland, prairie
- abandoned row crop field (vegetated & naturalizing)
- hay field (non-row crop), lightly grazed pasture
- lightly managed forest (selectively logged)
- designated wildlife area, lightly managed parkland
- other wetland, lake, river

Non-Buffers Include:

- lawns, golf courses, manicured parkland
- residential, commercial, industrial
- roadways (including shoulders), parking lots
- row crop field
- conservation tillage, heavily grazed pasture
- clear-cutting, mining, construction activity

			Score
Wide Buffer Width:	≥150 feet around the perimeter	6 pts	4.0
Medium Buffer Width:	75 to <150 feet around the perimeter	4 pts	
Narrow Buffer Width:	25 to <75 feet around the perimeter	2 pt	
Very Narrow Buffer Width:	0 (no buffer) to <25 feet around the perimeter	0 pt	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland

Step 1: Using the most recent aerial photograph available, sketch a 1,000-foot wide "land use zone" around the Wetland.

Step 2: Estimate percent coverages comprised by each of the four types of land use listed below.

Step 3: If any land use type comprises more than 25% of the total land use, it is considered to be a "dominant" land use type for the purposes of MiRAM and will receive points. Sum the available points from all dominant land use types and then average the score. Round to the nearest 0.5 increment. **Maximum 6 points**.

Type of Land Use	Examples within each Type of Land Use			Score
Very Low Intensity:	• maturing forest • natural grassland, prairie	• designated wildlife area • other wetland, lake, river	6 pts	1.0
Low Intensity:	• shrubland/young forest • recent selective logging • hay field (non-row crop)	• lightly managed parkland • old field, lightly grazed pasture • one-lane road/two track	4 pts	
Moderately High Intensity:	• residential & lawns • manicured parkland • golf course	• conservation tillage • recent clear-cut (<10 years) • two-lane road	2 pts	
High Intensity:	• commercial, industrial • high-density residential • heavily grazed pasture • row crop field	• multi-lane paved roadway • construction activity • parking lot • mining	1 pt	

5.0	**Metric 2 Total** add 2a & 2b **(12 points max.)**

Metric 3. Hydrology

Limited to 26 points.

3a. Sources of Water: Select all that apply. **Maximum 8 points**.		Score
Precipitation: Directly and/or as runoff from upland areas.	1 pt	1.0
Groundwater: Seeps or evidence, such as significant amounts of skunk cabbage (*Symplocarpus foetidus*) or other fen-adapted species.	2 pts	2.0
Seasonal/Intermittent Surface Water: Seasonal inundation from a lake, pond, or stream. (A Wetland can only receive points for this source of water or the next, not both.)	2 pts	0.0
Perennial Surface Water: Perennial inundation from a lake, stream or pond.	5 pts	0.0

3b. Connectivity: Select all that apply. **Maximum 8 points**.		Score
100-Year Floodplain. As defined in the Floodplain Authority under Part 31 of the NREPA.	2 pts	0.0
Between a Stream/Lake/Pond and Human Land Use. The Wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the Wetland before it discharges into the surface waterbody.	2 pts	0.0
Wetland/Upland Complex. The Wetland is part of a large scale (10+ acres) non-linear complex of wetlands with small areas of unmanicured/undeveloped vegetated uplands that do not restrict movement of organisms between the wetland areas.	2 pts	2.0
Riparian Corridor. The Wetland is part of a linear *riparian* corridor that provides organism movement along a stream/river. Typically, these corridors should exceed 100 feet in width and extend at least one half mile.	2 pts	0.0

3c. Duration of Inundation/Saturation Select the option(s) from below that best describe(s) the dominant hydrologic characteristic of the Wetland. For the purposes of this submetric, "dominant" is defined as comprising at least 25% of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, select all that apply and average the points. Round to the nearest 0.5 increment. **Maximum 4 points.**		**Score**
Permanently Inundated	4 pts	2.0
Permanently Saturated to Regularly Inundated	3 pts	
Regularly Saturated to Seasonally Inundated	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil	1 pt	

3d. Alterations to Natural Hydrologic Regime

This submetric evaluates the intactness of the natural hydrologic regime of the Wetland.
Check (√) all forms of past or ongoing hydrologic alteration(s) that are potentially influencing the Wetland.

- ☒ ditch(es) in or near the wetland
- ☐ tile(s) in or near the wetland
- ☐ dike(s) in or near the wetland
- ☐ weir(s) in or near the wetland
- ☐ stormwater inputs (addition of water)
- ☐ stream channelization
- ☐ point source discharge(s) (non-stormwater)
- ☐ filling/grading activities in or near the wetland
- ☐ road bed(s)/RR grades(s) in or near the wetland
- ☐ dredging activities in or near the wetland
- ☐ other (specify)
- ☐ other (specify)

Evaluate whether an alteration is significant or minor in relation to the Wetland's overall area and hydrologic regime. For this submetric, "significant" is defined as affecting approximately 10% or greater of the Wetland. "Minor" is defined as affecting less than approximately 10% of the Wetland. A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).

Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's natural hydrologic regime. If uncertain, select adjoining options and average the available points. Round to the nearest 0.5 increment. If the Wetland's natural hydrologic regime has been significantly altered, it shall receive no more than 6 points for this submetric. **Maximum 8 points.**			**Score**
No Hydrologic Alterations Apparent:	There has been no significant alteration(s) to the Wetland's natural hydrologic regime, and/or ongoing minor alteration(s) is/are rare.	8 pts	6.0
Recovered:	Significant hydrologic alteration(s) occurred more than 20 years prior to the assessment, and/or ongoing minor hydrologic alteration(s) is/are only occasional.	6 pts	
Recovering:	A single significant hydrologic alteration occurred within 20 years prior to the assessment, and/or ongoing minor hydrologic alteration(s) is/are frequent.	4 pts	
Recent or No Recovery:	Multiple significant hydrologic alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt	

13.0	**Metric 3 Total** add 3a – 3d **(26 points max.)**

Metric 4. Habitat Alteration and Habitat Structure Development
Maximum 20 Points.

4a. Substrate/Soil Disturbance

This submetric evaluates the intactness or lack of disturbance to the Wetland's substrate and soil. Check (√) all possible forms of past or ongoing substrate/soil disturbance that are observed within the Wetland.

- ☒ human-induced erosion or exposure
- ☒ human-induced sedimentation or burial
- ☒ filling
- ☒ grading
- ☐ dredging
- ☐ plowing, disking
- ☐ intensive grazing (hooves)
- ☒ off-road vehicle use
- ☒ construction vehicle use
- ☐ other (specify)

Evaluate whether a disturbance is significant or minor in relation to the Wetland's overall area. For this submetric, "significant" is defined as affecting approximately 10% or greater of the Wetland. "Minor" is defined as affecting less than approximately 10% of the Wetland. A substrate disturbance may also be an alteration of the natural hydrologic regime (Submetric 3d) and/or an alteration of habitat (Submetric 4b).

Select an option below that best describes the extent of (or lack of) disturbances to the Wetland's substrate. If uncertain, select adjoining options and average the points. Round to the nearest 0.5 increment. If the Wetland's substrate has been significantly altered, it should receive no more than 3 points. **Maximum 4 points.**

			Score
No Substrate Disturbance Apparent:	There has been no significant disturbance to the Wetland's substrate and/or ongoing minor disturbance events are rare.	4 pts	3.0
Recovered:	Significant substrate disturbance occurred more than 20 years prior to the assessment, and/or ongoing minor substrate disturbance events are only occasional (e.g., light sedimentation from a nearby dirt road).	3 pts	
Recovering:	A single significant substrate disturbance event occurred within 20 years prior to the assessment, and/or ongoing minor substrate disturbance events are frequent.	2 pts	
Recent or No Recovery:	Multiple significant substrate disturbance events have occurred in the 20 years prior to the assessment, and/or significant disturbance is ongoing.	1 pt	

4b. Habitat Alteration

This submetric evaluates the intactness of the natural habitat within the Wetland. A "significant" alteration is defined as affecting 10% or greater of the Wetland. "Minor" alternation affects less than 10% of the Wetland. Check (√) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland.

- ☐ barriers such as road bed(s)/RR grades(s)
- ☐ selective cutting
- ☐ clearcutting
- ☐ mowing or shrub removal
- ☐ coarse woody debris (CWD) removal
- ☐ intensive grazing
- ☐ nutrient enrichment, e.g., nuisance algae
- ☐ herbicide/chemical treatment
- ☒ sedimentation
- ☐ dredging
- ☒ filling/grading
- ☐ plowing/disking/farming
- ☐ other (specify)

Utilize aerial photography and field evidence to determine if any habitat alterations occurred prior to approximately 20 years ago. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes, such as large, woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc. Disregard changes that can be attributed to wetland community succession or other natural processes. A habitat alteration may also be an alteration of the natural hydrologic regime (Submetric 3d) and/or a substrate disturbance (Submetric 4a).

Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's habitat. If unclear, select adjoining options and average the available points. Round to the nearest 0.5 increment. **Maximum 9 points**.

			Score
No Habitat Alterations Apparent:	There has been no significant alteration to the Wetland's natural habitat, and/or ongoing minor alteration(s) is/are rare.	9 pts	9.0
Recovered:	Significant habitat alteration(s) occurred more than 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are only occasional.	6 pts	
Recovering:	A single, significant habitat alteration occurred within 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are frequent.	3 pts	
Recent or No Recovery:	Multiple significant habitat alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt	

4c. Habitat Structure Development

Determine an overall qualitative rating of how well developed the Wetland is in comparison to the best of its type. For this submetric, a wetland's type is defined as any ecologically and/or hydrogeomorphically similar wetland habitat typical of the region. Well-developed communities, regardless of successional state, often exhibit many of the following habitat characteristics:

- Quality vertical habitat, such as hummocks, organic debris, and diverse plant height ranges.
- Quality horizontal habitat, such as varying vegetation density and patchiness, moderate ratios of open space to cover, plant species diversity, and a wide range of plant ages.
- Other ecological attributes, such as a diverse assortment of the following: breeding areas, rearing areas, feeding areas, niche space, etc.

Select an option below that best describes the Wetland's habitat structure development. If unclear, select adjoining options and average the points. Round to the nearest 0.5 increment.
Maximum 7 points.

			Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	5.0
Good:	Wetland appears to be a good example of its type but because of past or present disturbance, or other reasons, is not excellent.	5 pts	
Fair:	Wetland appears to be a moderately good example of its type but because of past or present disturbance, or other reasons, is not good.	3 pts	
Poor:	Wetland is a poor example of its type because of past or present disturbance, or other reasons.	1 pt	

17.0 **Metric 4 Total**
add 4a – 4c
(20 points max.)

Metric 5. Special Situations

Refer to the Narrative Rating for definitions and the *User's Manual* for guidance, **Limited to 10 points**

5a. High Ecological Value. See Narrative Rating for definitions of each.
10 points for each that apply.

Score: 10.0

- ☐ 1. Contains USFWS-designated Critical Habitat
- ☐ 2. Federal or State-listed T/E Plant or Animal Species
- ☐ 3. S1, S2, or S3 Natural Community Type (at least 5 acres or 25% of the Wetland)
- ☐ 4. Southern Bog (at least 5 acres or 25% of the Wetland)
- ☒ 5. Old-Growth/Mature Forested Wetland (at least 5 acres or 25% of the Wetland)
- ☐ 6. Great Lakes Coastal Wetland

5b. Forested Wetland. **5 points**.
Exhibits combined canopy cover from any group(s) of trees. Stem DBH must be at least 3 inches to qualify as a tree. Total area must comprise at least 5 acres or 25% of the Wetland. Does not qualify if most of the trees are ungrouped and widely scattered (e.g., a savanna), or located only thinly along the Wetland's margin.

Score: 5.0

5c. Urban/Suburban Wetland. **5 points**.
Greater than 50% of the surrounding landscape (1,000 foot radius) is comprised of low-permeability surfaces, such as roads, lawns, parking lots, buildings, sidewalks, etc.

Score: 0.0

5d. Low-Quality Wetland. Negative 10 points.
The Wetland is less than 1 acre and non-contiguous as defined in Part 303 and either: *1)* a stormwater pond that was excavated from upland and constructed for stormwater treatment in conjunction with a development project *or 2)* more than 75% covered by highly-invasive vegetation. See Submetric 6c for a list of highly-invasive species.

Score: 0.0

15.0 **Metric 5 Total**
(10 points max.)
Can be negative

Metric 6. Vegetation, Interspersion, and Habitat Features
Maximum 20 points.

6a. Wetland Vegetation Components

Determine the Qualitative Cover Score of each Vegetation Component (Herbaceous, Shrub/Sapling, Forest Overstory). Using the Qualitative Cover Scoring Table, start on the left and proceed to the right, until a point value is obtained for each Vegetation Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include widely-scattered trees, lone shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c to aid in the proper identification of broad-leaved cattail (*Typha latifolia*), a non-invasive, native species.

Qualitative Cover Scoring Table

Vegetation Component ► is >¼ acre	>25% of Wetland area ►	Native species dominate the coverage ►	High native diversity ►	3 pts
			Moderate to low native diversity ►	2 pts
		Invasive or non-native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
	<25% of Wetland area ►	Native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
		Invasive or non-native species dominate the coverage ►	Moderate native diversity ►	1 pt
			Low native diversity ►	0 pt
Vegetation Component is <¼ acre ►	>25% of Wetland area ►	Native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
		Invasive or non-native species dominate the coverage ►		0 pt
	<25% of Wetland area ►			0 pt

	Score
Forest Overstory Component, qualitative cover score derived from table **maximum 3 points**. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height. The Wetland does not have a forested component if the trees are widely scattered (e.g., a savanna), located only thinly along the Wetland's margin, or if it is clear that most of the trees are actually located on upland around the perimeter of the Wetland.	2.0
Shrub/Sapling Component, qualitative cover score derived from table **maximum 3 points**. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	0.0
Herbaceous Component, qualitative cover score derived from table **maximum 3 points**. Herbaceous wetlands are areas dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. The MiRAM includes the robust-stemmed yellow pond lily (*Nuphar advena*) and American lotus (*Nelumbo lutea*) within the herbaceous component because of their tendency to hold their stems and leaves well above the water. All floating-leaf species (including *Nymphaea* spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	0.0

6b. Open Water Component

Open water is an unobstructed, inundated area of water containing few or no rooted emergent or woody plant species. It can occur as a distinct zone along a river or lake or as a combination of small ponds, streams, or pools (e.g., within a marsh or swamp) and as an "understory" below a forest canopy (e.g., a forested vernal pool).

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds, streams, and pools**.
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life.
- **Aquatic bed areas**, also known as submergent marsh or submerged aquatic vegetation (SAV). Aquatic bed is dominated by plants that grow at or below the surface of the water for most of the growing season in most years. The MiRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the MiRAM, all floating-leaf aquatic taxa, such as water lilies (*Nymphaea* spp.), are included in the definition of aquatic bed and, therefore, are also included in the definition of open water.
- **100-foot wide strip of open water along a lake or river** (see Boundary Guidelines in the *User's Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see MiRAM Boundary Determination Guidelines). Simply divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake's open water included within the Wetland would be calculated as: 200/400 = 0.5 acre.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).

Estimate the total open water coverage. **Maximum 3 points**.			**Score**
High:	2.5 acres or more	3 pts	0.0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pt	

6c. Coverage of Highly-Invasive Plant Species

Estimate the combined total coverage of any of the species listed below. Assign points based on a range from virtually absent (1 point) to extensive (negative 5 points).

- common reed (*Phragmites australis)*
- purple loosestrife (*Lythrum salicaria*)
- reed canary grass (*Phalaris arundinacea*)
- common buckthorn (*Rhamnus cathartica*)
- glossy buckthorn (*Rhamnus frangula*)
- narrow-leaved cattail (*Typha angustifolia*)
- hybrid cattail (*Typha x glauca*)
- marsh thistle (*Cirsium palustre*)
- multiflora rose (*Rosa multiflora*)
- non-native honeysuckle (*Lonicera spp.*)

Key to Aid in Identification of Invasive and Non-Invasive Cattail (Typha) Species

Native, non-invasive: Male and female portions of the flower spike are not separated (or only slightly separated) on most of the stems within the same local stand. Female flower spikes are light brown and are 0.8-1.2 inches thick at maturity (before expanding when dried). Most leaf blades are approximately 0.5 to1 inch wide at widest part. Typically, not tightly packed into an area (non-invasive). .....**broad-leaved cattail (*T. latifolia)***

Non-native, Invasive: Male and female portions of the flower spike are separated on most of the stems within the same local stand. Female flower spikes are dark brown and less than 0.8 inch thick at maturity (before expanding when dried). Most leaf blades are less than 0.5 inch wide at widest part. Typically, tightly packed within an area, crowding out other plant species (invasive). .....**narrow-leaved cattail (*T. angustifolia)***

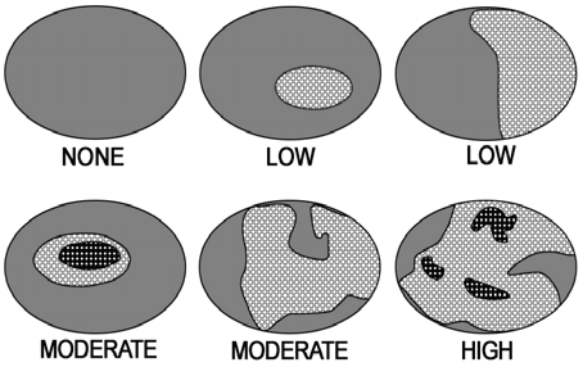
Non-native, Invasive: Hybridization may have occurred if most plants within the same local stand do not cleanly fit the characteristics of either pure species described above. The gap between the male and female portions of the flower spikes is highly variable, with many plants within the same local stand having no gap, and many having relatively wide gaps. Typically, extremely vigorous and often tightly packed within an area, crowding out other plant species (invasive).....**hybrid cattail (*T. x glauca)***

Estimate the total coverage. **Maximum 1 point**.			**Score**
Virtually Absent:	<1% aerial coverage of highly-invasive species	1 pt	0.0
Nearly Absent:	1% to <5% aerial coverage of highly-invasive species	0 pt	
Low:	5% to <25% aerial coverage of highly-invasive species	-1 pt	
Moderate:	25% to <75% aerial coverage of highly-invasive species	-3 pts	
Extensive:	≥75% aerial coverage of highly-invasive species	-5 pts	

6d. Horizontal (Plan View) Interspersion

Evaluate the Wetland from a "plan view," i.e., as if you are looking down upon it. The graphic shows hypothetical wetlands for estimating degree of interspersion.

Select only one option. **Maximum 5 points**.



		Score
Wetland has a high degree of interspersion	5 pts	2.0
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pt	

6e. Habitat Features

Determine the amount of each habitat feature that is present in the Wetland. **Maximum 3 points for each habitat feature.**

1. Hummocks/Tussocks/Tree Mounds, e.g., sedge/grass tussocks, decaying nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of all raised features (hummocks/tussocks/tree mounds) and includes the depressional matrix within any group of raised features.

				Score
Virtually Absent: 0 pt <5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	1

2. Coarse Woody Debris (CWD). Per log, average width ≥6 inches; each at least 10 feet long. e.g., fallen trees and/or large branches, etc.

				Score
Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	3.0

3. Large Standing Trees, Living or Dead (≥12 inches DBH).

				Score
Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	3.0

4. Amphibian Breeding/Nursery Habitat, e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat.

				Score
Virtually Absent: 0 pt < 5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	2.0

13.0	**Metric 6 Total** add 6a – 6f **(20 points max.)**

Metric 7. Scenic, Recreational, and Cultural Value

Maximum 3 points.

Select all that apply. Maximum 1 point per submetric.		Score
7a. Scenic: The public can view the Wetland from a public road or public land OR the Wetland has significant scenic value (assign 1 point).	1 pt	0.0
7b. Recreational: The general public has access to the Wetland or the Wetland is assumed to be used for recreational activities (assign 1 point).	1 pt	1.0
7c. Cultural/Historical: The Wetland, or any part of the Wetland, has been recognized as having important cultural or historic value (assign 1 point).	1 pt.	0.0

1.0 **Metric 7 Total**
(3 points max.)

MiRAM Summary

Narrative Rating

Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat	☐YES ☒NO
Question 2: Threatened or Endangered (T/E) Species Habitat	☐YES ☒NO
Question 3: Rare Wetland Natural Community Type	☐YES ☒NO
Question 4: Great Lakes Coastal Wetland	☐YES ☒NO

Quantitative Rating

	Score	Maximum
Metric 1: Wetland Size and Distribution	6.0	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	5.0	12
Metric 3: Hydrology	13.0	26
Metric 4: Habitat Alteration and Habitat Structure Development	17.0	20
Metric 5: Special Situations	15.0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	13.0	20
Metric 7: Scenic, Recreational, and Cultural Value	1.0	3
Seasonally Adjusted Score (add 10 pts if outside the growing season)		10

Grand Total
Add totals from all seven metrics

70.0 **100 Max.**

Scoring comments:

Background Information

Wetland

Proposed Project Site Name or DNRE File #: I-275, WC106
Date of Evaluation: 7/23/2012
County: Wayne
Township: Canton
Town: 2S
Range: 8E
Section: 12
Decimal Lat/Long: -83.4427, 42.3308

Evaluator

Name: S. Kogge, R. Roos
Address: 11181 Marwill Ave
City: West Olive State: MI Zip: 49460
Phone: 616-847-1680
Email: stu.kogge@cardno.com

Is a Wetland Delineation Report available?
☐ YES ☒ NO Date Completed:_____
If "YES", completed by (name of person/firm/agency):

Check (√) each box below when item is complete.

☒ **MiRAM Boundary**. See *MiRAM User's Manual* for more information
Size of the Wetland Evaluation Area: 0.1 acres

☒ **Location Map**. A county road map showing the location of the Wetland Evaluation Area, north arrow, map scale information, roads, landmarks, etc. *Attach* a map to the end of this document.

☒ **Color Photographs**. Photos should show the wetland vegetation components, habitat/community types, hydrologic features, and any other pertinent site features. *Attach* to the end of this document.

☒ **Landscape Sketch or Aerial Photograph**.

1. Clearly label the Proposed Project Site and Wetland Evaluation Area. Indicate the location of the MiRAM Boundary.
2. Label and indicate the extent of all general wetland community types identified within the Wetland Evaluation Area. Examples include: marsh, wet meadow, hardwood swamp, conifer swamp, shrub swamp, etc. Some wetland communities may be further classified as natural communities. Natural communities are predominantly structured by natural processes rather than modern anthropogenic disturbances. Examples include: bog, prairie fen, muskeg, wet prairie, southern wet meadow, etc.
3. Identify and label all hydrologic features, such as: streams, 100-year floodplains, ponds, vernal pools, and small patches of open water within a marsh or swamp.
4. Identify and label surrounding upland features.
5. Include north arrow and map scale information.
6. *Attach* the landscape sketch or aerial photo to the end of this document.

Comments: List any important site features or apparent disturbance events that have occurred within or near the Wetland Evaluation Area.

Field Datasheet

List plant species observed within the Wetland. *Attach* additional sheets as necessary.
Nomenclature will follow Voss (1972,1985,1996) or Gleason and Cronquist (1991).

Forest Overstory Stratum (woody plants 3 inches or more DBH, regardless of height)

none observed	

Shrub/Sapling Stratum (woody plants less than 3 inches DBH and greater than 3.28 feet tall)

Cornus amomum	
Populus deltoides	
Rhamnus frangula	
Salix amygdaloides	

Herbaceous Stratum (non-woody plants, regardless of size, and woody plants less than 3.28 feet tall)

Bidens comosus	Galium asprellum
Bidens frondosus	Juncus tenuis
Carex bebii	Juncus effusus
Carex vulpinoidea	Lythrum salicaria
Cyperus strigosus	Mentha arvensis
Dipsacus laciniatus	Scirpus atrovirens
Eupatorium maculatum	Scirpus cyperinus
Euthamia graminfolia	Solidago gigantea

Checklist of features and conditions to observe during the field inspection:

- ☐ Hydrologic Condition and Interactions
- ☐ Hydrologic Alterations
- ☐ Substrate/Soil Disturbances
- ☐ Habitat Structure Development
- ☐ Habitat Alterations
- ☐ Habitat/Wetland Condition
- ☐ Amphibian Breeding Pools
- ☐ Vegetation Diversity
- ☐ Vegetation Condition
- ☐ Amount of Open Water
- ☐ Percent of Invasive/Non-native Species
- ☐ Community Interspersion
- ☐ Vertical/Horizontal Structure
- ☐ S1, S2, or S3 Natural Community

Approximately how much of the Wetland Evaluation Area was reviewed during the field inspection? 99 %

Has vegetation within the Wetland Evaluation Area been altered and/or buffer areas impacted <u>within the past 5 years</u>? ☒ YES ☐ NO

Please Note: The Wetland Evaluation Area (encompassed by the MiRAM Boundary) is simply referred to as the "Wetland" throughout the remainder of this document.

Narrative Rating

Completion of the Narrative Rating allows the Evaluator to quickly identify whether the Wetland is one of several wetland types that typically have exceptional ecological value. If any of the metrics are answered affirmatively, the Wetland has *exceptional ecological value and is automatically rated as having high functional value* and completion of the Quantitative Rating is not necessary. If none of the metrics are answered affirmatively, proceed to the Quantitative Rating.

Answer all of the following metrics.

1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat.

Is any part of the Wetland located within an area designated as Critical Habitat and does the Wetland *actually* contain habitat suitable for either species listed below?

Piping Plover (*Charadrius melodus*) Critical Habitat Units are designated only within the following counties: Alger, Benzie, Charlevoix, Cheboygan, Chippewa, Emmet, Iosco, Leelanau, Luce, Mackinac, Mason, Muskegon, Presque Isle, and Schoolcraft. See URL below for Unit locations.
www.fws.gov/midwest/endangered/pipingplover/final_rule.pdf

Hines's Emerald Dragonfly (*Somatochlora Hineana*) Critical Habitat Units are designated only within the following counties: Alpena, Mackinac, and Presque Isle. See URL below for Unit locations.
www.fws.gov/midwest/endangered/insects/hed/pdf/hinesfCH_FR.pdf

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

2. Threatened or Endangered (T/E) Species.

Do federal/state-listed T/E plant or animal species occur within the Wetland? Complete the following questions to answer this metric.

a. ☐YES ☒NO Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c.

b. ☐YES ☒NO Does the T/E survey indicate T/E species present within the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric.

c. ☐YES ☒NO Has the Evaluator (or others known to the Evaluator) observed any T/E species within the Wetland? If "Yes," answer "Yes" to this metric. If "No," go to question d.

d. ☐YES ☒NO Does the DNRE Endangered Species Assessment (ESA) web site interactive map, **www.mcgi.state.mi.us/esa,** indicate that there is a potential for unique natural features at or near your site of interest"?" If "No," answer "No" to this metric. If "Yes," request a DNRE formal review by submitting the online form. Type "MiRAM" within the "Project Information" field on the form. Go to question e.

e. ☐YES ☒NO Did the DNRE review confirm potential T/E occurrence in the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric. **The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE**.

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

3. Rare Wetland Natural Community Type.

Are more than 5 acres *or* more than 25% of the Wetland comprised of a Rare Wetland Natural Community Type*? Check (√) all Rare Wetland Natural Community Types

☐ **S1 or S2 Natural Community Type.**
Has the Wetland been identified by the Evaluator — *or other persons* — as being an S1 or S2 natural community type as defined by the Michigan Natural Features Inventory (MNFI)? See the *MiRAM User's Manual* for more information.

☐ **Southern Bog**, defined as any bog occurring below the northern limit of Michigan's Floristic Tension Zone (see figure for approximate location).

☐ **Old-Growth/Mature Forested Wetland.** Lacks evidence of any significant harvesting. Dominated by large, overstory trees (mean overstory DBH ≥20 inches, including at least two trees/acre having DBH ≥28 inches) and the canopy is multi-aged and multi-layered. Aggregations of canopy trees are interspersed with canopy gaps and large snags. Large nursery logs and tip-up mounds litter the forest floor. Does the forested Wetland have all/most of these characteristics?

*If the Rare Wetland Community Type is less than 5 acres *and* less than 25% of the Wetland, the rare community should be split off and evaluated separately.

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

4. Great Lakes Coastal Wetland.

Is any part of the Wetland within 1,000 feet of the ordinary high water mark of any of the Great Lakes, including Lake St. Clair?

☐ YES ☒ NO

If "**yes**", the Wetland has ***high functional value***.

Quantitative Rating

Completion of the Quantitative Rating assists the Evaluator in recognizing the functional value of the Wetland. Complete all metrics by completing all sections, circling the correct point value(s), and assigning a score.

Metric 1. Wetland Size and Distribution

Maximum 9 points.

1a. Wetland Size Estimate the size of the Wetland (i.e., Wetland Evaluation Area). Select a size class. **Maximum 6 points.**			**Score**
50	acres	Select this option if the wetland's actual size ≥ 50 acres.	6 pts
25	acres to <50 acres		5 pts
10	acres to <25 acres		4 pts
3	acres to <10 acres		3 pts
¼	acre to <3 acres		2 pts
less than ¼ acre			0 pt

0.0

1b. Wetland Scarcity Utilize the USFWS National Wetlands Inventory (NWI) maps to estimate percentage of wetland area remaining within a 2-mile radius from the Wetland's center. For the purpose of this submetric, areas of open water within the Great Lakes, inland lakes, streams, etc., should be excluded from the wetland percentage. Select the most appropriate percentage category. **Maximum 3 points.**		**Score**
0 to 20% of surrounding 2-mile radius is wetland	3 pts	3.0
>20 to 80% of surrounding 2-mile radius is wetland	2 pts	
>80% of surrounding 2-mile radius is wetland	1 pt	

3.0

Metric 1 Total
add 1a & 1b
(9 points max.)

Metric 2. Upland Buffers and Intensity of Surrounding Land Use

Maximum 12 points.

2a. Average Buffer Width around the Wetland's Perimeter

Step 1: Using the most recent aerial photograph available, sketch a 150-foot wide "buffer zone" around the Wetland.
Step 2: Estimate the buffer widths from the Wetland's edge to any non-buffer areas (up to 150 feet).
Step 3: Average the buffer widths along the Wetland's perimeter.
Step 4: Select the buffer width that is most appropriate. **Maximum 6 points**.

Buffers Include:

- shrubland, young forest, natural grassland, prairie
- abandoned row crop field (vegetated & naturalizing)
- hay field (non-row crop), lightly grazed pasture
- lightly managed forest (selectively logged)
- designated wildlife area, lightly managed parkland
- other wetland, lake, river

Non-Buffers Include:

- lawns, golf courses, manicured parkland
- residential, commercial, industrial
- roadways (including shoulders), parking lots
- row crop field
- conservation tillage, heavily grazed pasture
- clear-cutting, mining, construction activity

			Score
Wide Buffer Width:	≥150 feet around the perimeter	6 pts	4.0
Medium Buffer Width:	75 to <150 feet around the perimeter	4 pts	
Narrow Buffer Width:	25 to <75 feet around the perimeter	2 pt	
Very Narrow Buffer Width:	0 (no buffer) to <25 feet around the perimeter	0 pt	

2b. Intensity of Surrounding Land Use within 1,000 feet of the Wetland

Step 1: Using the most recent aerial photograph available, sketch a 1,000-foot wide "land use zone" around the Wetland.

Step 2: Estimate percent coverages comprised by each of the four types of land use listed below.

Step 3: If any land use type comprises more than 25% of the total land use, it is considered to be a "dominant" land use type for the purposes of MiRAM and will receive points. Sum the available points from all dominant land use types and then average the score. Round to the nearest 0.5 increment. **Maximum 6 points**.

Type of Land Use	Examples within each Type of Land Use			Score
Very Low Intensity:	• maturing forest • natural grassland, prairie	• designated wildlife area • other wetland, lake, river	6 pts	1.0
Low Intensity:	• shrubland/young forest • recent selective logging • hay field (non-row crop)	• lightly managed parkland • old field, lightly grazed pasture • one-lane road/two track	4 pts	
Moderately High Intensity:	• residential & lawns • manicured parkland • golf course	• conservation tillage • recent clear-cut (<10 years) • two-lane road	2 pts	
High Intensity:	• commercial, industrial • high-density residential • heavily grazed pasture • row crop field	• multi-lane paved roadway • construction activity • parking lot • mining	1 pt	

5.0	**Metric 2 Total** add 2a & 2b **(12 points max.)**

Metric 3. Hydrology

Limited to 26 points.

3a. Sources of Water: Select all that apply. **Maximum 8 points**.		Score
Precipitation: Directly and/or as runoff from upland areas.	1 pt	1.0
Groundwater: Seeps or evidence, such as significant amounts of skunk cabbage (*Symplocarpus foetidus*) or other fen-adapted species.	2 pts	0.0
Seasonal/Intermittent Surface Water: Seasonal inundation from a lake, pond, or stream. (A Wetland can only receive points for this source of water or the next, not both.)	2 pts	0.0
Perennial Surface Water: Perennial inundation from a lake, stream or pond.	5 pts	0.0

3b. Connectivity: Select all that apply. **Maximum 8 points**.		Score
100-Year Floodplain. As defined in the Floodplain Authority under Part 31 of the NREPA.	2 pts	0.0
Between a Stream/Lake/Pond and Human Land Use. The Wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the Wetland before it discharges into the surface waterbody.	2 pts	0.0
Wetland/Upland Complex. The Wetland is part of a large scale (10+ acres) non-linear complex of wetlands with small areas of unmanicured/undeveloped vegetated uplands that do not restrict movement of organisms between the wetland areas.	2 pts	2.0
Riparian Corridor. The Wetland is part of a linear *riparian* corridor that provides organism movement along a stream/river. Typically, these corridors should exceed 100 feet in width and extend at least one half mile.	2 pts	0.0

3c. Duration of Inundation/Saturation Select the option(s) from below that best describe(s) the dominant hydrologic characteristic of the Wetland. For the purposes of this submetric, "dominant" is defined as comprising at least 25% of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, select all that apply and average the points. Round to the nearest 0.5 increment. **Maximum 4 points.**		**Score**
Permanently Inundated	4 pts	1.0
Permanently Saturated to Regularly Inundated	3 pts	
Regularly Saturated to Seasonally Inundated	2 pts	
Seasonally Saturated in the Upper 12 Inches of Soil	1 pt	

3d. Alterations to Natural Hydrologic Regime

This submetric evaluates the intactness of the natural hydrologic regime of the Wetland.
Check (√) all forms of past or ongoing hydrologic alteration(s) that are potentially influencing the Wetland.

- ☐ ditch(es) in or near the wetland
- ☐ tile(s) in or near the wetland
- ☐ dike(s) in or near the wetland
- ☐ weir(s) in or near the wetland
- ☐ stormwater inputs (addition of water)
- ☐ stream channelization
- ☐ point source discharge(s) (non-stormwater)
- ☐ filling/grading activities in or near the wetland
- ☐ road bed(s)/RR grades(s) in or near the wetland
- ☐ dredging activities in or near the wetland
- ☐ other (specify)
- ☐ other (specify)

Evaluate whether an alteration is significant or minor in relation to the Wetland's overall area and hydrologic regime. For this submetric, "significant" is defined as affecting approximately 10% or greater of the Wetland. "Minor" is defined as affecting less than approximately 10% of the Wetland. A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).

Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's natural hydrologic regime. If uncertain, select adjoining options and average the available points. Round to the nearest 0.5 increment. If the Wetland's natural hydrologic regime has been significantly altered, it shall receive no more than 6 points for this submetric. **Maximum 8 points.**			**Score**
No Hydrologic Alterations Apparent:	There has been no significant alteration(s) to the Wetland's natural hydrologic regime, and/or ongoing minor alteration(s) is/are rare.	8 pts	6.0
Recovered:	Significant hydrologic alteration(s) occurred more than 20 years prior to the assessment, and/or ongoing minor hydrologic alteration(s) is/are only occasional.	6 pts	
Recovering:	A single significant hydrologic alteration occurred within 20 years prior to the assessment, and/or ongoing minor hydrologic alteration(s) is/are frequent.	4 pts	
Recent or No Recovery:	Multiple significant hydrologic alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt	

10.0	**Metric 3 Total** add 3a – 3d **(26 points max.)**

Metric 4. Habitat Alteration and Habitat Structure Development
Maximum 20 Points.

4a. Substrate/Soil Disturbance

This submetric evaluates the intactness or lack of disturbance to the Wetland's substrate and soil. Check (√) all possible forms of past or ongoing substrate/soil disturbance that are observed within the Wetland.

- ☒ human-induced erosion or exposure
- ☒ human-induced sedimentation or burial
- ☒ filling
- ☒ grading
- ☐ dredging
- ☐ plowing, disking
- ☐ intensive grazing (hooves)
- ☒ off-road vehicle use
- ☒ construction vehicle use
- ☐ other (specify)

Evaluate whether a disturbance is significant or minor in relation to the Wetland's overall area. For this submetric, "significant" is defined as affecting approximately 10% or greater of the Wetland. "Minor" is defined as affecting less than approximately 10% of the Wetland. A substrate disturbance may also be an alteration of the natural hydrologic regime (Submetric 3d) and/or an alteration of habitat (Submetric 4b).

Select an option below that best describes the extent of (or lack of) disturbances to the Wetland's substrate. If uncertain, select adjoining options and average the points. Round to the nearest 0.5 increment. If the Wetland's substrate has been significantly altered, it should receive no more than 3 points. **Maximum 4 points.**

			Score
No Substrate Disturbance Apparent:	There has been no significant disturbance to the Wetland's substrate and/or ongoing minor disturbance events are rare.	4 pts	3.0
Recovered:	Significant substrate disturbance occurred more than 20 years prior to the assessment, and/or ongoing minor substrate disturbance events are only occasional (e.g., light sedimentation from a nearby dirt road).	3 pts	
Recovering:	A single significant substrate disturbance event occurred within 20 years prior to the assessment, and/or ongoing minor substrate disturbance events are frequent.	2 pts	
Recent or No Recovery:	Multiple significant substrate disturbance events have occurred in the 20 years prior to the assessment, and/or significant disturbance is ongoing.	1 pt	

4b. Habitat Alteration

This submetric evaluates the intactness of the natural habitat within the Wetland. A "significant" alteration is defined as affecting 10% or greater of the Wetland. "Minor" alternation affects less than 10% of the Wetland. Check (√) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland.

- ☒ barriers such as road bed(s)/RR grades(s)
- ☐ selective cutting
- ☐ clearcutting
- ☒ mowing or shrub removal
- ☐ coarse woody debris (CWD) removal
- ☐ intensive grazing
- ☐ nutrient enrichment, e.g., nuisance algae
- ☐ herbicide/chemical treatment
- ☐ sedimentation
- ☐ dredging
- ☒ filling/grading
- ☐ plowing/disking/farming
- ☐ other (specify)

Utilize aerial photography and field evidence to determine if any habitat alterations occurred prior to approximately 20 years ago. Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes, such as large, woody debris, plant species diversity, hummocks, patchiness, niche diversity, etc. Disregard changes that can be attributed to wetland community succession or other natural processes. A habitat alteration may also be an alteration of the natural hydrologic regime (Submetric 3d) and/or a substrate disturbance (Submetric 4a).

Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's habitat. If unclear, select adjoining options and average the available points. Round to the nearest 0.5 increment. **Maximum 9 points**.

			Score
No Habitat Alterations Apparent:	There has been no significant alteration to the Wetland's natural habitat, and/or ongoing minor alteration(s) is/are rare.	9 pts	6.0
Recovered:	Significant habitat alteration(s) occurred more than 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are only occasional.	6 pts	
Recovering:	A single, significant habitat alteration occurred within 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are frequent.	3 pts	
Recent or No Recovery:	Multiple significant habitat alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt	

4c. Habitat Structure Development

Determine an overall qualitative rating of how well developed the Wetland is in comparison to the best of its type. For this submetric, a wetland's type is defined as any ecologically and/or hydrogeomorphically similar wetland habitat typical of the region. Well-developed communities, regardless of successional state, often exhibit many of the following habitat characteristics:

- Quality vertical habitat, such as hummocks, organic debris, and diverse plant height ranges.
- Quality horizontal habitat, such as varying vegetation density and patchiness, moderate ratios of open space to cover, plant species diversity, and a wide range of plant ages.
- Other ecological attributes, such as a diverse assortment of the following: breeding areas, rearing areas, feeding areas, niche space, etc.

Select an option below that best describes the Wetland's habitat structure development. If unclear, select adjoining options and average the points. Round to the nearest 0.5 increment.
Maximum 7 points.

			Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	2.0
Good:	Wetland appears to be a good example of its type but because of past or present disturbance, or other reasons, is not excellent.	5 pts	
Fair:	Wetland appears to be a moderately good example of its type but because of past or present disturbance, or other reasons, is not good.	3 pts	
Poor:	Wetland is a poor example of its type because of past or present disturbance, or other reasons.	1 pt	

11.0 **Metric 4 Total**
add 4a – 4c
(20 points max.)

Metric 5. Special Situations

Refer to the Narrative Rating for definitions and the *User's Manual* for guidance, **Limited to 10 points**

5a. High Ecological Value. See Narrative Rating for definitions of each.
10 points for each that apply.

☐ 1. Contains USFWS-designated Critical Habitat
☐ 2. Federal or State-listed T/E Plant or Animal Species
☐ 3. S1, S2, or S3 Natural Community Type (at least 5 acres or 25% of the Wetland)
☐ 4. Southern Bog (at least 5 acres or 25% of the Wetland)
☐ 5. Old-Growth/Mature Forested Wetland (at least 5 acres or 25% of the Wetland)
☐ 6. Great Lakes Coastal Wetland

Score 0.0

5b. Forested Wetland. **5 points**.
Exhibits combined canopy cover from any group(s) of trees. Stem DBH must be at least 3 inches to qualify as a tree. Total area must comprise at least 5 acres or 25% of the Wetland. Does not qualify if most of the trees are ungrouped and widely scattered (e.g., a savanna), or located only thinly along the Wetland's margin.

Score 0.0

5c. Urban/Suburban Wetland. **5 points**.
Greater than 50% of the surrounding landscape (1,000 foot radius) is comprised of low-permeability surfaces, such as roads, lawns, parking lots, buildings, sidewalks, etc.

Score 0.0

5d. Low-Quality Wetland. Negative 10 points.
The Wetland is less than 1 acre and non-contiguous as defined in Part 303 and either: *1)* a stormwater pond that was excavated from upland and constructed for stormwater treatment in conjunction with a development project *or 2)* more than 75% covered by highly-invasive vegetation. See Submetric 6c for a list of highly-invasive species.

Score 0.0

0 **Metric 5 Total**
(10 points max.)
Can be negative

Metric 6. Vegetation, Interspersion, and Habitat Features
Maximum 20 points.

6a. Wetland Vegetation Components

Determine the Qualitative Cover Score of each Vegetation Component (Herbaceous, Shrub/Sapling, Forest Overstory). Using the Qualitative Cover Scoring Table, start on the left and proceed to the right, until a point value is obtained for each Vegetation Component. Vegetation Components may exist in overlapping layers, e.g., significant areas of shrub/sapling and/or herbaceous may exist under a forest canopy. Only groups of trees, clusters of shrubs, or dense patches of herbaceous stems may count toward area coverage. Do not include widely-scattered trees, lone shrub/saplings, or sparse patches of herbaceous stems. See Submetric 6c to aid in the proper identification of broad-leaved cattail (*Typha latifolia*), a non-invasive, native species.

Qualitative Cover Scoring Table

Vegetation Component ► is >¼ acre	>25% of Wetland area ►	Native species dominate the coverage ►	High native diversity ►	3 pts
			Moderate to low native diversity ►	2 pts
		Invasive or non-native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
	<25% of Wetland area ►	Native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
		Invasive or non-native species dominate the coverage ►	Moderate native diversity ►	1 pt
			Low native diversity ►	0 pt
Vegetation Component is <¼ acre ►	>25% of Wetland area ►	Native species dominate the coverage ►	Moderate to high native diversity ►	2 pts
			Low native diversity ►	1 pt
		Invasive or non-native species dominate the coverage ►		0 pt
	<25% of Wetland area ►			0 pt

	Score
Forest Overstory Component, qualitative cover score derived from table **maximum 3 points**. Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height. The Wetland does not have a forested component if the trees are widely scattered (e.g., a savanna), located only thinly along the Wetland's margin, or if it is clear that most of the trees are actually located on upland around the perimeter of the Wetland.	0.0
Shrub/Sapling Component, qualitative cover score derived from table **maximum 3 points**. Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	0.0
Herbaceous Component, qualitative cover score derived from table **maximum 3 points**. Herbaceous wetlands are areas dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. The MiRAM includes the robust-stemmed yellow pond lily (*Nuphar advena*) and American lotus (*Nelumbo lutea*) within the herbaceous component because of their tendency to hold their stems and leaves well above the water. All floating-leaf species (including *Nymphaea* spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	2.0

6b. Open Water Component

Open water is an unobstructed, inundated area of water containing few or no rooted emergent or woody plant species. It can occur as a distinct zone along a river or lake or as a combination of small ponds, streams, or pools (e.g., within a marsh or swamp) and as an "understory" below a forest canopy (e.g., a forested vernal pool).

This Habitat Component includes combined acreage from any of the following areas:

- **Small ponds, streams, and pools**.
- **Seasonal standing water areas** (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life.
- **Aquatic bed areas**, also known as submergent marsh or submerged aquatic vegetation (SAV). Aquatic bed is dominated by plants that grow at or below the surface of the water for most of the growing season in most years. The MiRAM includes aquatic bed within the definition of open water, due to the potential difficulty in differentiating the two entities. For the purposes of the MiRAM, all floating-leaf aquatic taxa, such as water lilies (*Nymphaea* spp.), are included in the definition of aquatic bed and, therefore, are also included in the definition of open water.
- **100-foot wide strip of open water along a lake or river** (see Boundary Guidelines in the *User's Manual*). When the Wetland is adjacent to a lake or large river, calculate the acreage of the 100-foot wide open water strip that is included within the Wetland (see MiRAM Boundary Determination Guidelines). Simply divide the linear feet of shoreline length by 400. For example, if the vegetated portion of the wetland interfaces with 200 linear feet of a lake, then the extent of the lake's open water included within the Wetland would be calculated as: 200/400 = 0.5 acre.
- **Shallow pools free of dense shrub canopy** (e.g., open area within an inundated shrub swamp).
- **Shallow pools free of densely-packed herbaceous vegetation** (e.g., open area within a marsh or bog).

Estimate the total open water coverage. **Maximum 3 points**.			**Score**
High:	2.5 acres or more	3 pts	0.0
Moderate:	1.0 acre to <2.5 acres	2 pts	
Low:	0.25 acre to <1.0 acre	1 pt	
Virtually Absent:	<0.25 acre	0 pt	

6c. Coverage of Highly-Invasive Plant Species

Estimate the combined total coverage of any of the species listed below. Assign points based on a range from virtually absent (1 point) to extensive (negative 5 points).

- common reed (*Phragmites australis)*
- purple loosestrife (*Lythrum salicaria*)
- reed canary grass (*Phalaris arundinacea*)
- common buckthorn (*Rhamnus cathartica*)
- glossy buckthorn (*Rhamnus frangula*)
- narrow-leaved cattail (*Typha angustifolia*)
- hybrid cattail (*Typha x glauca*)
- marsh thistle (*Cirsium palustre*)
- multiflora rose (*Rosa multiflora*)
- non-native honeysuckle (*Lonicera spp.*)

Key to Aid in Identification of Invasive and Non-Invasive Cattail (Typha) Species

Native, non-invasive: Male and female portions of the flower spike are not separated (or only slightly separated) on most of the stems within the same local stand. Female flower spikes are light brown and are 0.8-1.2 inches thick at maturity (before expanding when dried). Most leaf blades are approximately 0.5 to1 inch wide at widest part. Typically, not tightly packed into an area (non-invasive). .....**broad-leaved cattail (*T. latifolia)***

Non-native, Invasive: Male and female portions of the flower spike are separated on most of the stems within the same local stand. Female flower spikes are dark brown and less than 0.8 inch thick at maturity (before expanding when dried). Most leaf blades are less than 0.5 inch wide at widest part. Typically, tightly packed within an area, crowding out other plant species (invasive). .....**narrow-leaved cattail (*T. angustifolia)***

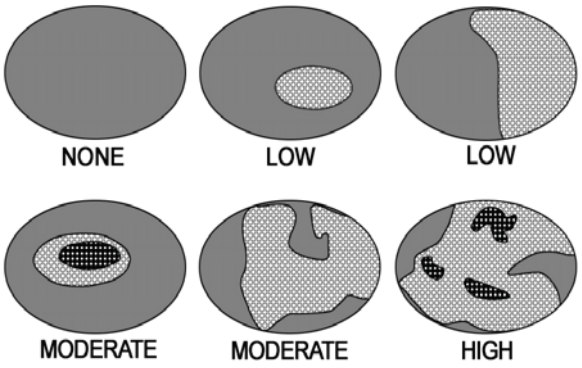
Non-native, Invasive: Hybridization may have occurred if most plants within the same local stand do not cleanly fit the characteristics of either pure species described above. The gap between the male and female portions of the flower spikes is highly variable, with many plants within the same local stand having no gap, and many having relatively wide gaps. Typically, extremely vigorous and often tightly packed within an area, crowding out other plant species (invasive).....**hybrid cattail (*T. x glauca)***

Estimate the total coverage. **Maximum 1 point**.			**Score**
Virtually Absent:	<1% aerial coverage of highly-invasive species	1 pt	0.0
Nearly Absent:	1% to <5% aerial coverage of highly-invasive species	0 pt	
Low:	5% to <25% aerial coverage of highly-invasive species	-1 pt	
Moderate:	25% to <75% aerial coverage of highly-invasive species	-3 pts	
Extensive:	≥75% aerial coverage of highly-invasive species	-5 pts	

6d. Horizontal (Plan View) Interspersion

Evaluate the Wetland from a "plan view," i.e., as if you are looking down upon it. The graphic shows hypothetical wetlands for estimating degree of interspersion.

Select only one option. **Maximum 5 points**.



		Score
Wetland has a high degree of interspersion	5 pts	1.0
Wetland has a moderate degree of interspersion	3 pts	
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pt	

6e. Habitat Features

Determine the amount of each habitat feature that is present in the Wetland. **Maximum 3 points for each habitat feature.**

1. Hummocks/Tussocks/Tree Mounds, e.g., sedge/grass tussocks, decaying nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of all raised features (hummocks/tussocks/tree mounds) and includes the depressional matrix within any group of raised features.

				Score
Virtually Absent: 0 pt <5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	2

2. Coarse Woody Debris (CWD). Per log, average width ≥6 inches; each at least 10 feet long. e.g., fallen trees and/or large branches, etc.

				Score
Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	0.0

3. Large Standing Trees, Living or Dead (≥12 inches DBH).

				Score
Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	0.0

4. Amphibian Breeding/Nursery Habitat, e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat.

				Score
Virtually Absent: 0 pt < 5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	0.0

5	**Metric 6 Total** add 6a – 6f **(20 points max.)**

Metric 7. Scenic, Recreational, and Cultural Value

Maximum 3 points.

Select all that apply. Maximum 1 point per submetric.		Score
7a. Scenic: The public can view the Wetland from a public road or public land OR the Wetland has significant scenic value (assign 1 point).	1 pt	0.0
7b. Recreational: The general public has access to the Wetland or the Wetland is assumed to be used for recreational activities (assign 1 point).	1 pt	0.0
7c. Cultural/Historical: The Wetland, or any part of the Wetland, has been recognized as having important cultural or historic value (assign 1 point).	1 pt.	0.0

0.0 **Metric 7 Total**
(3 points max.)

MiRAM Summary

Narrative Rating

Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat	☐YES ☒NO
Question 2: Threatened or Endangered (T/E) Species Habitat	☐YES ☒NO
Question 3: Rare Wetland Natural Community Type	☐YES ☒NO
Question 4: Great Lakes Coastal Wetland	☐YES ☒NO

Quantitative Rating

	Score	Maximum
Metric 1: Wetland Size and Distribution	3.0	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	5.0	12
Metric 3: Hydrology	10.0	26
Metric 4: Habitat Alteration and Habitat Structure Development	11.0	20
Metric 5: Special Situations	0.0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	5.0	20
Metric 7: Scenic, Recreational, and Cultural Value	0.0	3
Seasonally Adjusted Score (add 10 pts if outside the growing season)		10

Grand Total
Add totals from all seven metrics

34.0 **100 Max.**

Scoring comments: Hummocks/tussocks/tree mounds = tire ruts

APPENDIX E:
Representative Stream Assessment Photos

Photo 1: Representative view of Tonquish Creek, Site 1

Photo 2: Representative view of Tonquish Creek, Site 1

Photo 3: Representative view of Tonquish Creek, Site 6

Photo 4: Representative view of Tonquish Creek, Site 6

Photo 5: Representative view of Willow Creek, Site 2

Photo 6: Representative view of Willow Creek, Site 2

Photo 7: Representative view of Willow Creek, Site 5

Photo 8: Representative view of Willow Creek, Site 5

Photo 9: Representative view of Fellows Creek, Site 3

Photo 10: Representative view of Fellows Creek, Site 3

Photo 11: Representative view of Fellows Creek Site 4

Photo 12: Representative view of tributary entering Fellows Creek, Site 4

APPENDIX F:
Stream Assessment (Procedure 51)
Field Forms

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: ST #1 SITE 1 TONQUISH CREEK

LOCATION (road crossing): WARREN & HAGERTY RD

COUNTY/TOWNSHIP: WAYNE COUNTY / CANTON TWNSHP

T: 2 South R: 8E S: 12

LAT(dd) DMS: 42° 20' 06.2614 LONG (dd): 83° 26' 46.7761

RIVER BASIN: ROUGE RIVER

STORET #:

HUC CODE: 04090004 0202 ECOREGION: MAUMEE LAKE PLAINE

INVESTIGATOR(S): M. BERNINGER, T. ESTROM, S. KOGGE

DATE: 7/31/12

TIME: 8:45 (AM) PM

REASON FOR SURVEY
- [x] Targeted: comment _____
- [ ] Randomized: VSEC # _____
- VSEC description (eg. cold small) _____

WEATHER CONDITIONS

Current
- [ ] Sunny
- [x] Partly Cloudy
- [ ] Cloudy
- [ ] Rainy

Has there been a significant rain in the last 7 days?
- [x] Yes [ ] No
- [ ] Don't Know

Air Temperature 78 °F

WATERSHED FEATURES

Predominant Surrounding Land Use
- [ ] Forest
- [x] Commercial
- [x] Field/Pasture
- [x] Industrial
- [ ] Agricultural
- [ ] Residential
- [ ] Other _____

Local Watershed NPS Pollution
- [ ] No evidence
- [x] Some potential sources
- [ ] Obvious Sources

Local Watershed Erosion
- [ ] None
- [x] Moderate
- [ ] Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species
- [x] Trees [ ] Shrubs
- [ ] Grasses [ ] Herbaceous

Species:

Estimate buffer width (left) 50 ft (right) 50 ft

STREAM CHARACTERIZATION

Stream Subsystem
- [x] Perennial
- [ ] Intermittent
- [ ] Lake Outlet Influenced
- [ ] Dam Influenced

Stream Origin
- [ ] Spring Fed
- [ ] Lake/Pond
- [ ] Swamp, Marsh, Bog
- [ ] Mixture of origins
- [ ] Other _____

Stream Modifications
- [ ] None
- [ ] Dredged
- [ ] Canopy Removal
- [ ] Snagging
- [ ] Impounded
- [ ] Relocated
- [ ] Bank Stabilization
- [ ] Habitat Improvement

Stream Type
- [ ] Coldwater
- [x] Warmwater

INSTREAM FEATURES

Avg. Stream Width 15 ft Avg. Stream Depth 0.8 ft

Surface Velocity _____ ft/sec (at thalweg) Est. Flow 31.5 cfs

Est. Survey Reach Length 210 ft

Survey Reach Area 3500 ft² High Water Mark 7-8 ft

Canopy Cover: 65 % Shaded

AQUATIC VEGETATION
- [ ] Rooted emergent
- [ ] Rooted submergent
- [ ] Rooted floating
- [ ] Free Floating
- [ ] Floating algae
- [ ] Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? Yes [ ] No [x]

Dominant species present _____

WATER QUALITY

Temperature 72 °F

Water Samples Taken
- [x] None [ ] Other _____
- [ ] GA [ ] GN
- [ ] MA [ ] MN
- [ ] VOA [ ] ON

Solids, Turbidity
- [ ] Clear
- [x] Slightly turbid
- [ ] Turbid
- [ ] Floating solids
- [ ] Suspended solids
- [ ] Settleable solids
- [ ] Foams

Color
- [ ] Clear
- [x] Stained
- [ ] Opaque
- [ ] Colored _____
- [ ] Other _____

Surface Oils
- [x] None
- [ ] Sheen
- [ ] Globs
- [ ] Flecks
- [ ] Slick
- [ ] Other _____

Water Odors
- [x] Normal/None
- [ ] Sewage
- [ ] Petroleum
- [ ] Chemical
- [ ] Fishy
- [ ] Other _____

SEDIMENT

Sediment Samples Taken
- [x] None [ ] Other _____
- [ ] MS [ ] GS
- [ ] VOA [ ] OS/BNA

Oils
- [ ] Absent
- [ ] Slight
- [ ] Moderate
- [ ] Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? [ ] Yes [ ] No

Sediment Odors
- [x] Normal/None
- [ ] Sewage
- [ ] Petroleum
- [ ] Chemical
- [ ] Anaerobic
- [ ] Other _____

Deposits
- [x] None
- [ ] Sludge
- [ ] Sawdust
- [ ] Paper fiber
- [ ] Sand
- [ ] Relict shells
- [ ] Other _____

TONQUISH CREEK SITE #1 APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	10
Boulder	>10"				
Cobble	2.5"-10"		Muck-Mud	black, very fine organic (FPOM)	5
Gravel	0.1"-2.5"	25			
Sand	Gritty (course)	65	Other	SAND/GRAVEL	85
Silt	Gritty (fine)	5			
Clay	slick	5			

Proportion of Reach Represented by Stream Morphology Types

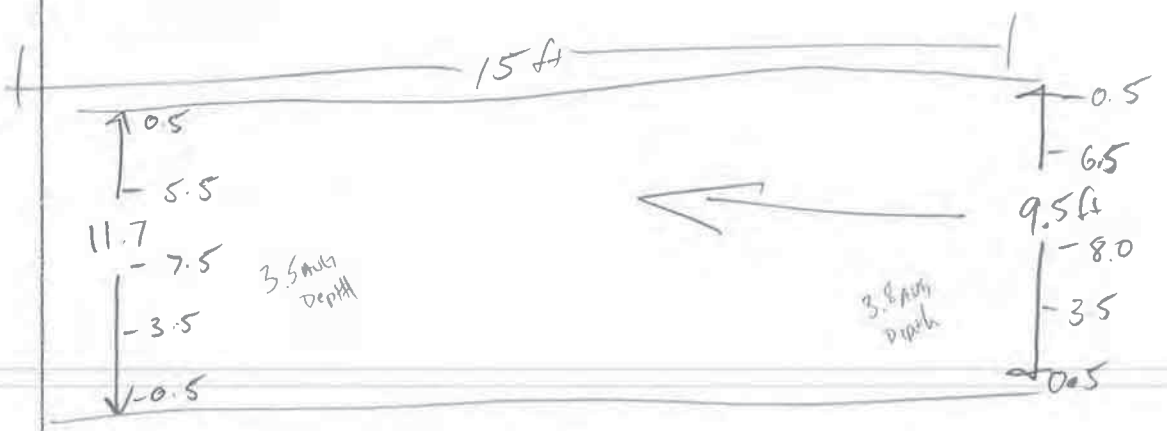
- ☐ Riffle 10 %
- ☐ Run 35 %
- ☐ Pool 65 %
- ☐ Depositional _____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☒	☐	☐
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☒	☐

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression



TIME #1 18 sec .83 ft/sec

#2 17 .88

#3 18 sec .83

.85 ft/sec Avg.

10.6 37.1

315 cfs

135

TONQUISH CREEK

MACROINVERTEBRATES

Station: ST# | SITE | Area Sampled: 2.10 x 15 Time Sampled: 20 MINS

PORIFERA
PLATYHELMINTHES
Turbellaria
NEMATOMORPHA
BRYOZOA
ANNELIDA
Hirudinea
Oligochaeta : (2)
ARTHROPODA
Crustacea
Amphipoda ☐ (8)
Decapoda ☒☒ : (23)
Isopoda
Arachnoidea
Hydracarina : (1)
Insecta
Ephemeroptera
Ametropodidae
Baetiscidae
Baetidae : (2)
Caenidae
Ephemerellidae
Ephemeridae
Heptageniidae
Isonychiidae
Leptophlebiidae
Metretopodidae
Polymitarcyidae
Potamanthidae
Siphlonuridae
Tricorythidae
Odonata
Anisoptera
Aeshnidae
Cordulegastridae
Corduliidae
Gomphidae
Libellulidae
Macromiidae
Zygoptera
Calopterygidae : (1)
Coenagrionidae ☒☒ :: (24)
Lestidae
Plecoptera
Capniidae
Chloroperlidae
Leuctridae
Nemouridae
Peltoperlidae
Perlidae
Perlodidae
Pteronarcyidae
Taeniopterygidae

Hemiptera
Belostomatidae
Corixidae : (3)
Gelastocoridae
Gerridae ☒☐ (17)
Mesoveliidae
Naucoridae
Nepidae
Notonectidae
Pleidae
Saldidae
Veliidae
Megaloptera
Corydalidae
Sialidae
Neuroptera
Sisyridae
Trichoptera
Brachycentridae
Glossosomatidae
Helicopsychidae
Hydropsychidae ☒☒☒ :: (34)
Hydroptilidae
Lepidostomatidae
Leptoceridae
Limnephilidae
Molannidae
Odontoceridae
Philopotamidae
Phryganeidae
Polycentropodidae
Psychomyiidae
Rhyacophilidae
Sericostomatidae
Uenoidae (*Neophylax*)
Lepidoptera
Noctuidae
Pyralidae
Coleoptera*
Dryopidae
Dytiscidae
Elmidae :: (4)
Gyrinidae (a)____ (l)____
Haliplidae (a)____ (l)____
Heteroceridae
Hydraenidae
Hydrophilidae
Lampyridae (a)____ (l)____
Noteridae (a)____ (l)____
Psephenidae(a)____ (l)____
Ptilodactylidae (a)____ (l)____
Scirtidae (a)____ (l)____

* record # of adults (a) or larvae (l) as indicated

Diptera
Athericidae
Ceratopogonidae : (2)
Chaoboridae ☒ ::
Chironomidae ☒☒☒☒☒☒☒☒☒☒ (114)
Culicidae
Dixidae
Dolichopodidae
Empididae
Ephydridae
Muscidae
Psychodidae
Ptychopteridae
Sciomyzidae
Simuliidae :: (4)
Stratiomyidae
Syrphidae
Tabanidae
Thaumaleidae
Tipulidae
MOLLUSCA
Gastropoda
Ancylidae ☒ :: (14)
Bithyniidae
Hydrobiidae
Lymnaeidae
Physidae
Planorbidae
Pleuroceridae
Pomatiopsidae
Valvatidae
Viviparidae
Pelecypoda
Dreissenidae
Pisidiidae
Sphaeriidae
Unionidae

Other taxa or comments:

UNKNOWN MAYFLY ☒ :

Appendix J (continued)

Location Sampled ST #1 SITE 1 Date 7/31/12

Length sampled 330ft Time sampled 45 MIN Gear type (circle): bps stream shocker boat shocker other

Species / length (in) SIZE CLASS	GRN SUNFISH	BGILL	CR CHUB	BLK NOSE DACE	FATHEAD MINNOW (VOUCHER)	* JN DAMTER			In
1									1
2	1 Deformity		||||| |||	|||||	11			2
3	11	1	||||| ||| || ☒ LI	|||||				3
4			11						4
5									5
6									6
7									7
8									8
9									9
10									10
11									11
12									12
13									13
14									14
15									15
16									16
17									17
18									18
19									19
20									20
>20									

For individuals >20" record actual length

Species / length (in)					FATHEAD				In
1									1
2					☑				2
3					•				3
4									4
5									5
6									6
7									7
8									8
9									9
10									10
11									11
12									12
13									13
14									14
15									15
16									16
17									17
18									18
19									19
20									20
>20									

Number of Anomalies 1 Number/Species of tagged/fin clipped fish

Description: ONE SMALL GRN SUNFISH W/ FACIAL ABNORMALITY (NO UPPER JAW)

Appendix J (continued)

FISH

Station Number: ST#1 SITE 1 - TONQUISH CREEK
Length Sampled (ft): 230 ft
Area Sampled (sq ft): 2300
Sampling Time: 45 mins
Probes: 1
Passes: 2
Gear: boat / ss / bps
Number of Anomalies: 1
Comments:

Petromyzontidae (Lampreys)		Sand shiner		**Gasterosteidae (Sticklebacks)**	
Sea lamprey (a/l)		Redfin shiner		Brook stickleback	
Silver lamprey (a/l)		Mimic shiner		Threespine stickleback	
Northern brook lamprey (a/l)		Brassy minnow		**Perchicthyidae (Temp. bass)**	
Chestnut lamprey (a/l)		Fathead minnow	28	*White bass	
American brook lamprey (a/l)		Bluntnose minnow		*White perch	
Lepisosteidae (Gars)		Suckermouth minnow		**Centrarchidae (Sunfishes)**	
*Spotted gar		Silverjaw minnow		*Rock bass	
*Longnose gar		Northern redbelly dace		*Green sunfish	3
Amiidae (Bowfins)		Southern redbelly dace		*Pumpkinseed	
*Bowfin		Finescale dace		*Warmouth	
Clupeidae (Herrings)		Blacknose dace	16	*Orangespotted sunfish	
*Alewife		Longnose dace		*Bluegill	1
*Gizzard shad		Redside dace		*Longear sunfish	
Salmonidae (Salmon/Trout)		*Pearl dace		*White crappie	
*Rainbow trout		**Cottidae (Sculpins)**		*Black crappie	
*Brown trout		Mottled sculpin		*Largemouth bass	
*Brook trout		Slimy sculpin		*Smallmouth bass	
*Coho		**Catostomidae (Suckers)**		**Percidae (Perch)**	
*Chinook		*Longnose sucker		N. sand darter	
Umbridae (Mudminnow)		*White sucker		Rainbow darter	
Central mudminnow		*Creek chubsucker		Iowa darter	
Esocidae (Pike)		*Lake chubsucker		Greenside darter	
*Grass pike		*Northern hog sucker		Fantail darter	
*Northern pike		*Spotted sucker		Orangethroat darter	
*Muskellunge		*Silver redhorse		Johnny darter	2
Cyprinidae (Minnows and Carp)		*River redhorse		Blackside darter	
Central stoneroller		*Black redhorse		Logperch	
Lake chub		*Golden redhorse		*Yellow perch	
*Goldfish		*Shorthead redhorse		*Walleye	
*Carp		*Greater redhorse		**Percopsidae (Trout-perch)**	
Bigeye chub		**Ictaluridae (Bullhead/Catfish)**		Trout-perch	
*Horneyhead chub		*Black bullhead		**Anguillidae (Eels)**	
*River chub		*Brown bullhead		*American eel	
*Creek chub	35	*Yellow bullhead		**Gadidae (Cod)**	
*Golden shiner		Stonecat		*Burbot	
Pugnose shiner		Tadpole madtom		**Sciaenidae (Drums)**	
Emerald shiner		Brindled madtom		*Freshwater drum	
Bigeye shiner		*Channel catfish		**Cobitidae (Loaches)**	
Ironcolor shiner		*Flathead catfish		Oriental weatherfish	
*Common shiner		**Aphredoderidae (Pirate perch)**		**Other family/species:**	
Central bigmouth shiner		Pirate perch			
Blackchin shiner		**Atherinidae (Silversides)**			
Blacknose shiner		Brook silverside			
Spottail shiner		**Cyprinodontidae (Topminnows)**			
Silver shiner		Banded killifish			
Rosyface shiner		Blackstripe topminnow			
Spotfin shiner				* = Measure length	

TONQUISH CREEK STREAM #1 ~420 LF ST1-561

Appendix J (continued)

HABITAT ASSESSMENT FIELD DATA SHEET - RIFFLE/RUN STREAMS

Habitat Parameter	Condition Category			
	Excellent	Good	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i e , logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 9	20 19 18 17 16	15 14 13 12 11	10 (9) 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE 16	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is <1 0 f/s, deep is >2 ft.).	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep).
SCORE 11	20 19 18 17 16	15 14 (13) 12 (11)	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 8	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
5a. Channel Flow Status - Maintained Flow Volume	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE 8	10 9	(8) 7 6	5 4 3	2 1 0
5b. Channel Flow Status – Flashiness	Vegetation along the stream bank is complete nearly to the waters edge. Little or no evidence of frequent changes in discharge and/or frequent high water events that scour stream bank vegetation. Channel retention devices (if present) stable and extending laterally across the stream channel.	Some evidence of bank scour approximately 4-8 inches above the waters surface. Channel retention devices (if present) mostly stable and extending partially into the active stream channel.	Bank scour evidence 9-18 inches above the waters surface. Channel retention devices (if present) tend to lay more against the stream bank rather than extending into the active channel.	Bank scour (>20 inches) along the stream channel. Channel retention devices are generally absent from the active channel and/or may exist as woody debris jams along the stream bank above the active channel.
SCORE 1	10 9	8 7 6	5 4 3	2 (1) 0

(53) PG TOTAL

Appendix J (continued)

Habitat Parameter	Condition Category			
	Excellent	Good	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging (greater than past 20 yr) may be present, but recent channelization is not present	Channelization is continuous but not recent (>5 years) Embankments without mature trees and dominated by grasses and shrubs	Stream reach has been recently channelized (<5 years) OR Banks shored with gabion, rock, cement or bare earth Instream habitat greatly altered or removed entirely Bank vegetation moderately dense to absent
SCORE 17	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE 2	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 (2) 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems <5% of bank affected	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars
SCORE 2 (LB)	Left Bank 10 9	8 7 6	5 4 3	(2) 1 0
SCORE 2 (RB)	Right Bank 10 9	8 7 6	5 4 3	(2) 1 0
9. Vegetative Protection (score each bank)	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the stream bank surfaces covered by native vegetation, but 1 class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining	50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining	Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 2 inches or less in average stubble height.
SCORE 1 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 (1) 0
SCORE 1 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 (1) 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >150 feet and dominated by native vegetation including trees, shrubs, or non-woody macrophytes or wetlands; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally Human activities (i e , parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 75-150 feet, human activities have impacted zone only minimally	Width of riparian zone 10-75 feet; human activities have impacted zone a great deal.	Width of riparian zone <10 feet; little or no riparian vegetation due to human activities
SCORE 9 (LB)	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
SCORE 8 (RB)	Right Bank 10 9	(8) 7 6	5 4 3	2 1 0

(53) PG 1 TOTAL
(42) PG 2 TOTAL

Total Score 95 TOTAL 2 PGS

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: ST#2 SITE #2 WILLOW CREEK

LOCATION (road crossing): Haggerty RD N of Ford RD

COUNTY/TOWNSHIP: WAYNE COUNTY / CANTON TWNSHP

T 2S R 8E S 12

LAT(dd) DMS: 42° 19' 33.7999 LONG (dd): 83° 26' 51.2039

RIVER BASIN: ROUGE RIVER

STORET #:

HUC CODE: 04090004 0202 ECOREGION: MAUMEE LAKE PLAINE

INVESTIGATOR(S): T. ESTREM, S. KOGGE, M. BERNINGER

DATE: 7/31/12

TIME: 1:15 AM (PM)

REASON FOR SURVEY
- [x] Targeted: comment _____
- [ ] Randomized: VSEC # _____
- VSEC description (eg. cold small) _____

WEATHER CONDITIONS

Current
- [x] Sunny
- [x] Partly Cloudy
- [ ] Cloudy
- [ ] Rainy

Has there been a significant rain in the last 7 days?
- [x] Yes [ ] No
- [ ] Don't Know

Air Temperature 85 °F

WATERSHED FEATURES

Predominant Surrounding Land Use
- [ ] Forest
- [x] Commercial
- [ ] Field/Pasture
- [x] Industrial
- [ ] Agricultural
- [ ] Residential
- [ ] Other _____

Local Watershed NPS Pollution
- [ ] No evidence
- [x] Some potential sources
- [ ] Obvious Sources

Local Watershed Erosion
- [ ] None
- [x] Moderate
- [ ] Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species
- [x] Trees [x] Shrubs
- [ ] Grasses [ ] Herbaceous

Species: SALEX, CORNUS, ACENEG, ACFSAS

Estimate buffer width (left) 100 ft (right) 35 ft

STREAM CHARACTERIZATION

Stream Subsystem
- [x] Perennial
- [ ] Intermittent
- [ ] Lake Outlet Influenced
- [ ] Dam influenced

Stream Origin
- [ ] Spring Fed
- [ ] Lake/Pond
- [ ] Swamp, Marsh, Bog
- [x] Mixture of origins
- [ ] Other _____

Stream Modifications
- [ ] None
- [ ] Dredged
- [ ] Canopy Removal
- [ ] Snagging
- [ ] Impounded
- [ ] Relocated
- [ ] Bank Stabilization
- [ ] Habitat Improvement

Stream Type
- [ ] Coldwater
- [x] Warmwater

INSTREAM FEATURES

Avg. Stream Width 15 ft Avg. Stream Depth 1 ft

Surface Velocity 0.1-00 ft/sec Est. Flow 6.00 cfs (at thalweg)

Est. Survey Reach Length 150 ft

Survey Reach Area 150X15 ft²

High Water Mark 2.5 ft

Canopy Cover: 50 % Shaded

AQUATIC VEGETATION
- [ ] Rooted emergent
- [ ] Rooted submergent
- [ ] Rooted floating
- [ ] Free Floating
- [ ] Floating algae
- [ ] Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? Yes [ ] No [x]

Dominant species present _____

WATER QUALITY

Temperature 75 °F

Water Samples Taken
- [x] None [ ] Other _____
- [ ] GA [ ] GN
- [ ] MA [ ] MN
- [ ] VOA [ ] ON

Solids, Turbidity
- [ ] Clear
- [ ] Slightly turbid
- [x] Turbid
- [x] Floating solids
- [ ] Suspended solids
- [x] Settleable solids
- [ ] Foams

Color
- [ ] Clear
- [ ] Stained
- [x] Opaque
- [ ] Colored _____
- [ ] Other _____

Surface Oils
- [ ] None
- [x] Sheen
- [ ] Globs
- [ ] Flecks
- [ ] Slick
- [ ] Other _____

Water Odors
- [ ] Normal/None
- [ ] Sewage
- [x] Petroleum
- [x] Chemical
- [ ] Fishy
- [ ] Other ✓

SEDIMENT

Sediment Samples Taken
- [x] None [ ] Other _____
- [ ] MS [ ] GS
- [ ] VOA [ ] OS/BNA

Looking at stones that are not deeply embedded, are the undersides black in color? [ ] Yes [ ] No

Oils
- [ ] Absent
- [ ] Slight
- [ ] Moderate
- [ ] Profuse

Sediment Odors
- [ ] Normal/None
- [ ] Sewage
- [x] Petroleum
- [x] Chemical
- [ ] Anaerobic
- [ ] Other _____

Deposits
- [x] None
- [ ] Sludge
- [ ] Sawdust
- [ ] Paper fiber
- [ ] Sand
- [ ] Relict shells
- [ ] Other _____

Willow Creek STREAM # 2 SITE 2

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	5
Boulder	>10"				
Cobble	2.5"-10"		Muck-Mud	black, very fine organic (FPOM)	90
Gravel	0.1"-2.5"				
Sand	Gritty (course)	5%	Other		5 TRASH
Silt	Gritty (fine)	45%			
Clay	slick Mock	50%			

Proportion of Reach Represented by Stream Morphology Types

- ☐ Riffle_____%
- ☐ Run_____%
- ☐ Pool_____%
- ☒ Depositional 100 %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☒	☐	☐
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☐	☒

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

PHOTOS 2165 – 2183 MB PENTAX CAMERA

- STREAM HAS LOTS OF GARBAGE & PETROLEUM SMELL/SHEEN WAS OBSERVED AT LOWER END OF REACH

VIRTUALLY NO FLOW ON MANY PARTS OF STREAM

Appendix J (continued)

Location Sampled ST#2 SITE #2 Date 7/31/12

Length sampled 150 Time sampled 30MINS Gear type (circle): (eps) stream shocker boat shocker other

Species / length (in) SIZE CLASS	COMSHINER	BLUNTNOSE MINNOW	LM BASS	JOHNNY DARTER	CRK CHUB	GRN SUNFISH			in
1									1
2				☒					2
3									3
4									4
5									5
6									6
7									7
8									8
9									9
10									10
11									11
12									12
13									13
14									14
15									15
16									16
17									17
18									18
19									19
20									20
>20									

For individuals >20" record actual length

Species / length (in)									in
1									1
2									2
3									3
4									4
5									5
6									6
7									7
8									8
9									9
10									10
11									11
12									12
13									13
14									14
15									15
16									16
17									17
18									18
19									19
20									20
>20									

Number of Anomalies_____ Number/Species of tagged/fin clipped fish_____

Description:

Appendix J (continued)

FISH

Station Number: STREAM #2 SITE #2
Length Sampled (ft): 150'±
Area Sampled (sq ft):
Sampling Time: 45 MINS # Probes: 1 # Passes: 2 Gear: boat / ss / bps
Number of Anomalies: 0
Comments: LOTS OF TRASH AND SHEEN IN CREEK

Petromyzontidae (Lampreys)
- Sea lamprey (a/l)
- Silver lamprey (a/l)
- Northern brook lamprey (a/l)
- Chestnut lamprey (a/l)
- American brook lamprey (a/l)

Lepisosteidae (Gars)
- *Spotted gar
- *Longnose gar

Amiidae (Bowfins)
- *Bowfin

Clupeidae (Herrings)
- *Alewife
- *Gizzard shad

Salmonidae (Salmon/Trout)
- *Rainbow trout
- *Brown trout
- *Brook trout
- *Coho
- *Chinook

Umbridae (Mudminnow)
- Central mudminnow

Esocidae (Pike)
- *Grass pike
- *Northern pike
- *Muskellunge

Cyprinidae (Minnows and Carp)
- Central stoneroller
- Lake chub
- *Goldfish
- *Carp
- Bigeye chub
- *Horneyhead chub
- *River chub
- *Creek chub: 5
- *Golden shiner
- Pugnose shiner
- Emerald shiner
- Bigeye shiner
- Ironcolor shiner
- *Common shiner: 1
- Central bigmouth shiner
- Blackchin shiner
- Blacknose shiner
- Spottail shiner
- Silver shiner
- Rosyface shiner
- Spotfin shiner
- Sand shiner
- Redfin shiner
- Mimic shiner
- Brassy minnow
- Fathead minnow
- Bluntnose minnow: 3
- Suckermouth minnow
- Silverjaw minnow
- Northern redbelly dace
- Southern redbelly dace
- Finescale dace
- Blacknose dace
- Longnose dace
- Redside dace
- *Pearl dace

Cottidae (Sculpins)
- Mottled sculpin
- Slimy sculpin

Catostomidae (Suckers)
- *Longnose sucker
- *White sucker
- *Creek chubsucker
- *Lake chubsucker
- *Northern hog sucker
- *Spotted sucker
- *Silver redhorse
- *River redhorse
- *Black redhorse
- *Golden redhorse
- *Shorthead redhorse
- *Greater redhorse

Ictaluridae (Bullhead/Catfish)
- *Black bullhead
- *Brown bullhead
- *Yellow bullhead
- Stonecat
- Tadpole madtom
- Brindled madtom
- *Channel catfish
- *Flathead catfish

Aphredoderidae (Pirate perch)
- Pirate perch

Atherinidae (Silversides)
- Brook silverside

Cyprinodontidae (Topminnows)
- Banded killifish
- Blackstripe topminnow

Gasterosteidae (Sticklebacks)
- Brook stickleback
- Threespine stickleback

Perchichthyidae (Temp. bass)
- *White bass
- *White perch

Centrarchidae (Sunfishes)
- *Rock bass
- *Green sunfish: 2
- *Pumpkinseed
- *Warmouth
- *Orangespotted sunfish
- *Bluegill
- *Longear sunfish
- *White crappie
- *Black crappie
- *Largemouth bass: 1
- *Smallmouth bass

Percidae (Perch)
- N. sand darter
- Rainbow darter
- Iowa darter
- Greenside darter
- Fantail darter
- Orangethroat darter
- Johnny darter: 11
- Blackside darter
- Logperch
- *Yellow perch
- *Walleye

Percopsidae (Trout-perch)
- Trout-perch

Anguillidae (Eels)
- *American eel

Gadidae (Cod)
- *Burbot

Sciaenidae (Drums)
- *Freshwater drum

Cobitidae (Loaches)
- Oriental weatherfish

Other family/species:
- _____
- _____
- _____
- _____

* = Measure length

STREAM #2 SITE #2

MACROINVERTEBRATES

Station: Area Sampled: 150x15 Time Sampled: 1:15 (45 min)

PORIFERA
PLATYHELMINTHES
Turbellaria : (1)
NEMATOMORPHA
BRYOZOA
ANNELIDA
Hirudinea :: (4)
Oligochaeta :: (6)
ARTHROPODA
Crustacea
Amphipoda : (3)
Decapoda LI (7)
Isopoda
Arachnoidea
Hydracarina
Insecta
Ephemeroptera
Ametropodidae
Baetiscidae
Baetidae
Caenidae
Ephemerellidae
Ephemeridae
Heptageniidae
Isonychiidae
Leptophlebiidae
Metretopodidae
Polymitarcyidae
Potamanthidae
Siphlonuridae
Tricorythidae
Odonata
Anisoptera
Aeshnidae
Cordulegastridae
Corduliidae
Gomphidae ☒ (9)
Libellulidae ☒ : (3)
Macromiidae
Zygoptera
Calopterygidae
Coenagrionidae ☒ : (12)
Lestidae
Plecoptera
Capniidae
Chloroperlidae
Leuctridae
Nemouridae
Peltoperlidae
Perlidae
Perlodidae
Pteronarcyidae
Taeniopterygidae

Hemiptera
Belostomatidae
Corixidae
Gelastocoridae
Gerridae
Mesoveliidae
Naucoridae
Nepidae
Notonectidae
Pleidae
Saldidae
Veliidae
Megaloptera
Corydalidae
Sialidae
Neuroptera
Sisyridae
Trichoptera
Brachycentridae
Glossosomatidae
Helicopsychidae
Hydropsychidae
Hydroptilidae
Lepidostomatidae
Leptoceridae
Limnephilidae
Molannidae
Odontoceridae
Philopotamidae
Phryganeidae
Polycentropodidae
Psychomyidae
Rhyacophilidae
Sericostomatidae
Uenoidae (*Neophylax*)
Lepidoptera
Noctuidae
Pyralidae
Coleoptera*
Dryopidae
Dytiscidae : (2)
Elmidae
Gyrinidae (a)___ (l)___
Haliplidae (a)___ (l)___
Heteroceridae
Hydraenidae
Hydrophilidae
Lampyridae (a)___ (l)___
Noteridae (a)___ (l)___
Psephenidae(a)___ (l)___
Ptilodactylidae (a)___ (l)___
Scirtidae (a)___ (l)___

* record # of adults (a) or larvae (l) as indicated

Diptera
Athericidae
Ceratopogonidae
Chaoboridae
Chironomidae ☒ ☒ ☒ ☒ ☒ ; (52)
Culicidae
Dixidae
Dolichopodidae
Empididae
Ephydridae
Muscidae
Psychodidae
Ptychopteridae
Sciomyzidae
Simuliidae
Stratiomyidae
Syrphidae
Tabanidae
Thaumaleidae
Tipulidae
MOLLUSCA
Gastropoda
Ancylidae
Bithyniidae
Hydrobiidae
Lymnaeidae
Physidae ☒ ☒ ☒ ☒ ☒ ☒ (49)
Planorbidae
Pleuroceridae
Pomatiopsidae
Valvatidae
Viviparidae • (1)
Pelecypoda
Dreissenidae
Pisidiidae
Sphaeriidae ☒ ☒ LI (28)
Unionidae

Other taxa or comments:

CORBICULOS LI (7)

- SAMPLED ENTIRE FISHERIES REACH

STREAM #2 SITE 2

Appendix J (continued)

HABITAT ASSESSMENT FIELD DATA SHEET - GLIDE/POOL STREAMS

Habitat Parameter	Condition Category			
	Excellent	Good	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale)	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 2	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 (2) 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE 6	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE 1	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 (1) 0
4. Sediment Deposition	Little or no enlargement of island or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 (0)
5a. Channel Flow Status - Maintained Flow Volume	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE 6	10 9	8 7 (6)	5 4 3	2 1 0
5b. Channel Flow Status – Flashiness	Vegetation along the stream bank is complete nearly to the waters edge Little or no evidence of frequent changes in discharge and/or frequent high water events that scours stream bank vegetation Large woody debris (if present) stable and extending laterally across the stream channel.	Some evidence of bank scour approximately 4-8 inches above the waters surface. Large woody debris (if present) mostly stable and extending partially into the active stream channel.	Bank scour evidence 9-18 inches above the waters surface Large woody debris (if present) tend to lay more against the stream bank rather than extending into the active channel.	Bank scour (>20 inches) along the stream channel. Large woody debris are generally absent from the active channel and/or may exist as woody debris jams along the stream bank above the active channel.
SCORE 4	10 9	8 7 6	5 (4) 3	2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization is continuous but not recent (>5 years) Embankments without mature trees and dominated by grasses and shrubs.	Stream reach has been recently channelized (<5 years) OR Banks shored with gabion, rock, cement or bare earth Instream habitat greatly altered or removed entirely Bank vegetation moderately dense to absent.
SCORE 6	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0

(25)

STREAM 2 SITE#2

Appendix J (continued)

Habitat Parameter	Condition Category			
	Excellent	**Good**	**Marginal**	**Poor**
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas This parameter is not easily rated in these areas).	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line. (Note: lack of sinuosity may be due to channelization)	Channel straight; waterway has been channelized for a long distance.
SCORE 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 (0)
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars
SCORE 6 (LB)	Left Bank 10 9	8 7 (6)	5 4 3	2 1 0
SCORE 7 (RB)	Right Bank 10 9	8 (7) 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but 1 class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation has been removed to 2 inches or less in average stubble height.
SCORE 6 (LB)	Left Bank 10 9	8 7 (6)	5 4 3	2 1 0
SCORE 6 (RB)	Right Bank 10 9	8 7 (6)	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >150 feet and dominated by native vegetation including trees, shrubs, or non-woody macrophytes or wetlands; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally Human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 75-150 feet; human activities have impacted zone only minimally.	Width of riparian zone 10-75 feet; human activities have impacted zone a great deal	Width of riparian zone <10 feet; little or no riparian vegetation due to human activities.
SCORE 9 (LB)	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
SCORE 4 (RB)	Right Bank 10	8 7 6	5 (4) 3	2 1 0

25
1
84
25
15

38

(25) TOTAL FROM 1ST PAGE

Total Score 63

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: STREAM 3 SITE 3 Fellows Creek

LOCATION (road crossing): Canterbury Dr. and Haggerty Rd.

COUNTY/TOWNSHIP: WAYNE COUNTY / CANTON TOWNSHIP

T: 2S R: 8E S:

LAT(dd): 42° 18' 47.5852 LONG (dd): 83° 26' 45.5682

RIVER BASIN: ROUGE RIVER

STORET #:

HUC CODE: 04090004 0202 ECOREGION: MAUMEE LAKE PLAINS

INVESTIGATOR(S): M. BERNINGER, S. KOGGE, T ESTROM

DATE: 7/3/12

TIME: 3:50 AM (PM)

REASON FOR SURVEY
- [x] Targeted: comment _____
- [ ] Randomized: VSEC # _____
- VSEC description (eg. cold small) _____

WEATHER CONDITIONS

Current
- [x] Sunny
- [x] Partly Cloudy
- [ ] Cloudy
- [ ] Rainy

Has there been a significant rain in the last 7 days?
- [ ] Yes [ ] No
- [ ] Don't Know

Air Temperature _____ °F

WATERSHED FEATURES

Predominant Surrounding Land Use
- [ ] Forest
- [ ] Commercial
- [ ] Field/Pasture
- [ ] Industrial
- [ ] Agricultural
- [x] Residential
- [ ] Other _____

Local Watershed NPS Pollution
- [ ] No evidence
- [x] Some potential sources
- [ ] Obvious Sources

Local Watershed Erosion
- [x] None
- [ ] Moderate
- [ ] Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species
- [x] Trees [x] Shrubs
- [x] Grasses [ ] Herbaceous

Species: SALIX, ACENEG, ACCSAI

Estimate buffer width (left) 25 ft (right) 50 ft

STREAM CHARACTERIZATION

Stream Subsystem
- [x] Perennial
- [ ] Intermittent
- [ ] Lake Outlet Influenced
- [ ] Dam Influenced

Stream Origin
- [ ] Spring Fed
- [ ] Lake/Pond
- [ ] Swamp, Marsh, Bog
- [x] Mixture of origins
- [ ] Other _____

Stream Modifications
- [ ] None
- [ ] Dredged
- [ ] Canopy Removal
- [ ] Snagging
- [ ] Impounded
- [ ] Relocated
- [ ] Bank Stabilization
- [ ] Habitat Improvement

Stream Type
- [ ] Coldwater
- [x] Warmwater

INSTREAM FEATURES

Avg. Stream Width 16 ft Avg. Stream Depth .6 ft

Surface Velocity _____ ft/sec (at thalweg) Est. Flow 40 cfs

Est Survey Reach Length 160 ft

Survey Reach Area 160 x .5 ft² High Water Mark 1.5 ft

Canopy Cover: 45 % Shaded

AQUATIC VEGETATION
- [ ] Rooted emergent
- [ ] Rooted submergent
- [ ] Rooted floating
- [ ] Free Floating
- [ ] Floating algae
- [ ] Attached algae

Portion of the reach with aquatic vegetation _____ %

Nuisance aquatic plants or slimes present? Yes [ ] No [ ]

Dominant species present _____

WATER QUALITY

Temperature 12 °F

Water Samples Taken
- [x] None [ ] Other _____
- [ ] GA [ ] GN
- [ ] MA [ ] MN
- [ ] VOA [ ] ON

Solids, Turbidity
- [x] Clear
- [ ] Slightly turbid
- [ ] Turbid
- [ ] Floating solids
- [ ] Suspended solids
- [ ] Settleable solids
- [ ] Foams

Color
- [x] Clear
- [ ] Stained
- [ ] Opaque
- [ ] Colored _____
- [ ] Other _____

Surface Oils
- [x] None
- [ ] Sheen
- [ ] Globs
- [ ] Flecks
- [ ] Slick
- [ ] Other _____

Water Odors
- [x] Normal/None
- [ ] Sewage
- [ ] Petroleum
- [ ] Chemical
- [ ] Fishy
- [ ] Other _____

SEDIMENT

Sediment Samples Taken
- [x] None [ ] Other _____
- [ ] MS [ ] GS
- [ ] VOA [ ] OS/BNA

Oils
- [x] Absent
- [ ] Slight
- [ ] Moderate
- [ ] Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? [ ] Yes [ ] No

Sediment Odors
- [x] Normal/None
- [ ] Sewage
- [ ] Petroleum
- [ ] Chemical
- [ ] Anaerobic
- [ ] Other _____

Deposits
- [x] None
- [ ] Sludge
- [ ] Sawdust
- [ ] Paper fiber
- [ ] Sand
- [ ] Relict shells
- [ ] Other _____

STREAM 3 SITE #3 Fellow's Creek

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	5%
Boulder	>10"	2%			
Cobble	2.5"-10"	5	Muck-Mud	black, very fine organic (FPOM)	5%
Gravel	0.1"-2.5"	3			
Sand	Gritty (course)	90	Other		
Silt	Gritty (fine)				
Clay	slick				

Proportion of Reach Represented by Stream Morphology Types

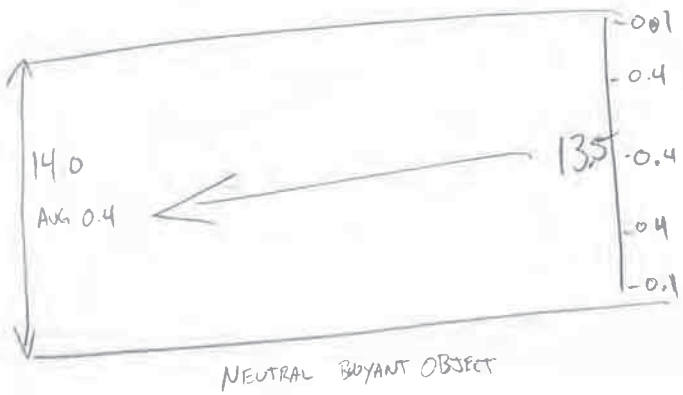
- ☐ Riffle_____%
- ☒ Run 100 %
- ☐ Pool_____%
- ☐ Depositional_____%

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☒	☐	☐
Large woody debris	☐	☐	☐	☒
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☐	☒

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression



TIME #1 40 SEC

#2 42

#3 41

Appendix J (continued)

Location Sampled STREAM #3 SITE 3 Date 7/31/12

Length sampled _____ Time sampled _____ Gear type (circle): bps stream shocker boat shocker other

Species / length (in)	Johnny DARTER	ORK CHUB	COM. SHINER	GRN SUNFISH	LGM BASS				In
1									1
2	⊠⊠⊠⊠⊠⊠⊠		:: (3)						2
3	:: (14)	· (1)		· (1)	· (1)				3
4									4
5									5
6									6
7									7
8									8
9									9
10									10
11									11
12									12
13									13
14									14
15									15
16									16
17									17
18									18
19									19
20									20
>20									

For individuals >20" record actual length

Species / length (in)									In
1									1
2									2
3									3
4									4
5									5
6									6
7									7
8									8
9									9
10									10
11									11
12									12
13									13
14									14
15									15
16									16
17									17
18									18
19									19
20									20
>20									

Number of Anomalies_____ Number/Species of tagged/fin clipped fish_____

Description:

Appendix J (continued)

FISH

Station Number: STREAM 3 SITE #3
Length Sampled (ft): 160ft
Area Sampled (sq ft):
Sampling Time: 45 MINS # Probes: 1
Passes: 2
Gear: boat / ~~ss~~ bps

Number of Anomalies:
Comments:

Petromyzontidae (Lampreys)
- Sea lamprey (a/l) ____
- Silver lamprey (a/l) ____
- Northern brook lamprey (a/l) ____
- Chestnut lamprey (a/l) ____
- American brook lamprey (a/l) ____

Lepisosteidae (Gars)
- *Spotted gar ____
- *Longnose gar ____

Amiidae (Bowfins)
- *Bowfin ____

Clupeidae (Herrings)
- *Alewife ____
- *Gizzard shad ____

Salmonidae (Salmon/Trout)
- *Rainbow trout ____
- *Brown trout ____
- *Brook trout ____
- *Coho ____
- *Chinook ____

Umbridae (Mudminnow)
- Central mudminnow ____

Esocidae (Pike)
- *Grass pike ____
- *Northern pike ____
- *Muskellunge ____

Cyprinidae (Minnows and Carp)
- Central stoneroller ____
- Lake chub ____
- *Goldfish ____
- *Carp ____
- Bigeye chub ____
- *Horneyhead chub ____
- *River chub ____
- *Creek chub ____
- *Golden shiner ____
- Pugnose shiner ____
- Emerald shiner ____
- Bigeye shiner ____
- Ironcolor shiner ____
- *Common shiner 3
- Central bigmouth shiner ____
- Blackchin shiner ____
- Blacknose shiner ____
- Spottail shiner ____
- Silver shiner ____
- Rosyface shiner ____
- Spotfin shiner ____
- Sand shiner ____
- Redfin shiner ____
- Mimic shiner ____
- Brassy minnow ____
- Fathead minnow ____
- Bluntnose minnow ____
- Suckermouth minnow ____
- Silverjaw minnow ____
- Northern redbelly dace ____
- Southern redbelly dace ____
- Finescale dace ____
- Blacknose dace ____
- Longnose dace ____
- Redside dace ____
- *Pearl dace ____

Cottidae (Sculpins)
- Mottled sculpin ____
- Slimy sculpin ____

Catostomidae (Suckers)
- *Longnose sucker ____
- *White sucker ____
- *Creek chubsucker ____
- *Lake chubsucker ____
- *Northern hog sucker ____
- *Spotted sucker ____
- *Silver redhorse ____
- *River redhorse ____
- *Black redhorse ____
- *Golden redhorse ____
- *Shorthead redhorse ____
- *Greater redhorse ____

Ictaluridae (Bullhead/Catfish)
- *Black bullhead ____
- *Brown bullhead ____
- *Yellow bullhead ____
- Stonecat ____
- Tadpole madtom ____
- Brindled madtom ____
- *Channel catfish ____
- *Flathead catfish ____

Aphredoderidae (Pirate perch)
- Pirate perch ____

Atherinidae (Silversides)
- Brook silverside ____

Cyprinodontidae (Topminnows)
- Banded killifish ____
- Blackstripe topminnow ____

Gasterosteidae (Sticklebacks)
- Brook stickleback ____
- Threespine stickleback ____

Perchichthyidae (Temp. bass)
- *White bass ____
- *White perch ____

Centrarchidae (Sunfishes)
- *Rock bass ____
- *Green sunfish 1
- *Pumpkinseed ____
- *Warmouth ____
- *Orangespotted sunfish ____
- *Bluegill ____
- *Longear sunfish ____
- *White crappie ____
- *Black crappie ____
- *Largemouth bass 1
- *Smallmouth bass ____

Percidae (Perch)
- N. sand darter ____
- Rainbow darter ____
- Iowa darter ____
- Greenside darter ____
- Fantail darter ____
- Orangethroat darter ____
- Johnny darter 74
- Blackside darter ____
- Logperch ____
- *Yellow perch ____
- *Walleye ____

Percopsidae (Trout-perch)
- Trout-perch ____

Anguillidae (Eels)
- *American eel ____

Gadidae (Cod)
- *Burbot ____

Sciaenidae (Drums)
- *Freshwater drum ____

Cobitidae (Loaches)
- Oriental weatherfish ____

Other family/species:
- _____ ____
- _____ ____
- _____ ____
- _____ ____

* = Measure length

MACROINVERTEBRATES

Station: STREAM #3 SITE 3 Area Sampled: Time Sampled: 45 mins

PORIFERA
PLATYHELMINTHES
Turbellaria :: (9)
NEMATOMORPHA
BRYOZOA
ANNELIDA
Hirudinea : (2)
Oligochaeta • (1)
ARTHROPODA
Crustacea
Amphipoda
Decapoda ☒ (10)
Isopoda ☒ (7)
Arachnoidea
Hydracarina
Insecta
Ephemeroptera
Ametropodidae
Baetiscidae
Baetidae
Caenidae
Ephemerellidae
Ephemeridae
Heptageniidae
Isonychiidae
Leptophlebiidae
Metretopodidae
Polymitarcyidae
Potamanthidae
Siphlonuridae
Tricorythidae
Odonata
Anisoptera
Aeshnidae • (1)
Cordulegastridae
Corduliidae
Gomphidae
Libellulidae
Macromiidae
Zygoptera
Calopterygidae
Coenagrionidae
Lestidae
Plecoptera
Capniidae
Chloroperlidae
Leuctridae
Nemouridae
Peltoperlidae
Perlidae
Perlodidae
Pteronarcyidae
Taeniopterygidae

Hemiptera
Belostomatidae
Corixidae ☒ (9)
Gelastocoridae
Gerridae
Mesoveliidae
Naucoridae
Nepidae
Notonectidae :: (4)
Pleidae
Saldidae
Veliidae
Megaloptera
Corydalidae
Sialidae
Neuroptera
Sisyridae
Trichoptera
Brachycentridae
Glossosomatidae
Helicopsychidae
Hydropsychidae
Hydroptilidae
Lepidostomatidae
Leptoceridae
Limnephilidae
Molannidae
Odontoceridae
Philopotamidae
Phryganeidae
Polycentropodidae
Psychomyiidae
Rhyacophilidae
Sericostomatidae
Uenoidae (*Neophylax*)
Lepidoptera
Noctuidae
Pyralidae
Coleoptera*
Dryopidae
Dytiscidae
Elmidae
Gyrinidae (a)____ (l)____
Haliplidae (a)____ (l)____
Heteroceridae
Hydraenidae
Hydrophilidae
Lampyridae (a)____ (l)____
Noteridae (a)____ (l)____
Psephenidae(a)____ (l) ☒☒☒☐ (48)
Ptilodactylidae (a)____ (l)____
Scirtidae (a)____ (l)____

* record # of adults (a) or larvae (l) as indicated

Diptera
Athericidae
Ceratopogonidae
Chaoboridae
Chironomidae ☒☒☒☒: (42)
Culicidae
Dixidae
Dolichopodidae
Empididae
Ephydridae
Muscidae
Psychodidae
Ptychopteridae
Sciomyzidae
Simuliidae
Stratiomyidae
Syrphidae
Tabanidae
Thaumaleidae
Tipulidae
MOLLUSCA
Gastropoda
Ancylidae :: (4)
Bithyniidae
Hydrobiidae
Lymnaeidae
Physidae ☒: (12)
Planorbidae
Pleuroceridae
Pomatiopsidae
Valvatidae
Viviparidae
Pelecypoda
Dreissenidae
Pisidiidae
Sphaeriidae ☒☐ (17)
Unionidae

Other taxa or comments:

STREAM #3 SITE 3 7/31/12

Appendix J (continued)

HABITAT ASSESSMENT FIELD DATA SHEET - RIFFLE/RUN STREAMS

Habitat Parameter	Condition Category			
	Excellent	Good	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e , logs/snags that are not new fall and not transient)	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale)	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking
SCORE 3	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 (3) 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment
SCORE 7	20 19 18 17 16	15 14 13 12 11	10 9 8 (7) 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow) (Slow is <1 0 f/s, deep is >2 ft.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low)	Dominated by 1 velocity/depth regime (usually slow-deep)
SCORE 2	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 (2) 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 5-30% of the bottom affected; slight deposition in pools	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition
SCORE 2	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 (2) 1 0
5a. Channel Flow Status - Maintained Flow Volume	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed	Very little water in channel and mostly present as standing pools
SCORE 7	10 9	8 (7) 6	5 4 3	2 1 0
5b. Channel Flow Status – Flashiness	Vegetation along the stream bank is complete nearly to the waters edge Little or no evidence of frequent changes in discharge and/or frequent high water events that scour stream bank vegetation Channel retention devices (if present) stable and extending laterally across the stream channel	Some evidence of bank scour approximately 4-8 inches above the waters surface Channel retention devices (if present) mostly stable and extending partially into the active stream channel	Bank scour evidence 9-18 inches above the waters surface Channel retention devices (if present) tend to lay more against the stream bank rather than extending into the active channel	Bank scour (>20 inches) along the stream channel Channel retention devices are generally absent from the active channel and/or may exist as woody debris jams along the stream bank above the active channel
SCORE 1	10 9	8 7 6	5 4 3	2 (1) 0

(22)

Habitat Parameter	Condition Category			
	Excellent	Good	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging (greater than past 20 yr) may be present, but recent channelization is not present	Channelization is continuous but not recent (>5 years). Embankments without mature trees and dominated by grasses and shrubs	Stream reach has been recently channelized (<5 years). OR Banks shored with gabion, rock, cement or bare earth. Instream habitat greatly altered or removed entirely. Bank vegetation moderately dense to absent.
SCORE 6	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 (0)
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE 4 (LB)	Left Bank 10 9	8 7 6	5 (4) 3	2 1 0
SCORE 4 (RB)	Right Bank 10 9	8 7 6	5 (4) 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the stream bank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the stream bank surfaces covered by native vegetation, but 1 class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the stream bank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the stream bank surfaces covered by vegetation; disruption of stream bank vegetation is very high; vegetation has been removed to 2 inches or less in average stubble height.
SCORE 8 (LB)	Left Bank 10 9	(8) 7 6	5 4 3	2 1 0
SCORE 8 (RB)	Right Bank 10 9	(8) 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >150 feet and dominated by native vegetation including trees, shrubs, or non-woody macrophytes or wetlands; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally. Human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 75-150 feet; human activities have impacted zone only minimally.	Width of riparian zone 10-75 feet; human activities have impacted zone a great deal.	Width of riparian zone <10 feet; little or no riparian vegetation due to human activities.
SCORE 3 (LB)	Left Bank 10 9	8 7 6	5 4 (3)	2 1 0
SCORE 4 (RB)	Right Bank 10 9	8 7 6	5 (4) 3	2 1 0

13
10
57

(22) TOTAL FROM PAGE 1

Total Score 59

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: STRM #3 ST. #4 Fellows Creek

LOCATION (road crossing): Windchase Blvd. south of Cherry Hill Rd

COUNTY/TOWNSHIP: WAYNE COUNTY / CANTON TOWNSHIP

T: 2S R: 8E S:

LAT(dd): LONG (dd):

RIVER BASIN: ROUGE RIVER

STORET #:

HUC CODE: 04090004020Z ECOREGION: MAUMEE LAKE PLAINS

INVESTIGATOR(S): M BERNINGER, S. KOGGE, T. ESTROM

DATE: 8-01-2012

TIME: 8:36 (AM) PM

REASON FOR SURVEY
- ☐ Targeted: comment
- ☒ Randomized: VSEC #
- VSEC description (eg. cold small)

WEATHER CONDITIONS

Current
- ☒ Sunny
- ☐ Partly Cloudy
- ☐ Cloudy
- ☐ Rainy

Has there been a significant rain in the last 7 days?
- ☒ Yes ☐ No
- ☐ Don't Know

Air Temperature 72 °F

WATERSHED FEATURES

Predominant Surrounding Land Use
- ☐ Forest
- ☒ Commercial
- ☐ Field/Pasture
- ☐ Industrial
- ☐ Agricultural
- ☒ Residential
- ☐ Other

Local Watershed NPS Pollution
- ☐ No evidence
- ☐ Some potential sources
- ☒ Obvious Sources

Local Watershed Erosion
- ☐ None
- ☒ Moderate
- ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species
- ☒ Trees ☒ Shrubs
- ☒ Grasses ☐ Herbaceous

Species: reed canary grass, common buckthorn, box elder, cottonwood

Estimate buffer width (left) 125 ft (right) 125 ft

STREAM CHARACTERIZATION

Stream Subsystem
- ☒ Perennial
- ☐ Intermittent
- ☐ Lake Outlet Influenced
- ☐ Dam Influenced

Stream Origin
- ☐ Spring Fed
- ☐ Lake/Pond
- ☐ Swamp, Marsh, Bog
- ☒ Mixture of origins
- ☐ Other

Stream Modifications
- ☒ None
- ☐ Dredged
- ☐ Canopy Removal
- ☐ Snagging
- ☐ Impounded
- ☐ Relocated
- ☐ Bank Stabilization
- ☐ Habitat Improvement

Stream Type
- ☐ Coldwater
- ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 14 ft Avg. Stream Depth .8 ft

Surface Velocity ft/sec (at thalweg) Est. Flow 55 cfs

Est. Survey Reach Length 140 ft

Survey Reach Area ft² High Water Mark 3.5 ft

Canopy Cover: 85 % Shaded

AQUATIC VEGETATION
- ☐ Rooted emergent
- ☐ Rooted submergent
- ☐ Rooted floating
- ☐ Free Floating
- ☐ Floating algae NONE
- ☐ Attached algae

Portion of the reach with aquatic vegetation < 1 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present

WATER QUALITY

Temperature 70 °F

Water Samples Taken
- ☒ None ☐ Other
- ☐ GA ☐ GN
- ☐ MA ☐ MN
- ☐ VOA ☐ ON

Solids, Turbidity
- ☐ Clear
- ☐ Slightly turbid
- ☒ Turbid (Very)
- ☐ Floating solids
- ☒ Suspended solids
- ☒ Settleable solids
- ☒ Foams

Color
- ☐ Clear
- ☐ Stained
- ☐ Opaque
- ☒ Colored Gray
- ☐ Other

Surface Oils
- ☐ None
- ☐ Sheen
- ☐ Globs
- ☐ Flecks
- ☐ Slick
- ☐ Other

Water Odors
- ☐ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Fishy
- ☐ Other

SEDIMENT

Sediment Samples Taken
- ☒ None ☐ Other
- ☐ MS ☐ GS
- ☐ VOA ☐ OS/BNA

Oils
- ☒ Absent
- ☐ Slight
- ☐ Moderate
- ☐ Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? ☒ Yes ☐ No

Sediment Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Anaerobic
- ☐ Other

Deposits
- ☒ None
- ☐ Sludge
- ☐ Sawdust
- ☐ Paper fiber
- ☐ Sand
- ☐ Relict shells
- ☐ Other

Fellow's Creek

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	20
Boulder	>10"	5			
Cobble	2.5"-10"	10	Muck-Mud	black, very fine organic (FPOM)	20
Gravel	0.1"-2.5"	10			
Sand	Gritty (course)	25	Other		
Silt	Gritty (fine)	25			
Clay	slick	25			

Proportion of Reach Represented by Stream Morphology Types

- ☐ Riffle_____%
- ☒ Run 15 %
- ☐ Pool_____%
- ☒ Depositional 85 %

Additional Structure Available for Macroinvertebrate Colonization

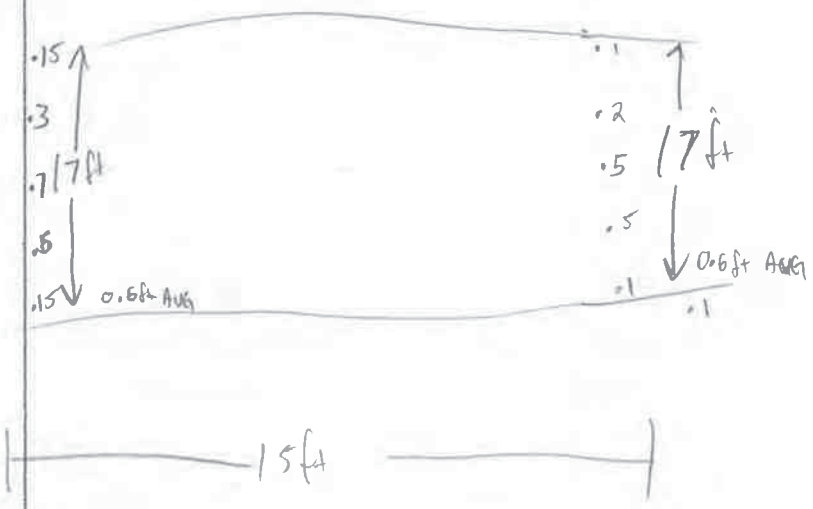
	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☒	☐	☐
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☐	☒

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

STREAM #3 8/1/12

SITE #4



TIME #1 60 SEC's

55 SEC

52 SECS

STREAM #3

Appendix J (continued)

Location Sampled ST. 4 u/s of culvert/roadcrossing 9:40 START TIME Date 8-1-2012

Length sampled 140ft Time sampled 45 min Gear type (circle): bps stream shocker boat shocker other

Species / length (in)	CRK CHUB sizclass	COM. SHINER	GRN SUNFISH	CENTRL STONEROLLER	JOHN DARTER	WHITE SUCKER	MTLD SCULPIN	CENTRL MUDMINNOW	In
1			::						1
2	⊠⊠⊡ (51)	:: (6)	⊡		⊠⊠⊠⊠⊡	⊡			2
3	⊠⊡:	·	⊠⊡ (31)	: (2)	⊠⊠⊠⊡	⊡: (12)	·	·	3
4	::	·			(3)		(1)	(1)	4
5	:		:						5
6	:								6
7	·								7
8									8
9									9
10									10
11									11
12									12
13									13
14									14
15									15
16									16
17									17
18									18
19									19
20									20
>20									

For individuals >20" record actual length

Species / length (in)	BLUEGILL				JOHN DARTER				In
1									1
2					⊠⊠⊡				2
3	· (1)				(117)				3
4									4
5									5
6									6
7									7
8									8
9									9
10									10
11									11
12									12
13									13
14									14
15									15
16									16
17									17
18									18
19									19
20									20
>20									

Number of Anomalies_____ Number/Species of tagged/fin clipped fish_____

Description:

Appendix J (continued)

FISH

Station Number: STREAM #3 STATION 4
Length Sampled (ft): 140
Area Sampled (sq ft):
Sampling Time: 45 MIN # Probes: 1 # Passes: 2
Gear: boat / ss (bps)
Number of Anomalies:
Comments:

Petromyzontidae (Lampreys)		Sand shiner		**Gasterosteidae (Sticklebacks)**	
Sea lamprey (a/l)		Redfin shiner		Brook stickleback	
Silver lamprey (a/l)		Mimic shiner		Threespine stickleback	
Northern brook lamprey (a/l)		Brassy minnow		**Perchicthyidae (Temp. bass)**	
Chestnut lamprey (a/l)		Fathead minnow		*White bass	
American brook lamprey (a/l)		Bluntnose minnow		*White perch	
Lepisosteidae (Gars)		Suckermouth minnow		**Centrarchidae (Sunfishes)**	
*Spotted gar		Silverjaw minnow		*Rock bass	
*Longnose gar		Northern redbelly dace		*Green sunfish	(31)
Amiidae (Bowfins)		Southern redbelly dace		*Pumpkinseed	
*Bowfin		Finescale dace		*Warmouth	
Clupeidae (Herrings)		Blacknose dace		*Orangespotted sunfish	
*Alewife		Longnose dace		*Bluegill	(1)
*Gizzard shad		Redside dace		*Longear sunfish	
Salmonidae (Salmon/Trout)		*Pearl dace		*White crappie	
*Rainbow trout		**Cottidae (Sculpins)**		*Black crappie	
*Brown trout		Mottled sculpin	(1)	*Largemouth bass	
*Brook trout		Slimy sculpin		*Smallmouth bass	
*Coho		**Catostomidae (Suckers)**		**Percidae (Perch)**	
*Chinook		*Longnose sucker		N. sand darter	
Umbridae (Mudminnow)		*White sucker	(12)	Rainbow darter	
Central mudminnow	(1)	*Creek chubsucker		Iowa darter	
Esocidae (Pike)		*Lake chubsucker		Greenside darter	
*Grass pike		*Northern hog sucker		Fantail darter	
*Northern pike		*Spotted sucker		Orangethroat darter	
*Muskellunge		*Silver redhorse		Johnny darter	(117)
Cyprinidae (Minnows and Carp)		*River redhorse		Blackside darter	
Central stoneroller	(2)	*Black redhorse		Logperch	
Lake chub		*Golden redhorse		*Yellow perch	
*Goldfish		*Shorthead redhorse		*Walleye	
*Carp		*Greater redhorse		**Percopsidae (Trout-perch)**	
Bigeye chub		**Ictaluridae (Bullhead/Catfish)**		Trout-perch	
*Horneyhead chub		*Black bullhead		**Anguillidae (Eels)**	
*River chub		*Brown bullhead		*American eel	
*Creek chub	(51)	*Yellow bullhead		**Gadidae (Cod)**	
*Golden shiner		Stonecat		*Burbot	
Pugnose shiner		Tadpole madtom		**Sciaenidae (Drums)**	
Emerald shiner		Brindled madtom		*Freshwater drum	
Bigeye shiner		*Channel catfish		**Cobitidae (Loaches)**	
Ironcolor shiner		*Flathead catfish		Oriental weatherfish	
*Common shiner	(6)	**Aphredoderidae (Pirate perch)**		**Other family/species:**	
Central bigmouth shiner		Pirate perch			
Blackchin shiner		**Atherinidae (Silversides)**			
Blacknose shiner		Brook silverside			
Spottail shiner		**Cyprinodontidae (Topminnows)**			
Silver shiner		Banded killifish			
Rosyface shiner		Blackstripe topminnow			
Spotfin shiner					

* = Measure length

MACROINVERTEBRATES

Station: STREAM #3 SITE #4 Area Sampled: Time Sampled:

PORIFERA
PLATYHELMINTHES
Turbellaria ∴ (3)
NEMATOMORPHA
BRYOZOA
ANNELIDA
Hirudinea
Oligochaeta ∴ (4)
ARTHROPODA
Crustacea
Amphipoda ∴ (4)
Decapoda ☒∴ (13)
Isopoda ∴ (3)
Arachnoidea
Hydracarina
Insecta
Ephemeroptera
Ametropodidae
Baetiscidae
Baetidae
Caenidae
Ephemerellidae
Ephemeridae
Heptageniidae
Isonychiidae
Leptophlebiidae
Metretopodidae
Polymitarcyidae
Potamanthidae
Siphlonuridae
Tricorythidae
Odonata
Anisoptera
Aeshnidae
Cordulegastridae
Corduliidae
Gomphidae
Libellulidae
Macromiidae
Zygoptera
Calopterygidae
Coenagrionidae ∴ (6)
Lestidae
Plecoptera
Capniidae
Chloroperlidae
Leuctridae
Nemouridae
Peltoperlidae
Perlidae
Perlodidae
Pteronarcyidae
Taeniopterygidae

Hemiptera
Belostomatidae
Corixidae
Gelastocoridae
Gerridae
Mesoveliidae
Naucoridae
Nepidae
Notonectidae
Pleidae • (1)
Saldidae
Veliidae • (1)
Megaloptera
Corydalidae
Sialidae
Neuroptera
Sisyridae
Trichoptera
Brachycentridae
Glossosomatidae
Helicopsychidae
Hydropsychidae ☒☒∴ (22)
Hydroptilidae
Lepidostomatidae
Leptoceridae
Limnephilidae ∴ (3)
Molannidae
Odontoceridae
Philopotamidae
Phryganeidae
Polycentropodidae
Psychomyiidae
Rhyacophilidae
Sericostomatidae
Uenoidae (*Neophylax*)
Lepidoptera
Noctuidae
Pyralidae
Coleoptera*
Dryopidae
Dytiscidae
Elmidae
Gyrinidae (a)____ (l)____
Haliplidae (a)____ (l)____
Heteroceridae
Hydraenidae
Hydrophilidae
Lampyridae (a)____ (l)____
Noteridae (a)____ (l)____
Psephenidae(a)____ (l)____
Ptilodactylidae (a)____ (l)____
Scirtidae (a)____ (l)____

* record # of adults (a) or larvae (l) as indicated

Diptera
Athericidae
Ceratopogonidae
Chaoboridae
Chironomidae ☒☒☒☒☒☒ (70)
Culicidae
Dixidae
Dolichopodidae
Empididae
Ephydridae
Muscidae
Psychodidae
Ptychopteridae
Sciomyzidae
Simuliidae
Stratiomyidae
Syrphidae
Tabanidae
Thaumaleidae
Tipulidae
MOLLUSCA
Gastropoda
Ancylidae ☒☒☐ (29)
Bithyniidae
Hydrobiidae
Lymnaeidae
Physidae ∴ (4)
Planorbidae • (1)
Pleuroceridae
Pomatiopsidae
Valvatidae
Viviparidae ☐ (8)
Pelecypoda
Dreissenidae
Pisidiidae
Sphaeriidae
Unionidae

Other taxa or comments:

UP KNOWN CASES ∴

SPRINGTAIL (Columbella

UNKNOWN LEPIDOPTERA - ∴ (Collected)

UNKNOWN BEETLE

Appendix J (continued)

HABITAT ASSESSMENT FIELD DATA SHEET - GLIDE/POOL STREAMS

Habitat Parameter	Condition Category			
	Excellent	Good	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking
SCORE 5	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation
SCORE 7	20 19 18 17 16	15 14 13 12 11	10 9 8 (7) 6	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools	Majority of pools small-shallow or pools absent.
SCORE 5	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of island or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected; slight deposition in pools	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 3	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 (3) 2 1 0
5a. Channel Flow Status - Maintained Flow Volume	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed	Very little water in channel and mostly present as standing pools
SCORE 8	10 9	(8) 7 6	5 4 3	2 1 0
5b. Channel Flow Status – Flashiness	Vegetation along the stream bank is complete nearly to the waters edge Little or no evidence of frequent changes in discharge and/or frequent high water events that scours stream bank vegetation Large woody debris (if present) stable and extending laterally across the stream channel.	Some evidence of bank scour approximately 4-8 inches above the waters surface. Large woody debris (if present) mostly stable and extending partially into the active stream channel	Bank scour evidence 9-18 inches above the waters surface. Large woody debris (if present) tend to lay more against the stream bank rather than extending into the active channel	Bank scour (>20 inches) along the stream channel. Large woody debris are generally absent from the active channel and/or may exist as woody debris jams along the stream bank above the active channel
SCORE 1	10 9	8 7 6	5 4 3	2 (1) 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization is continuous but not recent (>5 years). Embankments without mature trees and dominated by grasses and shrubs.	Stream reach has been recently channelized (<5 years) OR Banks shored with gabion, rock, cement or bare earth Instream habitat greatly altered or removed entirely Bank vegetation moderately dense to absent.
SCORE 16	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

(45)

29
16
45

Habitat Parameter	Condition Category			
	Excellent	Good	Marginal	Poor
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas)	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line (Note: lack of sinuosity may be due to channelization)	Channel straight; waterway has been channelized for a long distance.
SCORE 6	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected	Moderately stable; infrequent, small areas of erosion mostly healed over 5-30% of bank in reach has areas of erosion	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars
SCORE 3 (LB)	Left Bank 10 9	8 7 6	5 4 3	(2) 1 0
SCORE 1 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 (1) 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but 1 class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation has been removed to 2 inches or less in average stubble height.
SCORE 0 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 (0)
SCORE 0 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 (0)
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >150 feet and dominated by native vegetation including trees, shrubs, or non-woody macrophytes or wetlands; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally Human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 75-150 feet; human activities have impacted zone only minimally	Width of riparian zone 10-75 feet; human activities have impacted zone a great deal	Width of riparian zone <10 feet; little or no riparian vegetation due to human activities
SCORE 8 (LB)	Left Bank 10 9	(8) 7 6	5 4 3	2 1 0
SCORE 8 (RB)	Right Bank 10 9	(8) 7 6	5 4 3	2 1 0

(45) TOTAL FROM PAGE 1

25

0

Total Score 70

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: STREAM #2 SITE #5 WILLOW CREEK

LOCATION (road crossing): Ford Road and I-275 bike path (east of HWY)

COUNTY/TOWNSHIP: WAYNE COUNTY / CANTON TOWNSHIP

T 2S R 8E S

LAT(dd) LONG (dd)

RIVER BASIN: ROUGE RIVER

STORET #

HUC CODE: 04090004 0202

ECOREGION: MAUMEE LAKE PLAINE

INVESTIGATOR(S): M. BERNINGER, S. KOGGE, T. ESTROM

DATE 8/1/12

TIME 11:39 (AM) PM

REASON FOR SURVEY
- ☐ Targeted: comment
- ☐ Randomized: VSEC #
- VSEC description (eg. cold small)

WEATHER CONDITIONS

Current
- ☒ Sunny
- ☐ Partly Cloudy
- ☐ Cloudy
- ☐ Rainy

Has there been a significant rain in the last 7 days?
- ☐ Yes ☐ No
- ☒ Don't Know

Air Temperature 85 °F

WATERSHED FEATURES

Predominant Surrounding Land Use
- ☐ Forest
- ☒ Commercial
- ☐ Field/Pasture
- ☐ Industrial
- ☐ Agricultural
- ☒ Residential
- ☒ Other HWY ROW

Local Watershed NPS Pollution
- ☐ No evidence
- ☒ Some potential sources
- ☐ Obvious Sources

Local Watershed Erosion
- ☐ None
- ☒ Moderate
- ☐ Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species
- ☒ Trees ☐ Shrubs
- ☐ Grasses ☐ Herbaceous

Species:

Estimate buffer width (left) ____ ft (right) ____ ft

STREAM CHARACTERIZATION

Stream Subsystem
- ☒ Perennial
- ☐ Intermittent
- ☐ Lake Outlet Influenced
- ☐ Dam Influenced

Stream Origin
- ☐ Spring Fed
- ☐ Lake/Pond
- ☐ Swamp, Marsh, Bog
- ☒ Mixture of origins
- ☐ Other ____

Stream Modifications
- ☐ None
- ☐ Dredged
- ☐ Canopy Removal
- ☐ Snagging
- ☐ Impounded
- ☐ Relocated
- ☒ Bank Stabilization
- ☐ Habitat Improvement

Stream Type
- ☐ Coldwater
- ☒ Warmwater

INSTREAM FEATURES

Avg. Stream Width 13 ft Avg. Stream Depth .5 ft

Surface Velocity ____ ft/sec (at thalweg) Est. Flow 45 cfs

Est. Survey Reach Length 130 ft

Survey Reach Area 1301 ft² High Water Mark 2.5 ft

Canopy Cover: 55 % Shaded

AQUATIC VEGETATION
- ☐ Rooted emergent
- ☐ Rooted submergent
- ☐ Rooted floating
- ☐ Free Floating
- ☐ Floating algae
- ☐ Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? Yes ☐ No ☒

Dominant species present

WATER QUALITY

Temperature 75 °F

Water Samples Taken
- ☒ None ☐ Other ____
- ☐ GA ☐ GN
- ☐ MA ☐ MN
- ☐ VOA ☐ ON

Solids, Turbidity
- ☐ Clear
- ☐ Slightly turbid
- ☒ Turbid
- ☐ Floating solids
- ☐ Suspended solids
- ☐ Settleable solids
- ☐ Foams

Color
- ☐ Clear
- ☐ Stained
- ☒ Opaque
- ☐ Colored ____
- ☐ Other ____

Surface Oils
- ☐ None
- ☒ Sheen
- ☐ Globs
- ☐ Flecks
- ☐ Slick
- ☐ Other ____

Water Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Fishy
- ☐ Other ____

SEDIMENT

Sediment Samples Taken
- ☒ None ☐ Other ____
- ☐ MS ☐ GS
- ☐ VOA ☐ OS/BNA

Looking at stones that are not deeply embedded, are the undersides black in color? ☐ Yes ☐ No

Oils
- ☐ Absent
- ☒ Slight
- ☐ Moderate
- ☐ Profuse

Sediment Odors
- ☒ Normal/None
- ☐ Sewage
- ☐ Petroleum
- ☐ Chemical
- ☐ Anaerobic
- ☐ Other ____

Deposits
- ☒ None
- ☐ Sludge
- ☐ Sawdust
- ☐ Paper fiber
- ☐ Sand
- ☐ Relict shells
- ☐ Other ____

Willow Creek

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	5
Boulder	>10"				
Cobble	2.5"-10"		Muck-Mud	black, very fine organic (FPOM)	50
Gravel	0.1"-2.5"	5			
Sand	Gritty (course)	15	Other		
Silt	Gritty (fine)	80			
Clay	slick				

Proportion of Reach Represented by Stream Morphology Types

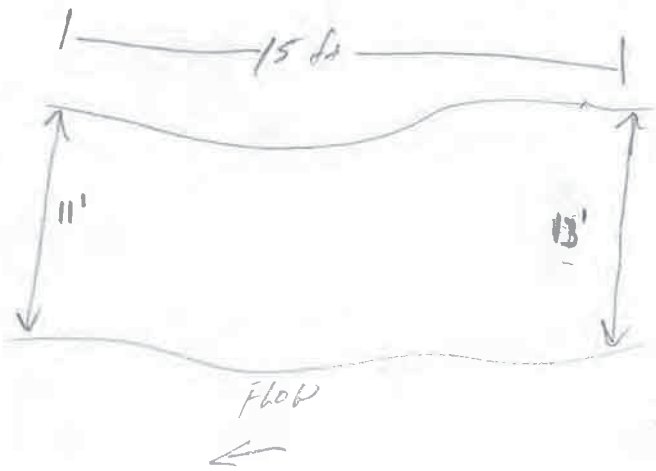
- ☐ Riffle_____%
- ☐ Run_____%
- ☐ Pool_____%
- ☒ Depositional 100 %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☐	☒
Overhanging vegetation	☐	☒	☐	☐
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☐	☒

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression



DNS CS 1" 4.5" 3.5" 2" 0.5"

UPS CS 3" 6" 6" 4.5" 1.5".

TIME

#1 1:07

#2

#3

STREAM #2 SITE 5 8/1/12

Appendix J (continued)

12:29 start macros

Location Sampled STREAM #2 Site #5 Date 8/1/12

Length sampled 130ft Time sampled 55 mins Gear type (circle): bps stream shocker boat shocker other

Species / length (in)	BLUNTNOSE MINNOW	CREEK CHUB	Johnny DARTER	Gen Scottish	COMMON SHINER	White SUCKER	BLUEGILL		In
1									1
2							6		2
3	29		31		5				3
4				14					4
5		83				1	2		5
6									6
7									7
8									8
9									9
10									10
11									11
12									12
13									13
14									14
15									15
16									16
17									17
18									18
19									19
20									20
>20									

For individuals >20" record actual length

Species / length (in)									In
1									1
2									2
3									3
4									4
5									5
6									6
7									7
8									8
9									9
10									10
11									11
12									12
13									13
14									14
15									15
16									16
17									17
18									18
19									19
20									20
>20									

Number of Anomalies_____ Number/Species of tagged/fin clipped fish_____

Description:

Appendix J (continued)

FISH

Station Number: STREAM #2 (willow CREEK) SITE #5
Length Sampled (ft): 100ft
Area Sampled (sq ft):
Sampling Time: # Probes: 1 Gear: boat / ss / (bps)
Passes: 2
Number of Anomalies: 0
Comments:

Petromyzontidae (Lampreys)		Sand shiner		**Gasterosteidae (Sticklebacks)**	
Sea lamprey (a/l)		Redfin shiner		Brook stickleback	
Silver lamprey (a/l)		Mimic shiner		Threespine stickleback	
Northern brook lamprey (a/l)		Brassy minnow		**Perchicthyidae (Temp. bass)**	
Chestnut lamprey (a/l)		Fathead minnow		*White bass	
American brook lamprey (a/l)		Bluntnose minnow	29	*White perch	
Lepisosteidae (Gars)		Suckermouth minnow		**Centrarchidae (Sunfishes)**	
*Spotted gar		Silverjaw minnow		*Rock bass	
*Longnose gar		Northern redbelly dace		*Green sunfish	14
Amiidae (Bowfins)		Southern redbelly dace		*Pumpkinseed	
*Bowfin		Finescale dace		*Warmouth	
Clupeidae (Herrings)		Blacknose dace		*Orangespotted sunfish	
*Alewife		Longnose dace		*Bluegill	2
*Gizzard shad		Redside dace		*Longear sunfish	
Salmonidae (Salmon/Trout)		*Pearl dace		*White crappie	
*Rainbow trout		**Cottidae (Sculpins)**		*Black crappie	
*Brown trout		Mottled sculpin		*Largemouth bass	
*Brook trout		Slimy sculpin		*Smallmouth bass	
*Coho		**Catostomidae (Suckers)**		**Percidae (Perch)**	
*Chinook		*Longnose sucker		N. sand darter	
Umbridae (Mudminnow)		*White sucker	1	Rainbow darter	
Central mudminnow		*Creek chubsucker		Iowa darter	
Esocidae (Pike)		*Lake chubsucker		Greenside darter	
*Grass pike		*Northern hog sucker		Fantail darter	
*Northern pike		*Spotted sucker		Orangethroat darter	
*Muskellunge		*Silver redhorse		Johnny darter	31
Cyprinidae (Minnows and Carp)		*River redhorse		Blackside darter	
Central stoneroller		*Black redhorse		Logperch	
Lake chub		*Golden redhorse		*Yellow perch	
*Goldfish		*Shorthead redhorse		*Walleye	
*Carp		*Greater redhorse		**Percopsidae (Trout-perch)**	
Bigeye chub		**Ictaluridae (Bullhead/Catfish)**		Trout-perch	
*Horneyhead chub		*Black bullhead		**Anguillidae (Eels)**	
*River chub		*Brown bullhead		*American eel	
*Creek chub	83	*Yellow bullhead		**Gadidae (Cod)**	
*Golden shiner		Stonecat		*Burbot	
Pugnose shiner		Tadpole madtom		**Sciaenidae (Drums)**	
Emerald shiner		Brindled madtom		*Freshwater drum	
Bigeye shiner		*Channel catfish		**Cobitidae (Loaches)**	
Ironcolor shiner		*Flathead catfish		Oriental weatherfish	
*Common shiner	5	**Aphredoderidae (Pirate perch)**		**Other family/species:**	
Central bigmouth shiner		Pirate perch			
Blackchin shiner		**Atherinidae (Silversides)**			
Blacknose shiner		Brook silverside			
Spottail shiner		**Cyprinodontidae (Topminnows)**			
Silver shiner		Banded killifish			
Rosyface shiner		Blackstripe topminnow			
Spotfin shiner				* = Measure length	

MACROINVERTEBRATES

Station: STREAM #2 SITE 5 Area Sampled: 130ft & 132 Time Sampled: 45 mins

PORIFERA
PLATYHELMINTHES
Turbellaria
NEMATOMORPHA
BRYOZOA
ANNELIDA
Hirudinea
Oligochaeta
ARTHROPODA
Crustacea
Amphipoda (2)
Decapoda (16)
Isopoda (4)
Arachnoidea
Hydracarina
Insecta
Ephemeroptera
Ametropodidae
Baetiscidae
Baetidae
Caenidae
Ephemerellidae
Ephemeridae
Heptageniidae
Isonychiidae
Leptophlebiidae
Metretopodidae
Polymitarcyidae
Potamanthidae
Siphlonuridae
Tricorythidae
Odonata
Anisoptera
Aeshnidae
Cordulegastridae
Corduliidae
Gomphidae
Libellulidae
Macromiidae
Zygoptera
Calopterygidae
Coenagrionidae
Lestidae
Plecoptera
Capniidae
Chloroperlidae
Leuctridae
Nemouridae
Peltoperlidae
Perlidae
Perlodidae
Pteronarcyidae
Taeniopterygidae

Hemiptera
Belostomatidae
Corixidae
Gelastocoridae
Gerridae (4)
Mesoveliidae
Naucoridae
Nepidae
Notonectidae
Pleidae (1)
Saldidae
Veliidae
Megaloptera
Corydalidae
Sialidae
Neuroptera
Sisyridae
Trichoptera
Brachycentridae
Glossosomatidae
Helicopsychidae
Hydropsychidae
Hydroptilidae
Lepidostomatidae
Leptoceridae
Limnephilidae
Molannidae
Odontoceridae
Philopotamidae
Phryganeidae
Polycentropodidae
Psychomyiidae
Rhyacophilidae
Sericostomatidae
Uenoidae (*Neophylax*)
Lepidoptera
Noctuidae
Pyralidae
Coleoptera*
Dryopidae
Dytiscidae
Elmidae
Gyrinidae (a)____ (l)____
Haliplidae (a)____ (l)____
Heteroceridae
Hydraenidae
Hydrophilidae
Lampyridae (a)____ (l)____
Noteridae (a)____ (l)____
Psephenidae(a)____ (l)____
Ptilodactylidae (a)____ (l)____
Scirtidae (a)____ (l)____

* record # of adults (a) or larvae (l) as indicated

Diptera
Athericidae
Ceratopogonidae
Chaoboridae
Chironomidae (72)
Culicidae
Dixidae
Dolichopodidae
Empididae
Ephydridae
Muscidae
Psychodidae
Ptychopteridae
Sciomyzidae
Simuliidae
Stratiomyidae
Syrphidae
Tabanidae
Thaumaleidae
Tipulidae
MOLLUSCA
Gastropoda
Ancylidae
Bithyniidae
Hydrobiidae
Lymnaeidae
Physidae
Planorbidae
Pleuroceridae
Pomatiopsidae
Valvatidae
Viviparidae
Pelecypoda
Dreissenidae
Pisidiidae
Sphaeriidae
Unionidae

Other taxa or comments:

CORBICULIDAE : (4)

CHANGE ON SITE #4

STREAM #2 SITE #5

Appendix J (continued)

HABITAT ASSESSMENT FIELD DATA SHEET - GLIDE/POOL STREAMS

Habitat Parameter	Condition Category			
	Excellent	Good	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 1	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 (1) 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE 6	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE 2	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 (2) 1 0
4. Sediment Deposition	Little or no enlargement of island or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 3	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 (3) 2 1 0
5a. Channel Flow Status - Maintained Flow Volume	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE 4	10 9	8 7 6	5 (4) 3	2 1 0
5b. Channel Flow Status - Flashiness	Vegetation along the stream bank is complete nearly to the waters edge. Little or no evidence of frequent changes in discharge and/or frequent high water events that scours stream bank vegetation. Large woody debris (if present) stable and extending laterally across the stream channel.	Some evidence of bank scour approximately 4-8 inches above the waters surface. Large woody debris (if present) mostly stable and extending partially into the active stream channel.	Bank scour evidence 9-18 inches above the waters surface. Large woody debris (if present) tend to lay more against the stream bank rather than extending into the active channel.	Bank scour (>20 inches) along the stream channel. Large woody debris are generally absent from the active channel and/or may exist as woody debris jams along the stream bank above the active channel.
SCORE 2	10 9	8 7 6	5 4 3	(2) 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization is continuous but not recent (>5 years). Embankments without mature trees and dominated by grasses and shrubs.	Stream reach has been recently channelized (<5 years) OR Banks shored with gabion, rock, cement or bare earth. Instream habitat greatly altered or removed entirely. Bank vegetation moderately dense to absent.
SCORE 3	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 (3) 2 1 0

(21)

STREAM #2

SITE #5

Appendix J (continued)

Habitat Parameter	Condition Category			
	Excellent	Good	Marginal	Poor
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas).	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line (Note: lack of sinuosity may be due to channelization)	Channel straight; waterway has been channelized for a long distance.
SCORE 7	20 19 18 17 16	15 14 13 12 11	10 9 8 (7) 6	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars
SCORE 2 (LB)	Left Bank 10 9	8 7 6	5 4 3	(2) 1 0
SCORE 2 (RB)	Right Bank 10 9	8 7 6	5 4 3	(2) 1 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but 1 class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation has been removed to 2 inches or less in average stubble height.
SCORE 1 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 (1) 0
SCORE 1 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 (1) 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >150 feet and dominated by native vegetation including trees, shrubs, or non-woody macrophytes or wetlands; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally. Human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 75-150 feet; human activities have impacted zone only minimally	Width of riparian zone 10-75 feet; human activities have impacted zone a great deal	Width of riparian zone <10 feet; little or no riparian vegetation due to human activities
SCORE 9 (LB)	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
SCORE 9 (RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0

13
18
31

(20) TOTAL FROM PAGE 1

Total Score 52

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME: STREAM # 1 SITE #6 TONQUISH CREEK

LOCATION (road crossing): North of Warren Rd, intersection of I-275 bike path

COUNTY/TOWNSHIP:

T 2S R 8E S

LAT(dd): 42° 20' .04 8159 LONG (dd): 83° 26' 31.6090

RIVER BASIN: Rouge River

STORET #:

HUC CODE: 04090004020Z ECOREGION: Maumee Lake Plane

INVESTIGATOR(S): T. Estrom, S. Kogge, M. Berninger

DATE: 8/1/12

TIME: 15:30 AM (PM)

REASON FOR SURVEY
- [x] Targeted: comment
- [ ] Randomized: VSEC #
- VSEC description (eg. cold small)

WEATHER CONDITIONS

Current
- [x] Sunny
- [ ] Partly Cloudy
- [ ] Cloudy
- [ ] Rainy

Has there been a significant rain in the last 7 days?
- [ ] Yes [ ] No
- [x] Don't Know

Air Temperature 85 °F

WATERSHED FEATURES

Predominant Surrounding Land Use
- [x] Forest
- [x] Commercial
- [ ] Field/Pasture
- [ ] Industrial
- [ ] Agricultural
- [ ] Residential
- [x] Other Road ROW

Local Watershed NPS Pollution
- [x] No evidence
- [ ] Some potential sources
- [ ] Obvious Sources

Local Watershed Erosion
- [ ] None
- [ ] Moderate
- [x] Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species
- [x] Trees [x] Shrubs [x] Herbaceous [ ] Grasses

Species: ACESA, ACENEG

Estimate buffer width (left) ft (right) ft

STREAM CHARACTERIZATION

Stream Subsystem
- [x] Perennial
- [ ] Intermittent
- [ ] Lake Outlet Influenced
- [ ] Dam Influenced

Stream Origin
- [ ] Spring Fed
- [ ] Lake/Pond
- [ ] Swamp, Marsh, Bog
- [ ] Mixture of origins
- [ ] Other

Stream Modifications
- [ ] None
- [ ] Dredged
- [ ] Canopy Removal
- [ ] Snagging
- [ ] Impounded
- [ ] Relocated
- [ ] Bank Stabilization
- [ ] Habitat Improvement

Stream Type
- [ ] Coldwater
- [x] Warmwater

INSTREAM FEATURES

Avg. Stream Width 16 ft Avg Stream Depth 1.5 ft

Surface Velocity ft/sec (at thalweg) Est. Flow 65 cfs

Est. Survey Reach Length 170 ft

Survey Reach Area 170X17 ft² High Water Mark ft

Canopy Cover: 65 % Shaded

AQUATIC VEGETATION
- [ ] Rooted emergent
- [ ] Rooted submergent
- [ ] Rooted floating
- [ ] Free Floating
- [ ] Floating algae
- [ ] Attached algae

Portion of the reach with aquatic vegetation 0 %

Nuisance aquatic plants or slimes present? [ ] Yes [x] No

Dominant species present

WATER QUALITY

Temperature 72 °F

Water Samples Taken
- [x] None [ ] Other
- [ ] GA [ ] GN
- [ ] MA [ ] MN
- [ ] VOA [ ] ON

Solids, Turbidity
- [ ] Clear
- [ ] Slightly turbid
- [x] Turbid
- [ ] Floating solids
- [ ] Suspended solids
- [ ] Settleable solids
- [ ] Foams

Color
- [ ] Clear
- [ ] Stained
- [x] Opaque
- [ ] Colored
- [ ] Other

Surface Oils
- [x] None
- [ ] Sheen
- [ ] Globs
- [ ] Flecks
- [ ] Slick
- [ ] Other

Water Odors
- [x] Normal/None
- [ ] Sewage
- [ ] Petroleum
- [ ] Chemical
- [ ] Fishy
- [ ] Other

SEDIMENT

Sediment Samples Taken
- [x] None [ ] Other
- [ ] MS [ ] GS
- [ ] VOA [ ] OS/BNA

Oils
- [x] Absent
- [ ] Slight
- [ ] Moderate
- [ ] Profuse

Looking at stones that are not deeply embedded, are the undersides black in color? [ ] Yes [ ] No

Sediment Odors
- [x] Normal/None
- [ ] Sewage
- [ ] Petroleum
- [ ] Chemical
- [ ] Anaerobic
- [ ] Other

Deposits
- [x] None
- [ ] Sludge
- [ ] Sawdust
- [ ] Paper fiber
- [ ] Sand
- [ ] Relict shells
- [ ] Other

Tonquish Creek

APPENDIX J (Continued)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse plant material (CPOM)	15
Boulder	>10"				
Cobble	2.5"-10"		Muck-Mud	black, very fine organic (FPOM)	15
Gravel	0.1"-2.5"				
Sand	Gritty (course)	90	Other		
Silt	Gritty (fine)				
Clay	slick	10			

Proportion of Reach Represented by Stream Morphology Types

- ☐ Riffle 10 %
- ☐ Run ____ %
- ☐ Pool 90 %
- ☐ Depositional ____ %

Additional Structure Available for Macroinvertebrate Colonization

	Extensive	Moderate	Sparse	Absent
Undercut banks	☐	☐	☒	☐
Overhanging vegetation	☐	☒	☐	☐
Large woody debris	☐	☐	☒	☐
Aquatic macrophytes	☐	☐	☐	☒
Rootwads	☐	☐	☐	☒

SITE LOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph)

- ☐ Further investigation necessary (explain)
- ☐ Obvious pollution source/expression

STREAM #1 SITE #6 8/1/12

17' UPS width

2.5" RDB | 10" | 20" | 25" | 14" LDB

19' DWS width

14" LDB | 11" | 10" | 3" | 1" RDB

Velocity runs

1st 55 sec

2nd 57 sec

3rd 55 sec

Appendix J (continued)

FISH

Station Number:
Length Sampled (ft):
Area Sampled (sq ft):
Sampling Time: # Probes: Gear: boat / ss / bps
Passes:

Number of Anomalies:
Comments: FISH COMMUNITY ANALYSES NOT COMPLETED DUE TO EQUIPMENT FAILURE, (COULD NOT PUSH ENOUGH VOLTS TO BE EFFECTIVE) ELECTRO-FISHING WAS NOT COMPLETED, MAY COME BACK IN FUTURE TO COMPLETE

Petromyzontidae (Lampreys)
- Sea lamprey (a/l) ____
- Silver lamprey (a/l) ____
- Northern brook lamprey (a/l) ____
- Chestnut lamprey (a/l) ____
- American brook lamprey (a/l) ____

Lepisosteidae (Gars)
- *Spotted gar ____
- *Longnose gar ____

Amiidae (Bowfins)
- *Bowfin ____

Clupeidae (Herrings)
- *Alewife ____
- *Gizzard shad ____

Salmonidae (Salmon/Trout)
- *Rainbow trout ____
- *Brown trout ____
- *Brook trout ____
- *Coho ____
- *Chinook ____

Umbridae (Mudminnow)
- Central mudminnow ____

Esocidae (Pike)
- *Grass pike ____
- *Northern pike ____
- *Muskellunge ____

Cyprinidae (Minnows and Carp)
- Central stoneroller ____
- Lake chub ____
- *Goldfish ____
- *Carp ____
- Bigeye chub ____
- *Hornyhead chub ____
- *River chub ____
- *Creek chub ____
- *Golden shiner ____
- Pugnose shiner ____
- Emerald shiner ____
- Bigeye shiner ____
- Ironcolor shiner ____
- *Common shiner ____
- Central bigmouth shiner ____
- Blackchin shiner ____
- Blacknose shiner ____
- Spottail shiner ____
- Silver shiner ____
- Rosyface shiner ____
- Spotfin shiner ____
- Sand shiner ____
- Redfin shiner ____
- Mimic shiner ____
- Brassy minnow ____
- Fathead minnow ____
- Bluntnose minnow ____
- Suckermouth minnow ____
- Silverjaw minnow ____
- Northern redbelly dace ____
- Southern redbelly dace ____
- Finescale dace ____
- Blacknose dace ____
- Longnose dace ____
- Redside dace ____
- *Pearl dace ____

Cottidae (Sculpins)
- Mottled sculpin ____
- Slimy sculpin ____

Catostomidae (Suckers)
- *Longnose sucker ____
- *White sucker ____
- *Creek chubsucker ____
- *Lake chubsucker ____
- *Northern hog sucker ____
- *Spotted sucker ____
- *Silver redhorse ____
- *River redhorse ____
- *Black redhorse ____
- *Golden redhorse ____
- *Shorthead redhorse ____
- *Greater redhorse ____

Ictaluridae (Bullhead/Catfish)
- *Black bullhead ____
- *Brown bullhead ____
- *Yellow bullhead ____
- Stonecat ____
- Tadpole madtom ____
- Brindled madtom ____
- *Channel catfish ____
- *Flathead catfish ____

Aphredoderidae (Pirate perch)
- Pirate perch ____

Atherinidae (Silversides)
- Brook silverside ____

Cyprinodontidae (Topminnows)
- Banded killifish ____
- Blackstripe topminnow ____

Gasterosteidae (Sticklebacks)
- Brook stickleback ____
- Threespine stickleback ____

Perchichthyidae (Temp. bass)
- *White bass ____
- *White perch ____

Centrarchidae (Sunfishes)
- *Rock bass ____
- *Green sunfish ____
- *Pumpkinseed ____
- *Warmouth ____
- *Orangespotted sunfish ____
- *Bluegill ____
- *Longear sunfish ____
- *White crappie ____
- *Black crappie ____
- *Largemouth bass ____
- *Smallmouth bass ____

Percidae (Perch)
- N. sand darter ____
- Rainbow darter ____
- Iowa darter ____
- Greenside darter ____
- Fantail darter ____
- Orangethroat darter ____
- Johnny darter ____
- Blackside darter ____
- Logperch ____
- *Yellow perch ____
- *Walleye ____

Percopsidae (Trout-perch)
- Trout-perch ____

Anguillidae (Eels)
- *American eel ____

Gadidae (Cod)
- *Burbot ____

Sciaenidae (Drums)
- *Freshwater drum ____

Cobitidae (Loaches)
- Oriental weatherfish ____

Other family/species:
- ____ ____
- ____ ____
- ____ ____
- ____ ____

* = Measure length

08/01/2012

MACROINVERTEBRATES

Station: Site 6, Stream 1 Area Sampled: Time Sampled: 30min

PORIFERA
PLATYHELMINTHES
Turbellaria
NEMATOMORPHA
BRYOZOA
ANNELIDA
Hirudinea
Oligochaeta
ARTHROPODA
Crustacea
Amphipoda
Decapoda ☒ ☐ (17)
Isopoda
Arachnoidea
Hydracarina
Insecta
Ephemeroptera
Ametropodidae
Baetiscidae
Baetidae
Caenidae
Ephemerellidae
Ephemeridae
Heptageniidae
Isonychiidae
Leptophlebiidae
Metretopodidae
Polymitarcyidae
Potamanthidae
Siphlonuridae
Tricorythidae
Odonata
Anisoptera
Aeshnidae * (1)
Cordulegastridae
Corduliidae
Gomphidae
Libellulidae
Macromiidae
Zygoptera
Calopterygidae
Coenagrionidae * (1)
Lestidae
Plecoptera
Capniidae
Chloroperlidae
Leuctridae
Nemouridae
Peltoperlidae
Perlidae
Perlodidae
Pteronarcyidae
Taeniopterygidae

Hemiptera
Belostomatidae
Corixidae
Gelastocoridae
Gerridae 1 : (5)
Mesoveliidae
Naucoridae
Nepidae
Notonectidae
Pleidae
Saldidae
Veliidae
Megaloptera
Corydalidae
Sialidae
Neuroptera
Sisyridae
Trichoptera
Brachycentridae
Glossosomatidae
Helicopsychidae
Hydropsychidae : (2)
Hydroptilidae
Lepidostomatidae
Leptoceridae
Limnephilidae
Molannidae
Odontoceridae
Philopotamidae
Phryganeidae
Polycentropodidae
Psychomyiidae
Rhyacophilidae
Sericostomatidae
Uenoidae (*Neophylax*)
Lepidoptera
Noctuidae
Pyralidae
Coleoptera*
Dryopidae
Dytiscidae
Elmidae
Gyrinidae (a)___ (l)___
Haliplidae (a)___ (l)___
Heteroceridae
Hydraenidae
Hydrophilidae
Lampyridae (a)___ (l)___
Noteridae (a)___ (l)___
Psephenidae(a)___ (l)___
Ptilodactylidae (a)___ (l)___
Scirtidae (a)___ (l)___

* record # of adults (a) or larvae (l) as indicated

Diptera
Athericidae
Ceratopogonidae
Chaoboridae
Chironomidae ☒ : (14)
Culicidae
Dixidae
Dolichopodidae
Empididae
Ephydridae
Muscidae
Psychodidae
Ptychopteridae
Sciomyzidae
Simuliidae
Stratiomyidae
Syrphidae
Tabanidae
Thaumaleidae
Tipulidae
MOLLUSCA
Gastropoda
Ancylidae : (3)
Bithyniidae
Hydrobiidae
Lymnaeidae
Physidae * (1)
Planorbidae
Pleuroceridae
Pomatiopsidae
Valvatidae
Viviparidae
Pelecypoda
Dreissenidae
Pisidiidae
Sphaeriidae
Unionidae

Other taxa or comments:

08/01/2012

Site 6, Stream 1

Appendix J (continued)

HABITAT ASSESSMENT FIELD DATA SHEET - GLIDE/POOL STREAMS

Habitat Parameter	Condition Category			
	Excellent	Good	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking
SCORE 2	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 (2) 1 0
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation	Hard-pan clay or bedrock; no root mat or vegetation
SCORE 4	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 (4) 3 2 1 0
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present	Majority of pools large-deep; very few shallow	Shallow pools much more prevalent than deep pools	Majority of pools small-shallow or pools absent.
SCORE 13	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of island or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected; slight deposition in pools	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition
SCORE 7	20 19 18 17 16	15 14 13 12 11	10 9 8 (7) 6	5 4 3 2 1 0
5a. Channel Flow Status - Maintained Flow Volume	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed	Water fills >75% of the available channel; or <25% of channel substrate is exposed	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed	Very little water in channel and mostly present as standing pools.
SCORE 7	10 9	8 (7) 6	5 4 3	2 1 0
5b. Channel Flow Status – Flashiness	Vegetation along the stream bank is complete nearly to the waters edge Little or no evidence of frequent changes in discharge and/or frequent high water events that scours stream bank vegetation Large woody debris (if present) stable and extending laterally across the stream channel.	Some evidence of bank scour approximately 4-8 inches above the waters surface. Large woody debris (if present) mostly stable and extending partially into the active stream channel	Bank scour evidence 9-18 inches above the waters surface. Large woody debris (if present) tend to lay more against the stream bank rather than extending into the active channel	Bank scour (>20 inches) along the stream channel. Large woody debris are generally absent from the active channel and/or may exist as woody debris jams along the stream bank above the active channel
SCORE 1	10 9	8 7 6	5 4 3	2 (1) 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization is continuous but not recent (>5 years) Embankments without mature trees and dominated by grasses and shrubs	Stream reach has been recently channelized (<5 years). OR Banks shored with gabion, rock, cement or bare earth. Instream habitat greatly altered or removed entirely. Bank vegetation moderately dense to absent
SCORE 13	20 19 (18) 17 16	15 (14) (13) 12 11	10 9 8 7 6	5 4 3 2 1 0

(47)

- Due to bridge crossing and rail crossing at upstream end of site

TONQUISH CREEK STREAM # 1
SITE #6

Appendix J (continued)

Habitat Parameter	Condition Category			
	Excellent	Good	Marginal	Poor
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas).	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line. (Note: lack of sinuosity may be due to channelization) due to channelization at upstream end	Channel straight; waterway has been channelized for a long distance
SCORE 8	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars
SCORE 1 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 (1) 0
SCORE 1 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 (1) 0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation; but 1 class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation has been removed to 2 inches or less in average stubble height.
SCORE 6 (LB)	Left Bank 10 9	8 7 (6)	5 4 3	2 1 0
SCORE 6 (RB)	Right Bank 10 9	8 7 (6)	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >150 feet and dominated by native vegetation including trees, shrubs, or non-woody macrophytes or wetlands; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally. Human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 75-150 feet; human activities have impacted zone only minimally	Width of riparian zone 10-75 feet; human activities have impacted zone a great deal.	Width of riparian zone <10 feet; little or no riparian vegetation due to human activities.
SCORE 9 (LB)	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
SCORE 9 (RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0

47
4

Total Score (87)

Notes:
- wire fencing and concrete armoring present at upstream end of site.
- discharge enters stream on LDB near pedestrian bridge