

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

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

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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
Address: 11191 Marwill Ave
City: West Olive State: MI Zip: 49460
Phone: 616-847-1680
Email: stu.kogge@cardno.com
Is a Wetland Delineation Report available? <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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:

- | | |
|--|---|
| <input type="checkbox"/> Hydrologic Condition and Interactions | <input type="checkbox"/> Vegetation Diversity |
| <input type="checkbox"/> Hydrologic Alterations | <input type="checkbox"/> Vegetation Condition |
| <input type="checkbox"/> Substrate/Soil Disturbances | <input type="checkbox"/> Amount of Open Water |
| <input type="checkbox"/> Habitat Structure Development | <input type="checkbox"/> Percent of Invasive/Non-native Species |
| <input type="checkbox"/> Habitat Alterations | <input type="checkbox"/> Community Interspersion |
| <input type="checkbox"/> Habitat/Wetland Condition | <input type="checkbox"/> Vertical/Horizontal Structure |
| <input type="checkbox"/> Amphibian Breeding Pools | <input type="checkbox"/> 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.

<p>1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat. Is any part of the Wetland located within an area designated as Critical Habitat <u>and</u> does the Wetland <i>actually</i> contain habitat suitable for either species listed below?</p> <p>Piping Plover (<i>Charadrius melodus</i>) 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</p> <p>Hines's Emerald Dragonfly (<i>Somatochlora Hineana</i>) 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</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>
<p>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.</p> <p>a. <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c.</p> <p>b. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>c. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>d. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>e. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE.</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>
<p>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</p> <p><input type="checkbox"/> 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 <i>MiRAM User's Manual</i> for more information.</p> <p><input type="checkbox"/> Southern Bog, defined as any bog occurring <u>below the northern limit</u> of Michigan's Floristic Tension Zone (see figure for approximate location).</p> <p><input type="checkbox"/> 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?</p> <p><small>*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.</small></p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>  <p>Floristic Tension Zone</p>
<p>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?</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>

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			Score
Estimate the size of the Wetland (i.e., Wetland Evaluation Area). Select a size class. Maximum 6 points.			
50 acres	Select this option if the wetland's actual size \geq 50 acres.	6 pts	0.0
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	

1b. Wetland Scarcity			Score
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.			
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			Score
<p>Step 1: Using the most recent aerial photograph available, sketch a 150-foot wide "buffer zone" around the Wetland.</p> <p>Step 2: Estimate the buffer widths from the Wetland's edge to any non-buffer areas (up to 150 feet).</p> <p>Step 3: Average the buffer widths along the Wetland's perimeter.</p> <p>Step 4: Select the buffer width that is most appropriate. Maximum 6 points.</p> <p>Buffers Include:</p> <ul style="list-style-type: none"> • 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 <p>Non-Buffers Include:</p> <ul style="list-style-type: none"> • 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 			
Wide Buffer Width:	\geq 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:	<ul style="list-style-type: none"> maturing forest natural grassland, prairie 	<ul style="list-style-type: none"> designated wildlife area other wetland, lake, river 	6 pts
Low Intensity:	<ul style="list-style-type: none"> shrubland/young forest recent selective logging hay field (non-row crop) 	<ul style="list-style-type: none"> lightly managed parkland old field, lightly grazed pasture one-lane road/two track 	4 pts
Moderately High Intensity:	<ul style="list-style-type: none"> residential & lawns manicured parkland golf course 	<ul style="list-style-type: none"> conservation tillage recent clear-cut (<10 years) two-lane road 	2 pts
High Intensity:	<ul style="list-style-type: none"> commercial, industrial high-density residential heavily grazed pasture row crop field 	<ul style="list-style-type: none"> 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 <u>all that apply</u>. 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 (<i>Symplocarpus foetidus</i>) 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 <u>all that apply</u>. 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 <i>riparian</i> 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		Score
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 <u>at least 25%</u> of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, <u>select all that apply and average the points</u> . Round to the nearest 0.5 increment. Maximum 4 points.		
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		Score	
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. <input checked="" type="checkbox"/> ditch(es) in or near the wetland <input type="checkbox"/> point source discharge(s) (non-stormwater) <input type="checkbox"/> tile(s) in or near the wetland <input type="checkbox"/> filling/grading activities in or near the wetland <input type="checkbox"/> dike(s) in or near the wetland <input checked="" type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland <input type="checkbox"/> weir(s) in or near the wetland <input type="checkbox"/> dredging activities in or near the wetland <input type="checkbox"/> stormwater inputs (addition of water) <input type="checkbox"/> other (specify) <input type="checkbox"/> stream channelization <input type="checkbox"/> 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.			
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.

- | | |
|---|--|
| <input checked="" type="checkbox"/> human-induced erosion or exposure | <input type="checkbox"/> plowing, disking |
| <input checked="" type="checkbox"/> human-induced sedimentation or burial | <input type="checkbox"/> intensive grazing (hooves) |
| <input type="checkbox"/> filling | <input type="checkbox"/> off-road vehicle use |
| <input type="checkbox"/> grading | <input checked="" type="checkbox"/> construction vehicle use |
| <input type="checkbox"/> dredging | <input type="checkbox"/> 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" alteration affects less than 10% of the Wetland. Check (✓) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland.

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

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: <ul style="list-style-type: none"> • 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.		Score
<input type="checkbox"/> 1. Contains USFWS-designated Critical Habitat <input type="checkbox"/> 2. Federal or State-listed T/E Plant or Animal Species <input type="checkbox"/> 3. S1, S2, or S3 Natural Community Type (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 4. Southern Bog (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 5. Old-Growth/Mature Forested Wetland (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 6. Great Lakes Coastal Wetland		0.0
5b. Forested Wetland. 5 points.		Score
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.		0.0
5c. Urban/Suburban Wetland. 5 points.		Score
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.		5.0
5d. Low-Quality Wetland. Negative 10 points.		Score
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.		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 (<i>Phragmites australis</i>) | • narrow-leaved cattail (<i>Typha angustifolia</i>) |
| • purple loosestrife (<i>Lythrum salicaria</i>) | • hybrid cattail (<i>Typha x glauca</i>) |
| • reed canary grass (<i>Phalaris arundinacea</i>) | • marsh thistle (<i>Cirsium palustre</i>) |
| • common buckthorn (<i>Rhamnus cathartica</i>) | • multiflora rose (<i>Rosa multiflora</i>) |
| • glossy buckthorn (<i>Rhamnus frangula</i>) | • non-native honeysuckle (<i>Lonicera</i> 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 to 1 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*)**

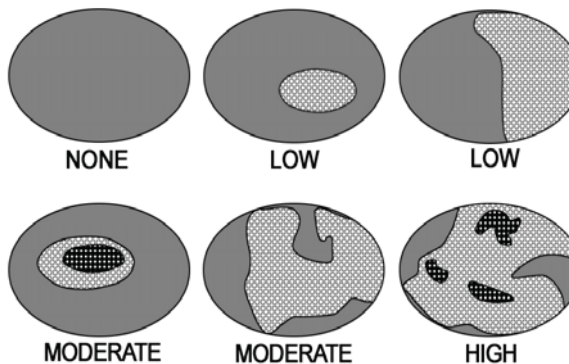
Non-native, Invasive: Hybridization may have occurred if most plants within the same local stand do not cleanly fit the characteristics of either pure species described above. The gap between the male and female portions of the flower spikes is highly variable, with many plants within the same local 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 <u>high</u> degree of interspersion	5 pts	1.0
Wetland has a <u>moderate</u> degree of interspersion	3 pts	
Wetland has a <u>low</u> degree of interspersion	1 pt	
Wetland has <u>no</u> 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.)
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Metric 7. Scenic, Recreational, and Cultural Value

Maximum 3 points.

Select <u>all that apply</u> . 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.)
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MiRAM Summary

Narrative Rating

- Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat
 Question 2: Threatened or Endangered (T/E) Species Habitat
 Question 3: Rare Wetland Natural Community Type
 Question 4: Great Lakes Coastal Wetland

- YES NO
 YES NO
 YES NO
 YES NO

Quantitative Rating

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

Score	Maximum
3	9
1	12
10	26
6	20
5	10
-1	20
0	3
0	10

Grand Total
*Add totals from
 all seven metrics*

24	100 Max.
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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? <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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:

- | | |
|--|---|
| <input type="checkbox"/> Hydrologic Condition and Interactions | <input type="checkbox"/> Vegetation Diversity |
| <input type="checkbox"/> Hydrologic Alterations | <input type="checkbox"/> Vegetation Condition |
| <input type="checkbox"/> Substrate/Soil Disturbances | <input type="checkbox"/> Amount of Open Water |
| <input type="checkbox"/> Habitat Structure Development | <input type="checkbox"/> Percent of Invasive/Non-native Species |
| <input type="checkbox"/> Habitat Alterations | <input type="checkbox"/> Community Interspersion |
| <input type="checkbox"/> Habitat/Wetland Condition | <input type="checkbox"/> Vertical/Horizontal Structure |
| <input type="checkbox"/> Amphibian Breeding Pools | <input type="checkbox"/> 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.

<p>1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat. Is any part of the Wetland located within an area designated as Critical Habitat <u>and</u> does the Wetland <i>actually</i> contain habitat suitable for either species listed below?</p> <p>Piping Plover (<i>Charadrius melodus</i>) 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</p> <p>Hines's Emerald Dragonfly (<i>Somatochlora Hineana</i>) 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</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>
<p>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.</p> <p>a. <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c.</p> <p>b. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>c. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>d. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>e. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE.</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>
<p>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</p> <p><input type="checkbox"/> 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 <i>MiRAM User's Manual</i> for more information.</p> <p><input type="checkbox"/> Southern Bog, defined as any bog occurring <u>below the northern limit</u> of Michigan's Floristic Tension Zone (see figure for approximate location).</p> <p><input type="checkbox"/> 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?</p> <p><small>*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.</small></p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>  <p>Floristic Tension Zone</p>
<p>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?</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>

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	2.0
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	

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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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:	<ul style="list-style-type: none"> maturing forest natural grassland, prairie 	<ul style="list-style-type: none"> designated wildlife area other wetland, lake, river 	6 pts
Low Intensity:	<ul style="list-style-type: none"> shrubland/young forest recent selective logging hay field (non-row crop) 	<ul style="list-style-type: none"> lightly managed parkland old field, lightly grazed pasture one-lane road/two track 	4 pts
Moderately High Intensity:	<ul style="list-style-type: none"> residential & lawns manicured parkland golf course 	<ul style="list-style-type: none"> conservation tillage recent clear-cut (<10 years) two-lane road 	2 pts
High Intensity:	<ul style="list-style-type: none"> commercial, industrial high-density residential heavily grazed pasture row crop field 	<ul style="list-style-type: none"> 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 <u>all that apply</u>. 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 (<i>Symplocarpus foetidus</i>) 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 <u>all that apply</u>. 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 <i>riparian</i> 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		Score
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 <u>at least 25%</u> of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, <u>select all that apply and average the points</u> . Round to the nearest 0.5 increment. Maximum 4 points.		
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		Score											
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. <table border="0" style="width: 100%;"> <tr> <td><input checked="" type="checkbox"/> ditch(es) in or near the wetland</td> <td><input type="checkbox"/> point source discharge(s) (non-stormwater)</td> </tr> <tr> <td><input type="checkbox"/> tile(s) in or near the wetland</td> <td><input type="checkbox"/> filling/grading activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/> dike(s) in or near the wetland</td> <td><input checked="" type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/> weir(s) in or near the wetland</td> <td><input type="checkbox"/> dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/> stormwater inputs (addition of water)</td> <td><input type="checkbox"/> other (specify)</td> </tr> <tr> <td><input type="checkbox"/> stream channelization</td> <td><input type="checkbox"/> other (specify)</td> </tr> </table> <p>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).</p> <p>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.</p>			<input checked="" type="checkbox"/> ditch(es) in or near the wetland	<input type="checkbox"/> point source discharge(s) (non-stormwater)	<input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> filling/grading activities in or near the wetland	<input type="checkbox"/> dike(s) in or near the wetland	<input checked="" type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland	<input type="checkbox"/> stormwater inputs (addition of water)	<input type="checkbox"/> other (specify)	<input type="checkbox"/> stream channelization
<input checked="" type="checkbox"/> ditch(es) in or near the wetland	<input type="checkbox"/> point source discharge(s) (non-stormwater)												
<input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> filling/grading activities in or near the wetland												
<input type="checkbox"/> dike(s) in or near the wetland	<input checked="" type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland												
<input type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland												
<input type="checkbox"/> stormwater inputs (addition of water)	<input type="checkbox"/> other (specify)												
<input type="checkbox"/> stream channelization	<input type="checkbox"/> other (specify)												
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.

- | | |
|---|---|
| <input checked="" type="checkbox"/> human-induced erosion or exposure | <input type="checkbox"/> plowing, disking |
| <input checked="" type="checkbox"/> human-induced sedimentation or burial | <input type="checkbox"/> intensive grazing (hooves) |
| <input checked="" type="checkbox"/> filling | <input type="checkbox"/> off-road vehicle use |
| <input checked="" type="checkbox"/> grading | <input type="checkbox"/> construction vehicle use |
| <input type="checkbox"/> dredging | <input type="checkbox"/> 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" alteration affects less than 10% of the Wetland. Check (✓) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland.

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

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: <ul style="list-style-type: none"> • 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.		Score
<input type="checkbox"/> 1. Contains USFWS-designated Critical Habitat <input type="checkbox"/> 2. Federal or State-listed T/E Plant or Animal Species <input type="checkbox"/> 3. S1, S2, or S3 Natural Community Type (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 4. Southern Bog (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 5. Old-Growth/Mature Forested Wetland (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 6. Great Lakes Coastal Wetland		0.0
5b. Forested Wetland. 5 points.		Score
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.		0.0
5c. Urban/Suburban Wetland. 5 points.		Score
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.		0.0
5d. Low-Quality Wetland. Negative 10 points.		Score
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.		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 (<i>Phragmites australis</i>) | • narrow-leaved cattail (<i>Typha angustifolia</i>) |
| • purple loosestrife (<i>Lythrum salicaria</i>) | • hybrid cattail (<i>Typha x glauca</i>) |
| • reed canary grass (<i>Phalaris arundinacea</i>) | • marsh thistle (<i>Cirsium palustre</i>) |
| • common buckthorn (<i>Rhamnus cathartica</i>) | • multiflora rose (<i>Rosa multiflora</i>) |
| • glossy buckthorn (<i>Rhamnus frangula</i>) | • non-native honeysuckle (<i>Lonicera</i> 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 to 1 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*)**

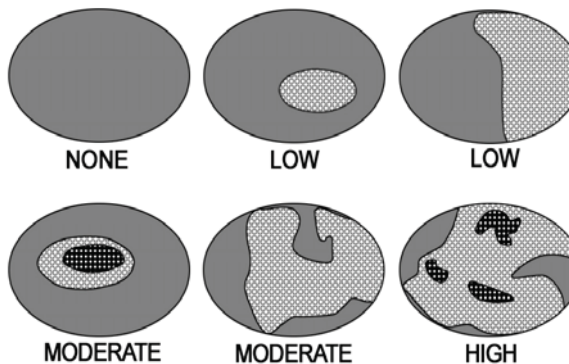
Non-native, Invasive: Hybridization may have occurred if most plants within the same local stand do not cleanly fit the characteristics of either pure species described above. The gap between the male and female portions of the flower spikes is highly variable, with many plants within the same local 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 <u>high</u> degree of interspersion	5 pts	0.0
Wetland has a <u>moderate</u> degree of interspersion	3 pts	
Wetland has a <u>low</u> degree of interspersion	1 pt	
Wetland has <u>no</u> 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.)
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Metric 7. Scenic, Recreational, and Cultural Value

Maximum 3 points.

Select <u>all that apply</u> . 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.)
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MiRAM Summary

Narrative Rating

- Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat
 Question 2: Threatened or Endangered (T/E) Species Habitat
 Question 3: Rare Wetland Natural Community Type
 Question 4: Great Lakes Coastal Wetland

- YES NO
 YES NO
 YES NO
 YES NO

Quantitative Rating

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

Score	Maximum
5.0	9
1.0	12
9.0	26
6.0	20
0.0	10
-3	20
0	3
0	10

Grand Total
*Add totals from
 all seven metrics*

18.0	100 Max.
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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:

- | | |
|--|---|
| <input type="checkbox"/> Hydrologic Condition and Interactions | <input type="checkbox"/> Vegetation Diversity |
| <input type="checkbox"/> Hydrologic Alterations | <input type="checkbox"/> Vegetation Condition |
| <input type="checkbox"/> Substrate/Soil Disturbances | <input type="checkbox"/> Amount of Open Water |
| <input type="checkbox"/> Habitat Structure Development | <input type="checkbox"/> Percent of Invasive/Non-native Species |
| <input type="checkbox"/> Habitat Alterations | <input type="checkbox"/> Community Interspersion |
| <input type="checkbox"/> Habitat/Wetland Condition | <input type="checkbox"/> Vertical/Horizontal Structure |
| <input type="checkbox"/> Amphibian Breeding Pools | <input type="checkbox"/> 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.

<p>1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat. Is any part of the Wetland located within an area designated as Critical Habitat <u>and</u> does the Wetland <i>actually</i> contain habitat suitable for either species listed below?</p> <p>Piping Plover (<i>Charadrius melodus</i>) 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</p> <p>Hines's Emerald Dragonfly (<i>Somatochlora Hineana</i>) 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</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>
<p>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.</p> <p>a. <input type="checkbox"/> YES <input type="checkbox"/> NO Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c.</p> <p>b. <input type="checkbox"/> YES <input type="checkbox"/> 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.</p> <p>c. <input type="checkbox"/> YES <input type="checkbox"/> 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.</p> <p>d. <input type="checkbox"/> YES <input type="checkbox"/> 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.</p> <p>e. <input type="checkbox"/> YES <input type="checkbox"/> 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.</p> <p>The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE.</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>
<p>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</p> <p><input type="checkbox"/> 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 <i>MiRAM User's Manual</i> for more information.</p> <p><input type="checkbox"/> Southern Bog, defined as any bog occurring <u>below the northern limit</u> of Michigan's Floristic Tension Zone (see figure for approximate location).</p> <p><input type="checkbox"/> 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?</p> <p><small>*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.</small></p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>  <p>Floristic Tension Zone</p>
<p>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?</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>

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	2.0
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	

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 <p>Step 1: Using the most recent aerial photograph available, sketch a 150-foot wide "buffer zone" around the Wetland.</p> <p>Step 2: Estimate the buffer widths from the Wetland's edge to any non-buffer areas (up to 150 feet).</p> <p>Step 3: Average the buffer widths along the Wetland's perimeter.</p> <p>Step 4: Select the buffer width that is most appropriate. Maximum 6 points.</p> <p>Buffers Include:</p> <ul style="list-style-type: none"> • 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 <p>Non-Buffers Include:</p> <ul style="list-style-type: none"> • 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:	<ul style="list-style-type: none"> maturing forest natural grassland, prairie 	<ul style="list-style-type: none"> designated wildlife area other wetland, lake, river 	6 pts
Low Intensity:	<ul style="list-style-type: none"> shrubland/young forest recent selective logging hay field (non-row crop) 	<ul style="list-style-type: none"> lightly managed parkland old field, lightly grazed pasture one-lane road/two track 	4 pts
Moderately High Intensity:	<ul style="list-style-type: none"> residential & lawns manicured parkland golf course 	<ul style="list-style-type: none"> conservation tillage recent clear-cut (<10 years) two-lane road 	2 pts
High Intensity:	<ul style="list-style-type: none"> commercial, industrial high-density residential heavily grazed pasture row crop field 	<ul style="list-style-type: none"> 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 <u>all that apply</u>. 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 (<i>Symplocarpus foetidus</i>) 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 <u>all that apply</u>. 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 <i>riparian</i> 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		Score
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 <u>at least 25%</u> of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, <u>select all that apply and average the points</u> . Round to the nearest 0.5 increment. Maximum 4 points.		
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		Score											
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. <table border="0" style="width: 100%;"> <tr> <td><input checked="" type="checkbox"/> ditch(es) in or near the wetland</td> <td><input type="checkbox"/> point source discharge(s) (non-stormwater)</td> </tr> <tr> <td><input type="checkbox"/> tile(s) in or near the wetland</td> <td><input type="checkbox"/> filling/grading activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/> dike(s) in or near the wetland</td> <td><input checked="" type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/> weir(s) in or near the wetland</td> <td><input type="checkbox"/> dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/> stormwater inputs (addition of water)</td> <td><input type="checkbox"/> other (specify)</td> </tr> <tr> <td><input type="checkbox"/> stream channelization</td> <td><input type="checkbox"/> other (specify)</td> </tr> </table> <p>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).</p> <p>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.</p>			<input checked="" type="checkbox"/> ditch(es) in or near the wetland	<input type="checkbox"/> point source discharge(s) (non-stormwater)	<input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> filling/grading activities in or near the wetland	<input type="checkbox"/> dike(s) in or near the wetland	<input checked="" type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland	<input type="checkbox"/> stormwater inputs (addition of water)	<input type="checkbox"/> other (specify)	<input type="checkbox"/> stream channelization
<input checked="" type="checkbox"/> ditch(es) in or near the wetland	<input type="checkbox"/> point source discharge(s) (non-stormwater)												
<input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> filling/grading activities in or near the wetland												
<input type="checkbox"/> dike(s) in or near the wetland	<input checked="" type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland												
<input type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland												
<input type="checkbox"/> stormwater inputs (addition of water)	<input type="checkbox"/> other (specify)												
<input type="checkbox"/> stream channelization	<input type="checkbox"/> other (specify)												
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.

- | | |
|---|---|
| <input checked="" type="checkbox"/> human-induced erosion or exposure | <input type="checkbox"/> plowing, disking |
| <input type="checkbox"/> human-induced sedimentation or burial | <input type="checkbox"/> intensive grazing (hooves) |
| <input checked="" type="checkbox"/> filling | <input type="checkbox"/> off-road vehicle use |
| <input checked="" type="checkbox"/> grading | <input type="checkbox"/> construction vehicle use |
| <input type="checkbox"/> dredging | <input type="checkbox"/> 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
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
		3.0

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" alteration affects less than 10% of the Wetland. Check (✓) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland.

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

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
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
		6.0

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: <ul style="list-style-type: none"> • 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.		Score
<input type="checkbox"/> 1. Contains USFWS-designated Critical Habitat <input type="checkbox"/> 2. Federal or State-listed T/E Plant or Animal Species <input type="checkbox"/> 3. S1, S2, or S3 Natural Community Type (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 4. Southern Bog (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 5. Old-Growth/Mature Forested Wetland (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 6. Great Lakes Coastal Wetland		0.0
5b. Forested Wetland. 5 points.		Score
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.		0.0
5c. Urban/Suburban Wetland. 5 points.		Score
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.		0.0
5d. Low-Quality Wetland. Negative 10 points.		Score
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.		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 (<i>Phragmites australis</i>) | • narrow-leaved cattail (<i>Typha angustifolia</i>) |
| • purple loosestrife (<i>Lythrum salicaria</i>) | • hybrid cattail (<i>Typha x glauca</i>) |
| • reed canary grass (<i>Phalaris arundinacea</i>) | • marsh thistle (<i>Cirsium palustre</i>) |
| • common buckthorn (<i>Rhamnus cathartica</i>) | • multiflora rose (<i>Rosa multiflora</i>) |
| • glossy buckthorn (<i>Rhamnus frangula</i>) | • non-native honeysuckle (<i>Lonicera</i> 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 to 1 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*)**

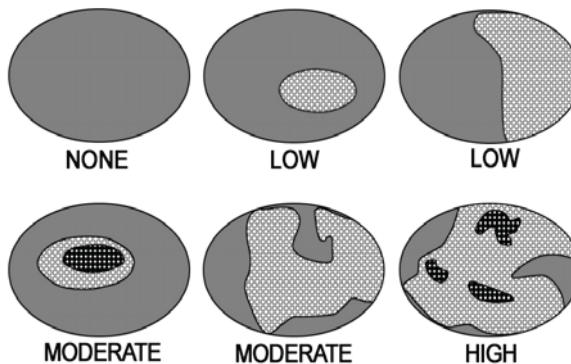
Non-native, Invasive: Hybridization may have occurred if most plants within the same local stand do not cleanly fit the characteristics of either pure species described above. The gap between the male and female portions of the flower spikes is highly variable, with many plants within the same local 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 <u>high</u> degree of interspersion	5 pts	1.0
Wetland has a <u>moderate</u> degree of interspersion	3 pts	
Wetland has a <u>low</u> degree of interspersion	1 pt	
Wetland has <u>no</u> 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.)
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Metric 7. Scenic, Recreational, and Cultural Value

Maximum 3 points.

Select <u>all that apply</u> . 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.)
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MiRAM Summary

Narrative Rating

- Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat
 Question 2: Threatened or Endangered (T/E) Species Habitat
 Question 3: Rare Wetland Natural Community Type
 Question 4: Great Lakes Coastal Wetland

- YES NO
 YES NO
 YES NO
 YES NO

Quantitative Rating

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

Score	Maximum
5.0	9
2.0	12
9.0	26
13.0	20
0.0	10
0.0	20
0.0	3
	10

Grand Total
*Add totals from
 all seven metrics*

29.0	100 Max.
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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 tenuis
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:

- | | |
|--|---|
| <input type="checkbox"/> Hydrologic Condition and Interactions | <input type="checkbox"/> Vegetation Diversity |
| <input type="checkbox"/> Hydrologic Alterations | <input type="checkbox"/> Vegetation Condition |
| <input type="checkbox"/> Substrate/Soil Disturbances | <input type="checkbox"/> Amount of Open Water |
| <input type="checkbox"/> Habitat Structure Development | <input type="checkbox"/> Percent of Invasive/Non-native Species |
| <input type="checkbox"/> Habitat Alterations | <input type="checkbox"/> Community Interspersion |
| <input type="checkbox"/> Habitat/Wetland Condition | <input type="checkbox"/> Vertical/Horizontal Structure |
| <input type="checkbox"/> Amphibian Breeding Pools | <input type="checkbox"/> 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.

<p>1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat. Is any part of the Wetland located within an area designated as Critical Habitat <u>and</u> does the Wetland <i>actually</i> contain habitat suitable for either species listed below?</p> <p>Piping Plover (<i>Charadrius melodus</i>) 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</p> <p>Hines's Emerald Dragonfly (<i>Somatochlora Hineana</i>) 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</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>
<p>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.</p> <p>a. <input type="checkbox"/> YES <input type="checkbox"/> NO Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c.</p> <p>b. <input type="checkbox"/> YES <input type="checkbox"/> 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.</p> <p>c. <input type="checkbox"/> YES <input type="checkbox"/> 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.</p> <p>d. <input type="checkbox"/> YES <input type="checkbox"/> 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.</p> <p>e. <input type="checkbox"/> YES <input type="checkbox"/> 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.</p> <p>The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE.</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>
<p>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</p> <p><input type="checkbox"/> 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 <i>MiRAM User's Manual</i> for more information.</p> <p><input type="checkbox"/> Southern Bog, defined as any bog occurring <u>below the northern limit</u> of Michigan's Floristic Tension Zone (see figure for approximate location).</p> <p><input type="checkbox"/> 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?</p> <p><small>*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.</small></p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>  <p>Floristic Tension Zone</p>
<p>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?</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>

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			Score
Estimate the size of the Wetland (i.e., Wetland Evaluation Area). Select a size class. Maximum 6 points.			
50 acres	Select this option if the wetland's actual size ≥ 50 acres.	6 pts	0.0
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	

1b. Wetland Scarcity			Score
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.			
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			Score
<p>Step 1: Using the most recent aerial photograph available, sketch a 150-foot wide "buffer zone" around the Wetland.</p> <p>Step 2: Estimate the buffer widths from the Wetland's edge to any non-buffer areas (up to 150 feet).</p> <p>Step 3: Average the buffer widths along the Wetland's perimeter.</p> <p>Step 4: Select the buffer width that is most appropriate. Maximum 6 points.</p> <p>Buffers Include:</p> <ul style="list-style-type: none"> • 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 <p>Non-Buffers Include:</p> <ul style="list-style-type: none"> • 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 			
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:	<ul style="list-style-type: none"> maturing forest natural grassland, prairie 	<ul style="list-style-type: none"> designated wildlife area other wetland, lake, river 	6 pts
Low Intensity:	<ul style="list-style-type: none"> shrubland/young forest recent selective logging hay field (non-row crop) 	<ul style="list-style-type: none"> lightly managed parkland old field, lightly grazed pasture one-lane road/two track 	4 pts
Moderately High Intensity:	<ul style="list-style-type: none"> residential & lawns manicured parkland golf course 	<ul style="list-style-type: none"> conservation tillage recent clear-cut (<10 years) two-lane road 	2 pts
High Intensity:	<ul style="list-style-type: none"> commercial, industrial high-density residential heavily grazed pasture row crop field 	<ul style="list-style-type: none"> 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 <u>all that apply</u>. 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 (<i>Symplocarpus foetidus</i>) 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 <u>all that apply</u>. 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 <i>riparian</i> 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		Score
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 <u>at least 25%</u> of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, <u>select all that apply and average the points</u> . Round to the nearest 0.5 increment. Maximum 4 points.		
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		Score											
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. <table border="0" style="width: 100%; margin-top: 10px;"> <tr> <td><input type="checkbox"/> ditch(es) in or near the wetland</td> <td><input type="checkbox"/> point source discharge(s) (non-stormwater)</td> </tr> <tr> <td><input type="checkbox"/> tile(s) in or near the wetland</td> <td><input type="checkbox"/> filling/grading activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/> dike(s) in or near the wetland</td> <td><input type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input checked="" type="checkbox"/> weir(s) in or near the wetland</td> <td><input type="checkbox"/> dredging activities in or near the wetland</td> </tr> <tr> <td><input checked="" type="checkbox"/> stormwater inputs (addition of water)</td> <td><input type="checkbox"/> other (specify)</td> </tr> <tr> <td><input type="checkbox"/> stream channelization</td> <td><input type="checkbox"/> other (specify)</td> </tr> </table> <p>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).</p> <p>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.</p>			<input type="checkbox"/> ditch(es) in or near the wetland	<input type="checkbox"/> point source discharge(s) (non-stormwater)	<input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> filling/grading activities in or near the wetland	<input type="checkbox"/> dike(s) in or near the wetland	<input type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland	<input checked="" type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland	<input checked="" type="checkbox"/> stormwater inputs (addition of water)	<input type="checkbox"/> other (specify)	<input type="checkbox"/> stream channelization
<input type="checkbox"/> ditch(es) in or near the wetland	<input type="checkbox"/> point source discharge(s) (non-stormwater)												
<input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> filling/grading activities in or near the wetland												
<input type="checkbox"/> dike(s) in or near the wetland	<input type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland												
<input checked="" type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland												
<input checked="" type="checkbox"/> stormwater inputs (addition of water)	<input type="checkbox"/> other (specify)												
<input type="checkbox"/> stream channelization	<input type="checkbox"/> other (specify)												
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.)
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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.

- | | |
|--|---|
| <input type="checkbox"/> human-induced erosion or exposure | <input type="checkbox"/> plowing, disking |
| <input type="checkbox"/> human-induced sedimentation or burial | <input type="checkbox"/> intensive grazing (hooves) |
| <input type="checkbox"/> filling | <input type="checkbox"/> off-road vehicle use |
| <input type="checkbox"/> grading | <input type="checkbox"/> construction vehicle use |
| <input type="checkbox"/> dredging | <input checked="" type="checkbox"/> 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" alteration affects less than 10% of the Wetland. Check (✓) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland.

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

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: <ul style="list-style-type: none"> • 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.		Score
<input type="checkbox"/> 1. Contains USFWS-designated Critical Habitat <input type="checkbox"/> 2. Federal or State-listed T/E Plant or Animal Species <input type="checkbox"/> 3. S1, S2, or S3 Natural Community Type (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 4. Southern Bog (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 5. Old-Growth/Mature Forested Wetland (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 6. Great Lakes Coastal Wetland		0.0
5b. Forested Wetland. 5 points.		Score
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.		0.0
5c. Urban/Suburban Wetland. 5 points.		Score
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.		0.0
5d. Low-Quality Wetland. Negative 10 points.		Score
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.		-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 to 1 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*)**

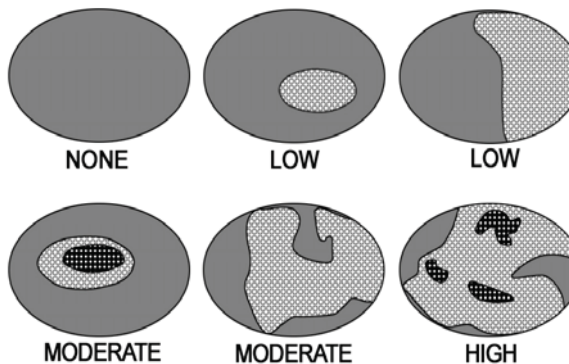
Non-native, Invasive: Hybridization may have occurred if most plants within the same local stand do not cleanly fit the characteristics of either pure species described above. The gap between the male and female portions of the flower spikes is highly variable, with many plants within the same local 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 <u>high</u> degree of interspersion	5 pts	0.0
Wetland has a <u>moderate</u> degree of interspersion	3 pts	
Wetland has a <u>low</u> degree of interspersion	1 pt	
Wetland has <u>no</u> 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.)
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Metric 7. Scenic, Recreational, and Cultural Value

Maximum 3 points.

Select <u>all that apply</u> . 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.)
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MiRAM Summary

Narrative Rating

- Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat
 Question 2: Threatened or Endangered (T/E) Species Habitat
 Question 3: Rare Wetland Natural Community Type
 Question 4: Great Lakes Coastal Wetland

- YES NO
 YES NO
 YES NO
 YES NO

Quantitative Rating

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

Score	Maximum
3.0	9
1.0	12
12.0	26
4.0	20
-10.0	10
3.0	20
1.0	3
	10

Grand Total
*Add totals from
 all seven metrics*

14.0	100 Max.
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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? <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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:

- | | |
|--|---|
| <input type="checkbox"/> Hydrologic Condition and Interactions | <input type="checkbox"/> Vegetation Diversity |
| <input type="checkbox"/> Hydrologic Alterations | <input type="checkbox"/> Vegetation Condition |
| <input type="checkbox"/> Substrate/Soil Disturbances | <input type="checkbox"/> Amount of Open Water |
| <input type="checkbox"/> Habitat Structure Development | <input type="checkbox"/> Percent of Invasive/Non-native Species |
| <input type="checkbox"/> Habitat Alterations | <input type="checkbox"/> Community Interspersion |
| <input type="checkbox"/> Habitat/Wetland Condition | <input type="checkbox"/> Vertical/Horizontal Structure |
| <input type="checkbox"/> Amphibian Breeding Pools | <input type="checkbox"/> 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 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.

<p>1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat. Is any part of the Wetland located within an area designated as Critical Habitat <u>and</u> does the Wetland <i>actually</i> contain habitat suitable for either species listed below?</p> <p>Piping Plover (<i>Charadrius melodus</i>) 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</p> <p>Hines's Emerald Dragonfly (<i>Somatochlora Hineana</i>) 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</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>
<p>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.</p> <p>a. <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c.</p> <p>b. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>c. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>d. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>e. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE.</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>
<p>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</p> <p><input type="checkbox"/> 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 <i>MiRAM User's Manual</i> for more information.</p> <p><input type="checkbox"/> Southern Bog, defined as any bog occurring <u>below the northern limit</u> of Michigan's Floristic Tension Zone (see figure for approximate location).</p> <p><input type="checkbox"/> 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?</p> <p><small>*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.</small></p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>  <p>Floristic Tension Zone</p>
<p>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?</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>

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	3.0
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	

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.			Score
Buffers Include: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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 		
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:	<ul style="list-style-type: none"> maturing forest natural grassland, prairie 	<ul style="list-style-type: none"> designated wildlife area other wetland, lake, river 	6 pts
Low Intensity:	<ul style="list-style-type: none"> shrubland/young forest recent selective logging hay field (non-row crop) 	<ul style="list-style-type: none"> lightly managed parkland old field, lightly grazed pasture one-lane road/two track 	4 pts
Moderately High Intensity:	<ul style="list-style-type: none"> residential & lawns manicured parkland golf course 	<ul style="list-style-type: none"> conservation tillage recent clear-cut (<10 years) two-lane road 	2 pts
High Intensity:	<ul style="list-style-type: none"> commercial, industrial high-density residential heavily grazed pasture row crop field 	<ul style="list-style-type: none"> 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 (<i>Symplocarpus foetidus</i>) 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 <i>riparian</i> 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		Score
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 <u>at least 25%</u> of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, <u>select all that apply and average the points</u> . Round to the nearest 0.5 increment. Maximum 4 points.		
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		Score											
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. <table border="0" style="width: 100%;"> <tr> <td><input type="checkbox"/> ditch(es) in or near the wetland</td> <td><input checked="" type="checkbox"/> point source discharge(s) (non-stormwater)</td> </tr> <tr> <td><input type="checkbox"/> tile(s) in or near the wetland</td> <td><input type="checkbox"/> filling/grading activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/> dike(s) in or near the wetland</td> <td><input checked="" type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input checked="" type="checkbox"/> weir(s) in or near the wetland</td> <td><input type="checkbox"/> dredging activities in or near the wetland</td> </tr> <tr> <td><input checked="" type="checkbox"/> stormwater inputs (addition of water)</td> <td><input type="checkbox"/> other (specify)</td> </tr> <tr> <td><input type="checkbox"/> stream channelization</td> <td><input type="checkbox"/> other (specify)</td> </tr> </table> <p>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).</p> <p>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.</p>			<input type="checkbox"/> ditch(es) in or near the wetland	<input checked="" type="checkbox"/> point source discharge(s) (non-stormwater)	<input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> filling/grading activities in or near the wetland	<input type="checkbox"/> dike(s) in or near the wetland	<input checked="" type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland	<input checked="" type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland	<input checked="" type="checkbox"/> stormwater inputs (addition of water)	<input type="checkbox"/> other (specify)	<input type="checkbox"/> stream channelization
<input type="checkbox"/> ditch(es) in or near the wetland	<input checked="" type="checkbox"/> point source discharge(s) (non-stormwater)												
<input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> filling/grading activities in or near the wetland												
<input type="checkbox"/> dike(s) in or near the wetland	<input checked="" type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland												
<input checked="" type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland												
<input checked="" type="checkbox"/> stormwater inputs (addition of water)	<input type="checkbox"/> other (specify)												
<input type="checkbox"/> stream channelization	<input type="checkbox"/> other (specify)												
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.)
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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.

- | | |
|--|---|
| <input type="checkbox"/> human-induced erosion or exposure | <input type="checkbox"/> plowing, disking |
| <input type="checkbox"/> human-induced sedimentation or burial | <input type="checkbox"/> intensive grazing (hooves) |
| <input checked="" type="checkbox"/> filling | <input type="checkbox"/> off-road vehicle use |
| <input checked="" type="checkbox"/> grading | <input type="checkbox"/> construction vehicle use |
| <input type="checkbox"/> dredging | <input type="checkbox"/> 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
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
		3.0

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" alteration affects less than 10% of the Wetland. Check (✓) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland.

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

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
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
		6.0

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: <ul style="list-style-type: none"> • 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.		Score
<input type="checkbox"/> 1. Contains USFWS-designated Critical Habitat <input type="checkbox"/> 2. Federal or State-listed T/E Plant or Animal Species <input type="checkbox"/> 3. S1, S2, or S3 Natural Community Type (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 4. Southern Bog (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 5. Old-Growth/Mature Forested Wetland (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 6. Great Lakes Coastal Wetland		0.0
5b. Forested Wetland. 5 points.		Score
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.		0.0
5c. Urban/Suburban Wetland. 5 points.		Score
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.		5.0
5d. Low-Quality Wetland. Negative 10 points.		Score
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.		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 to 1 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*)**

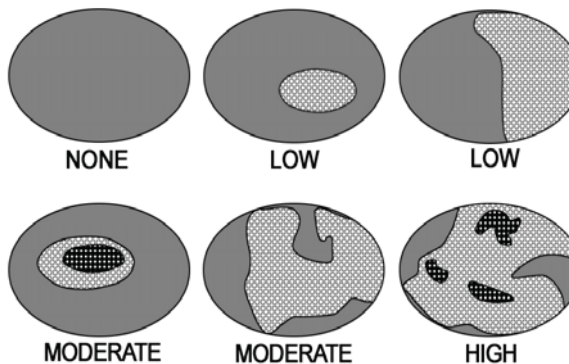
Non-native, Invasive: Hybridization may have occurred if most plants within the same local stand do not cleanly fit the characteristics of either pure species described above. The gap between the male and female portions of the flower spikes is highly variable, with many plants within the same local 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 <u>high</u> degree of interspersion	5 pts	1.0
Wetland has a <u>moderate</u> degree of interspersion	3 pts	
Wetland has a <u>low</u> degree of interspersion	1 pt	
Wetland has <u>no</u> 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.)
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Metric 7. Scenic, Recreational, and Cultural Value

Maximum 3 points.

Select <u>all that apply</u> . 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.)
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MiRAM Summary

Narrative Rating

- Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat
 Question 2: Threatened or Endangered (T/E) Species Habitat
 Question 3: Rare Wetland Natural Community Type
 Question 4: Great Lakes Coastal Wetland

- YES NO
 YES NO
 YES NO
 YES NO

Quantitative Rating

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

Score	Maximum
6.0	9
1.0	12
17.0	26
12.0	20
5.0	10
2.0	20
1.0	3
	10

Grand Total
*Add totals from
 all seven metrics*

44.0	100 Max.
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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? <input checked="" type="checkbox"/> YES <input type="checkbox"/> 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
Elymus virginicus	Toxicodendron radicans
Impatiens capensis	Verbena hastata
Lysimachia nummularia	Verbena urticifolia

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

- | | |
|--|---|
| <input type="checkbox"/> Hydrologic Condition and Interactions | <input type="checkbox"/> Vegetation Diversity |
| <input type="checkbox"/> Hydrologic Alterations | <input type="checkbox"/> Vegetation Condition |
| <input type="checkbox"/> Substrate/Soil Disturbances | <input type="checkbox"/> Amount of Open Water |
| <input type="checkbox"/> Habitat Structure Development | <input type="checkbox"/> Percent of Invasive/Non-native Species |
| <input type="checkbox"/> Habitat Alterations | <input type="checkbox"/> Community Interspersion |
| <input type="checkbox"/> Habitat/Wetland Condition | <input type="checkbox"/> Vertical/Horizontal Structure |
| <input type="checkbox"/> Amphibian Breeding Pools | <input type="checkbox"/> 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.

<p>1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat. Is any part of the Wetland located within an area designated as Critical Habitat <u>and</u> does the Wetland <i>actually</i> contain habitat suitable for either species listed below?</p> <p>Piping Plover (<i>Charadrius melodus</i>) 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</p> <p>Hines's Emerald Dragonfly (<i>Somatochlora Hineana</i>) 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</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>
<p>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.</p> <p>a. <input type="checkbox"/> YES <input type="checkbox"/> NO Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c.</p> <p>b. <input type="checkbox"/> YES <input type="checkbox"/> 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.</p> <p>c. <input type="checkbox"/> YES <input type="checkbox"/> 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.</p> <p>d. <input type="checkbox"/> YES <input type="checkbox"/> 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.</p> <p>e. <input type="checkbox"/> YES <input type="checkbox"/> 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.</p> <p>The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE.</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>
<p>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</p> <p><input type="checkbox"/> 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 <i>MiRAM User's Manual</i> for more information.</p> <p><input type="checkbox"/> Southern Bog, defined as any bog occurring <u>below the northern limit</u> of Michigan's Floristic Tension Zone (see figure for approximate location).</p> <p><input type="checkbox"/> 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?</p> <p><small>*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.</small></p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>  <p>Floristic Tension Zone</p>
<p>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?</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>

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	3.0
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	

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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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:	<ul style="list-style-type: none"> maturing forest natural grassland, prairie 	<ul style="list-style-type: none"> designated wildlife area other wetland, lake, river 	6 pts
Low Intensity:	<ul style="list-style-type: none"> shrubland/young forest recent selective logging hay field (non-row crop) 	<ul style="list-style-type: none"> lightly managed parkland old field, lightly grazed pasture one-lane road/two track 	4 pts
Moderately High Intensity:	<ul style="list-style-type: none"> residential & lawns manicured parkland golf course 	<ul style="list-style-type: none"> conservation tillage recent clear-cut (<10 years) two-lane road 	2 pts
High Intensity:	<ul style="list-style-type: none"> commercial, industrial high-density residential heavily grazed pasture row crop field 	<ul style="list-style-type: none"> 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 <u>all that apply</u>. 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 (<i>Symplocarpus foetidus</i>) 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 <u>all that apply</u>. 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 <i>riparian</i> 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		Score
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 <u>at least 25%</u> of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, <u>select all that apply and average the points</u> . Round to the nearest 0.5 increment. Maximum 4 points.		
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		Score	
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. <input checked="" type="checkbox"/> ditch(es) in or near the wetland <input type="checkbox"/> point source discharge(s) (non-stormwater) <input type="checkbox"/> tile(s) in or near the wetland <input type="checkbox"/> filling/grading activities in or near the wetland <input type="checkbox"/> dike(s) in or near the wetland <input checked="" type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland <input type="checkbox"/> weir(s) in or near the wetland <input type="checkbox"/> dredging activities in or near the wetland <input checked="" type="checkbox"/> stormwater inputs (addition of water) <input type="checkbox"/> other (specify) <input checked="" type="checkbox"/> stream channelization <input type="checkbox"/> 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.			
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.

- | | |
|---|---|
| <input checked="" type="checkbox"/> human-induced erosion or exposure | <input type="checkbox"/> plowing, disking |
| <input checked="" type="checkbox"/> human-induced sedimentation or burial | <input type="checkbox"/> intensive grazing (hooves) |
| <input type="checkbox"/> filling | <input type="checkbox"/> off-road vehicle use |
| <input type="checkbox"/> grading | <input type="checkbox"/> construction vehicle use |
| <input checked="" type="checkbox"/> dredging | <input type="checkbox"/> 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" alteration affects less than 10% of the Wetland. Check (✓) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland.

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

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: <ul style="list-style-type: none"> • 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.		Score
<input type="checkbox"/> 1. Contains USFWS-designated Critical Habitat <input type="checkbox"/> 2. Federal or State-listed T/E Plant or Animal Species <input type="checkbox"/> 3. S1, S2, or S3 Natural Community Type (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 4. Southern Bog (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 5. Old-Growth/Mature Forested Wetland (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 6. Great Lakes Coastal Wetland		0.0
5b. Forested Wetland. 5 points.		Score
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.		0.0
5c. Urban/Suburban Wetland. 5 points.		Score
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.		5.0
5d. Low-Quality Wetland. Negative 10 points.		Score
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.		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 (<i>Phragmites australis</i>) | • narrow-leaved cattail (<i>Typha angustifolia</i>) |
| • purple loosestrife (<i>Lythrum salicaria</i>) | • hybrid cattail (<i>Typha x glauca</i>) |
| • reed canary grass (<i>Phalaris arundinacea</i>) | • marsh thistle (<i>Cirsium palustre</i>) |
| • common buckthorn (<i>Rhamnus cathartica</i>) | • multiflora rose (<i>Rosa multiflora</i>) |
| • glossy buckthorn (<i>Rhamnus frangula</i>) | • non-native honeysuckle (<i>Lonicera</i> 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 to 1 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*)**

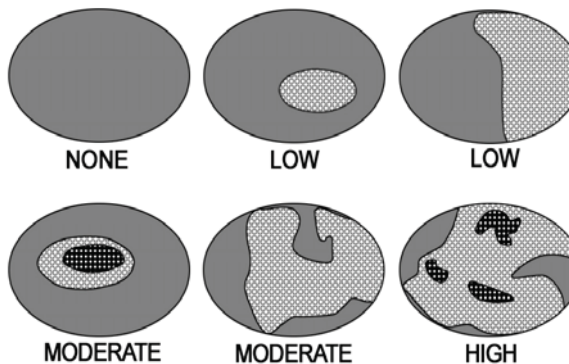
Non-native, Invasive: Hybridization may have occurred if most plants within the same local stand do not cleanly fit the characteristics of either pure species described above. The gap between the male and female portions of the flower spikes is highly variable, with many plants within the same local 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 <u>high</u> degree of interspersion	5 pts	1.0
Wetland has a <u>moderate</u> degree of interspersion	3 pts	
Wetland has a <u>low</u> degree of interspersion	1 pt	
Wetland has <u>no</u> 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.)
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Metric 7. Scenic, Recreational, and Cultural Value

Maximum 3 points.

Select <u>all that apply</u> . 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.)
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MiRAM Summary

Narrative Rating

- Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat
 Question 2: Threatened or Endangered (T/E) Species Habitat
 Question 3: Rare Wetland Natural Community Type
 Question 4: Great Lakes Coastal Wetland

- YES NO
 YES NO
 YES NO
 YES NO

Quantitative Rating

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

Score	Maximum
6.0	9
3.0	12
18.5	26
13.0	20
5.0	10
7.0	20
0.0	3
	10

Grand Total
*Add totals from
 all seven metrics*

52.5	100 Max.
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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? <input checked="" type="checkbox"/> YES <input type="checkbox"/> 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 allegheniensis	

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 bebbii	Onoclea sensibilis
Carex lacustris	Phalaris arundinacea
Carex vulpinoidea	Polygonum virginianum

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

- | | |
|--|---|
| <input type="checkbox"/> Hydrologic Condition and Interactions | <input type="checkbox"/> Vegetation Diversity |
| <input type="checkbox"/> Hydrologic Alterations | <input type="checkbox"/> Vegetation Condition |
| <input type="checkbox"/> Substrate/Soil Disturbances | <input type="checkbox"/> Amount of Open Water |
| <input type="checkbox"/> Habitat Structure Development | <input type="checkbox"/> Percent of Invasive/Non-native Species |
| <input type="checkbox"/> Habitat Alterations | <input type="checkbox"/> Community Interspersion |
| <input type="checkbox"/> Habitat/Wetland Condition | <input type="checkbox"/> Vertical/Horizontal Structure |
| <input type="checkbox"/> Amphibian Breeding Pools | <input type="checkbox"/> 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 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.

<p>1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat. Is any part of the Wetland located within an area designated as Critical Habitat <u>and</u> does the Wetland <i>actually</i> contain habitat suitable for either species listed below?</p> <p>Piping Plover (<i>Charadrius melodus</i>) 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</p> <p>Hines's Emerald Dragonfly (<i>Somatochlora Hineana</i>) 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</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>
<p>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.</p> <p>a. <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c.</p> <p>b. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>c. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>d. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>e. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE.</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>
<p>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</p> <p><input type="checkbox"/> 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 <i>MiRAM User's Manual</i> for more information.</p> <p><input type="checkbox"/> Southern Bog, defined as any bog occurring <u>below the northern limit</u> of Michigan's Floristic Tension Zone (see figure for approximate location).</p> <p><input type="checkbox"/> 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?</p> <p><small>*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.</small></p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>  <p>Floristic Tension Zone</p>
<p>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?</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>

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	3.0
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	

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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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:	<ul style="list-style-type: none"> maturing forest natural grassland, prairie 	<ul style="list-style-type: none"> designated wildlife area other wetland, lake, river 	6 pts
Low Intensity:	<ul style="list-style-type: none"> shrubland/young forest recent selective logging hay field (non-row crop) 	<ul style="list-style-type: none"> lightly managed parkland old field, lightly grazed pasture one-lane road/two track 	4 pts
Moderately High Intensity:	<ul style="list-style-type: none"> residential & lawns manicured parkland golf course 	<ul style="list-style-type: none"> conservation tillage recent clear-cut (<10 years) two-lane road 	2 pts
High Intensity:	<ul style="list-style-type: none"> commercial, industrial high-density residential heavily grazed pasture row crop field 	<ul style="list-style-type: none"> 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 (<i>Symplocarpus foetidus</i>) 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 <i>riparian</i> 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		Score
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 <u>at least 25%</u> of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, <u>select all that apply and average the points</u> . Round to the nearest 0.5 increment. Maximum 4 points.		
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		Score	
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. <input checked="" type="checkbox"/> ditch(es) in or near the wetland <input type="checkbox"/> point source discharge(s) (non-stormwater) <input type="checkbox"/> tile(s) in or near the wetland <input type="checkbox"/> filling/grading activities in or near the wetland <input type="checkbox"/> dike(s) in or near the wetland <input type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland <input type="checkbox"/> weir(s) in or near the wetland <input type="checkbox"/> dredging activities in or near the wetland <input type="checkbox"/> stormwater inputs (addition of water) <input type="checkbox"/> other (specify) <input type="checkbox"/> stream channelization <input type="checkbox"/> 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.			
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.

- | | |
|---|--|
| <input checked="" type="checkbox"/> human-induced erosion or exposure | <input type="checkbox"/> plowing, disking |
| <input checked="" type="checkbox"/> human-induced sedimentation or burial | <input type="checkbox"/> intensive grazing (hooves) |
| <input checked="" type="checkbox"/> filling | <input checked="" type="checkbox"/> off-road vehicle use |
| <input checked="" type="checkbox"/> grading | <input checked="" type="checkbox"/> construction vehicle use |
| <input type="checkbox"/> dredging | <input type="checkbox"/> 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" alteration affects less than 10% of the Wetland. Check (✓) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland.

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

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: <ul style="list-style-type: none"> • 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.			
<input type="checkbox"/> 1. Contains USFWS-designated Critical Habitat <input type="checkbox"/> 2. Federal or State-listed T/E Plant or Animal Species <input type="checkbox"/> 3. S1, S2, or S3 Natural Community Type (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 4. Southern Bog (at least 5 acres <u>or</u> 25% of the Wetland) <input checked="" type="checkbox"/> 5. Old-Growth/Mature Forested Wetland (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 6. Great Lakes Coastal Wetland			Score
			10.0
5b. Forested Wetland. 5 points.			Score
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.			5.0
5c. Urban/Suburban Wetland. 5 points.			Score
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.			0.0
5d. Low-Quality Wetland. Negative 10 points.			Score
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.			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		

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

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.

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

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 to 1 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*)**

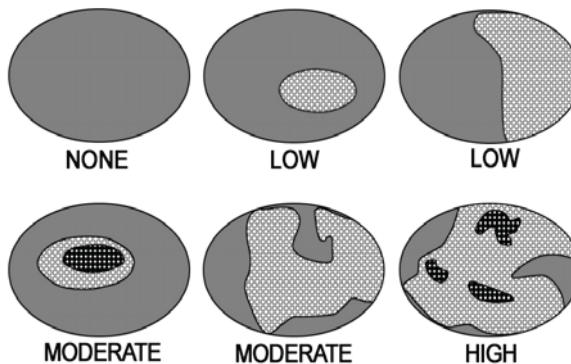
Non-native, Invasive: Hybridization may have occurred if most plants within the same local stand do not cleanly fit the characteristics of either pure species described above. The gap between the male and female portions of the flower spikes is highly variable, with many plants within the same local 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 <u>high</u> degree of interspersion	5 pts	2.0
Wetland has a <u>moderate</u> degree of interspersion	3 pts	
Wetland has a <u>low</u> degree of interspersion	1 pt	
Wetland has <u>no</u> 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.)
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Metric 7. Scenic, Recreational, and Cultural Value

Maximum 3 points.

Select <u>all that apply</u> . 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.)
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MiRAM Summary

Narrative Rating

- Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat
 Question 2: Threatened or Endangered (T/E) Species Habitat
 Question 3: Rare Wetland Natural Community Type
 Question 4: Great Lakes Coastal Wetland

- YES NO
 YES NO
 YES NO
 YES NO

Quantitative Rating

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

Score	Maximum
6.0	9
5.0	12
13.0	26
17.0	20
15.0	10
13.0	20
1.0	3
	10

Grand Total
*Add totals from
 all seven metrics*

70.0	100 Max.
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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? <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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 bebbii	Juncus effusus
Carex vulpinoidea	Lythrum salicaria
Cyperus strigosus	Mentha arvensis
Dipsacus laciniatus	Scirpus atrovirens
Eupatorium maculatum	Scirpus cyperinus
Euthamia graminifolia	Solidago gigantea

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

- | | |
|--|---|
| <input type="checkbox"/> Hydrologic Condition and Interactions | <input type="checkbox"/> Vegetation Diversity |
| <input type="checkbox"/> Hydrologic Alterations | <input type="checkbox"/> Vegetation Condition |
| <input type="checkbox"/> Substrate/Soil Disturbances | <input type="checkbox"/> Amount of Open Water |
| <input type="checkbox"/> Habitat Structure Development | <input type="checkbox"/> Percent of Invasive/Non-native Species |
| <input type="checkbox"/> Habitat Alterations | <input type="checkbox"/> Community Interspersion |
| <input type="checkbox"/> Habitat/Wetland Condition | <input type="checkbox"/> Vertical/Horizontal Structure |
| <input type="checkbox"/> Amphibian Breeding Pools | <input type="checkbox"/> 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 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.

<p>1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat. Is any part of the Wetland located within an area designated as Critical Habitat <u>and</u> does the Wetland <i>actually</i> contain habitat suitable for either species listed below?</p> <p>Piping Plover (<i>Charadrius melodus</i>) 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</p> <p>Hines's Emerald Dragonfly (<i>Somatochlora Hineana</i>) 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</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>
<p>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.</p> <p>a. <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c.</p> <p>b. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>c. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>d. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>e. <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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.</p> <p>The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE.</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>
<p>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</p> <p><input type="checkbox"/> 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 <i>MiRAM User's Manual</i> for more information.</p> <p><input type="checkbox"/> Southern Bog, defined as any bog occurring <u>below the northern limit</u> of Michigan's Floristic Tension Zone (see figure for approximate location).</p> <p><input type="checkbox"/> 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?</p> <p><small>*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.</small></p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>  <p>Floristic Tension Zone</p>
<p>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?</p>	<p><input type="checkbox"/> YES <input checked="" type="checkbox"/> NO</p> <p>If "yes", the Wetland has high functional value.</p>

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	0.0
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	

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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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:	<ul style="list-style-type: none"> maturing forest natural grassland, prairie 	<ul style="list-style-type: none"> designated wildlife area other wetland, lake, river 	6 pts
Low Intensity:	<ul style="list-style-type: none"> shrubland/young forest recent selective logging hay field (non-row crop) 	<ul style="list-style-type: none"> lightly managed parkland old field, lightly grazed pasture one-lane road/two track 	4 pts
Moderately High Intensity:	<ul style="list-style-type: none"> residential & lawns manicured parkland golf course 	<ul style="list-style-type: none"> conservation tillage recent clear-cut (<10 years) two-lane road 	2 pts
High Intensity:	<ul style="list-style-type: none"> commercial, industrial high-density residential heavily grazed pasture row crop field 	<ul style="list-style-type: none"> 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 <u>all that apply</u>. 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 (<i>Symplocarpus foetidus</i>) 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 <u>all that apply</u>. 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 <i>riparian</i> 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		Score
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 <u>at least 25%</u> of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, <u>select all that apply and average the points</u> . Round to the nearest 0.5 increment. Maximum 4 points.		
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		Score											
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. <table border="0" style="width: 100%; margin-top: 10px;"> <tr> <td><input type="checkbox"/> ditch(es) in or near the wetland</td> <td><input type="checkbox"/> point source discharge(s) (non-stormwater)</td> </tr> <tr> <td><input type="checkbox"/> tile(s) in or near the wetland</td> <td><input type="checkbox"/> filling/grading activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/> dike(s) in or near the wetland</td> <td><input type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/> weir(s) in or near the wetland</td> <td><input type="checkbox"/> dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/> stormwater inputs (addition of water)</td> <td><input type="checkbox"/> other (specify)</td> </tr> <tr> <td><input type="checkbox"/> stream channelization</td> <td><input type="checkbox"/> other (specify)</td> </tr> </table> <p>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).</p> <p>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.</p>			<input type="checkbox"/> ditch(es) in or near the wetland	<input type="checkbox"/> point source discharge(s) (non-stormwater)	<input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> filling/grading activities in or near the wetland	<input type="checkbox"/> dike(s) in or near the wetland	<input type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland	<input type="checkbox"/> stormwater inputs (addition of water)	<input type="checkbox"/> other (specify)	<input type="checkbox"/> stream channelization
<input type="checkbox"/> ditch(es) in or near the wetland	<input type="checkbox"/> point source discharge(s) (non-stormwater)												
<input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> filling/grading activities in or near the wetland												
<input type="checkbox"/> dike(s) in or near the wetland	<input type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland												
<input type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland												
<input type="checkbox"/> stormwater inputs (addition of water)	<input type="checkbox"/> other (specify)												
<input type="checkbox"/> stream channelization	<input type="checkbox"/> other (specify)												
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.

- | | |
|---|--|
| <input checked="" type="checkbox"/> human-induced erosion or exposure | <input type="checkbox"/> plowing, disking |
| <input checked="" type="checkbox"/> human-induced sedimentation or burial | <input type="checkbox"/> intensive grazing (hooves) |
| <input checked="" type="checkbox"/> filling | <input checked="" type="checkbox"/> off-road vehicle use |
| <input checked="" type="checkbox"/> grading | <input checked="" type="checkbox"/> construction vehicle use |
| <input type="checkbox"/> dredging | <input type="checkbox"/> 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" alteration affects less than 10% of the Wetland. Check (✓) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland.

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

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: <ul style="list-style-type: none"> • 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.		Score
<input type="checkbox"/> 1. Contains USFWS-designated Critical Habitat <input type="checkbox"/> 2. Federal or State-listed T/E Plant or Animal Species <input type="checkbox"/> 3. S1, S2, or S3 Natural Community Type (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 4. Southern Bog (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 5. Old-Growth/Mature Forested Wetland (at least 5 acres <u>or</u> 25% of the Wetland) <input type="checkbox"/> 6. Great Lakes Coastal Wetland		0.0
5b. Forested Wetland. 5 points.		Score
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.		0.0
5c. Urban/Suburban Wetland. 5 points.		Score
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.		0.0
5d. Low-Quality Wetland. Negative 10 points.		Score
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.		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

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 to 1 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*)**

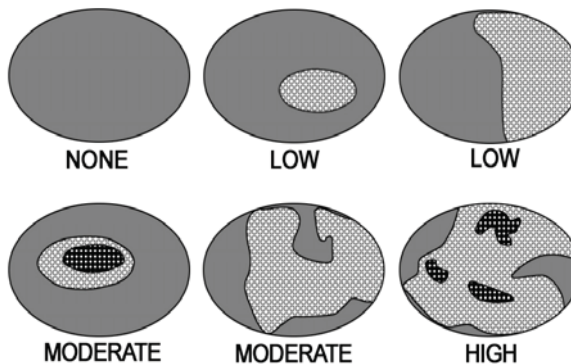
Non-native, Invasive: Hybridization may have occurred if most plants within the same local stand do not cleanly fit the characteristics of either pure species described above. The gap between the male and female portions of the flower spikes is highly variable, with many plants within the same local 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 <u>high</u> degree of interspersion	5 pts	1.0
Wetland has a <u>moderate</u> degree of interspersion	3 pts	
Wetland has a <u>low</u> degree of interspersion	1 pt	
Wetland has <u>no</u> 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.)
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Metric 7. Scenic, Recreational, and Cultural Value

Maximum 3 points.

Select <u>all that apply</u> . 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.)
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MiRAM Summary

Narrative Rating

- Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat
 Question 2: Threatened or Endangered (T/E) Species Habitat
 Question 3: Rare Wetland Natural Community Type
 Question 4: Great Lakes Coastal Wetland

- YES NO
 YES NO
 YES NO
 YES NO

Quantitative Rating

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

Score	Maximum
3.0	9
5.0	12
10.0	26
11.0	20
0.0	10
5.0	20
0.0	3
	10

Grand Total
*Add totals from
 all seven metrics*

34.0	100 Max.
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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 TONQUOSH CREEK		LOCATION (road crossing) WARREN & HAGERTY RD	
COUNTY/TOWNSHIP WARREN COUNTY / CANTON TOWNSHIP		T 2	R 8
LAT(dd) DMS 42° 20' 06.2614		LONG (dd) 83° 26' 46.7761	
STORET #		RIVER BASIN ROUGE RIVER	
INVESTIGATOR(S) M. BECKENFELDER T. ESTROM S. KOGGE		HUC CODE 040900040202	
DATE 7/31/12		ECOREGION MAUMEE LAKE PLANE	
TIME 8:45 (AM) (PM)		REASON FOR SURVEY <input checked="" type="checkbox"/> Targeted: comment _____ <input type="checkbox"/> Randomized: VSEC # _____ VSEC description (eg. cold small)	

WEATHER CONDITIONS	WATERSHED FEATURES
Current <input type="checkbox"/> Sunny <input checked="" type="checkbox"/> Partly Cloudy <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy	Predominant Surrounding Land Use <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Commercial <input checked="" type="checkbox"/> Field/Pasture <input checked="" type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Residential <input type="checkbox"/> Other _____
Has there been a significant rain in the last 7 days? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know	Local Watershed NPS Pollution <input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious Sources
Air Temperature 78 °F	Local Watershed Erosion <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy

RIPARIAN VEGETATION	ESTIMATE BUFFER WIDTH
Indicate the dominant type and record the dominant species <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs Species: <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous	Estimate buffer width (left) 50 ft (right) 50 ft

STREAM CHARACTERIZATION	INSTREAM FEATURES
Stream Subsystem <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Lake Outlet Influenced <input type="checkbox"/> Dam Influenced	Avg. Stream Width 15 ft Avg. Stream Depth 0.8 ft
Stream Origin <input type="checkbox"/> Spring Fed <input type="checkbox"/> Lake/Pond <input type="checkbox"/> Swamp, Marsh, Bog <input type="checkbox"/> Mixture of origins <input type="checkbox"/> Other _____	Surface Velocity _____ ft/sec Est. Flow 31.5 cfs (at thalweg) Est. Survey Reach Length 210 ft
Stream Modifications <input type="checkbox"/> None <input type="checkbox"/> Dredged <input type="checkbox"/> Canopy Removal <input type="checkbox"/> Snagging <input type="checkbox"/> Impounded <input type="checkbox"/> Relocated <input type="checkbox"/> Bank Stabilization <input type="checkbox"/> Habitat Improvement	Survey Reach Area 3500 ft ² High Water Mark 7-8 ft
Stream Type <input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater	Canopy Cover: 65 % Shaded

AQUATIC VEGETATION	PORTION OF THE REACH WITH AQUATIC VEGETATION
<input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating	<input type="checkbox"/> Free Floating <input type="checkbox"/> Floating algae <input type="checkbox"/> Attached algae
	Portion of the reach with aquatic vegetation <input type="radio"/> % Nuisance aquatic plants or slimes present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Dominant species present _____

WATER QUALITY	SOLIDS, TURBIDITY	COLOR	SURFACE OILS	WATER ODORS
Temperature 72 °F	<input type="checkbox"/> Clear <input checked="" type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid	<input type="checkbox"/> Clear <input checked="" type="checkbox"/> Stained <input type="checkbox"/> Opaque <input type="checkbox"/> Colored _____ <input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> None <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Slick <input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____
Water Samples Taken <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ <input type="checkbox"/> GA <input type="checkbox"/> GN <input type="checkbox"/> MA <input type="checkbox"/> MN <input type="checkbox"/> VOA <input type="checkbox"/> ON	<input type="checkbox"/> Floating solids <input type="checkbox"/> Suspended solids <input type="checkbox"/> Settleable solids <input type="checkbox"/> Foams			

SEDIMENT	SEDIMENT ODORS	DEPOSITS
Sediment Samples Taken <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ <input type="checkbox"/> MS <input type="checkbox"/> GS <input type="checkbox"/> VOA <input type="checkbox"/> OS/BNA	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> None <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input type="checkbox"/> Other _____
Oils <input type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse		
Looking at stones that are not deeply embedded, are the undersides black in color? <input type="checkbox"/> Yes <input type="checkbox"/> No		

TONGUESH 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"		Muck-Mud	black, very fine organic (FPOM)	5
Cobble	2.5"-10"		Other	SAND/GRAVEL	85
Gravel	0.1"-2.5"	25			
Sand	Gritty (course)	65			
Silt	Gritty (fine)	5			
Clay	slick	5			

Proportion of Reach Represented by Stream Morphology Types	Additional Structure Available for Macroinvertebrate Colonization			
	Extensive	Moderate	Sparse	Absent
<input type="checkbox"/> Riffle 10 %	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Run 35 %	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Pool 65 %	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Depositional _____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Undercut banks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Overhanging vegetation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Large woody debris	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Aquatic macrophytes	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Rootwads	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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

flow

15 ft

0.5
5.5
11.7
7.5
3.5
0.5

3.5m depth

0.5
6.5
9.5
8.0
3.5
0.5

3.5m depth

Time #1 18 sec 0.83 ft/sec

#2 17 0.88

#3 18 sec 0.83

0.85 ft/sec Avg.

10.6 371

315 cfs

135

TONQUISH CREEK

MACROINVERTEBRATES

Station: ST# | SITE |

Area Sampled: 210x15

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 _____
- Ametropbidae _____
- Baetiscidae _____
- Baetidae ; (2)
- Caenidae _____
- Ephemerellidae _____
- Ephemeridae _____
- Heptageniidae _____
- Isonychiidae _____
- Leptophlebiidae _____
- Metropodidae _____
- Polymitarcyidae _____
- Potamanthidae _____
- Siphonuridae _____
- Tricorythidae _____
- Odonata _____
- Anisoptera _____
- Aeshnidae _____
- Cordulegastriidae _____
- Corduliidae _____
- Gomphidae _____
- Libellulidae _____
- Macroniidae _____
- Zygoptera _____
- Calopterygidae (1)
- Coenagrionidae (24)
- Lestidae _____
- Plecoptera _____
- Capniidae _____
- Chloroperlidae _____
- Leuctridae _____
- Nemouridae _____
- Peltoperlidae _____
- Perlidae _____
- Perlodidae _____
- Pteronarcyidae _____
- Taeniopterygidae _____

- Hemiptera _____
- Belostomatidae _____
- Corixidae ; (3)
- Gelastocoridae _____
- Gerridae (17)
- Mesovellidae _____
- 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)

- Diptera _____
- Athericidae _____
- Ceratopogonidae ; (2)
- Chaoboridae _____
- Chironomidae (114)
- Culicidae _____
- Dixidae _____
- Dolichopodidae _____
- Empididae _____
- Ephydriidae _____
- Muscidae _____
- Psychodidae _____
- Ptychopteridae _____
- Sciomyzidae _____
- Simuliidae ; (4)
- Stratiomyidae _____
- Syrphidae _____
- Tabanidae _____
- Thaumaleidae _____
- Tipulidae _____
- MOLLUSCA _____
- Gastropoda _____
- Ancylidae (14)
- Bithyniidae _____
- Hydrobiidae _____
- Lymnaeidae _____
- Physidae _____
- Planorbidae _____
- Pleuroceridae _____
- Pomatopsidae _____
- Valvatidae _____
- Viviparidae _____
- Pelecypoda _____
- Dreissenidae _____
- Pisidiidae _____
- Sphaeriidae _____
- Unionidae _____

Other taxa or comments:
 Jukwa D Mayfly

* record # of adults (a) or larvae (l) as indicated

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	GRN SUNFISH	BGILL	CR CHUB	BIRNOSTRICE	FATHHEAD	JINDAMER	ln
1							1
2	1 Deforming		###		###		2
3			#####	⊗ L	###		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							ln
1							1
2					FATHHEAD		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 SAW)

Appendix J (continued)

FISH

Station Number: ST#1 SITE1 - TONGUEH CREEK

Length Sampled (ft): 230 ft

Area Sampled (sq ft): 2300

Sampling Time: 45 mins # Probes: 1

Gear: boat / ss / bps

Passes: 2

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	_____	Perchichthyidae (Temp. bass)	_____
Chestnut lamprey (a/l)	Fathead minnow	<u>28</u>	*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	<u>3</u>
Amiidae (Bowfins)	Southern redbelly dace	_____	*Pumpkinseed	_____
*Bowfin	Finescale dace	_____	*Warmouth	_____
Clupeidae (Herrings)	Blacknose dace	<u>16</u>	*Orangespotted sunfish	_____
*Alewife	Longnose dace	_____	*Bluegill	<u>1</u>
*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. saiid 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	<u>2</u>
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	_____
*Honeyhead chub	*Black bullhead	_____	Anguillidae (Eels)	_____
*River chub	*Brown bullhead	_____	*American eel	_____
*Creek chub	*Yellow bullhead	_____	Gadidae (Cod)	_____
*Golden shiner	Stonercat	_____	*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

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 <10 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 water's 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 water's surface. Channel retention devices (if present) mostly stable and extending partially into the active stream channel.	Bank scour evidence 9-18 inches above the water's 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	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 <u>ST#2 STATE #2 WILLOW CREEK</u>		LOCATION (road crossing) <u>Haggerty RD N of Ford RD</u>	
COUNTY/TOWNSHIP <u>WAYNE COUNTY / CANTON TOWNSHIP</u>		T <u>2S</u> R <u>8E</u> S <u>12</u>	
LAT(dd) DMS <u>42° 19' 33.7999</u>		LONG (dd) <u>83° 26' 51.2039</u>	
STORET #		RIVER BASIN <u>ROUGE RIVER</u>	
INVESTIGATOR(S) <u>T. ESTREM</u> <u>S. KOGGE</u> <u>M. BERNSTEIN</u>		HUC CODE <u>040900040202</u>	
DATE <u>7/31/12</u>		ECOREGION <u>PLUMEE LAKE PLANE</u>	
TIME <u>1:15</u> AM <input checked="" type="checkbox"/> PM		REASON FOR SURVEY <input checked="" type="checkbox"/> Targeted: comment _____ <input type="checkbox"/> Randomized: VSEC # _____ VSEC description (eg. cold small)	

WEATHER CONDITIONS		WATERSHED FEATURES	
Current	Has there been a significant rain in the last 7 days?	Predominant Surrounding	Local Watershed NPS Pollution
<input checked="" type="checkbox"/> Sunny	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Land Use	<input type="checkbox"/> No evidence
<input checked="" type="checkbox"/> Partly Cloudy	<input type="checkbox"/> Don't Know	<input type="checkbox"/> Forest	<input checked="" type="checkbox"/> Some potential sources
<input type="checkbox"/> Cloudy	Air Temperature <u>85</u> °F	<input checked="" type="checkbox"/> Commercial	<input type="checkbox"/> Obvious Sources
<input type="checkbox"/> Rainy		<input type="checkbox"/> Field/Pasture	
		<input checked="" type="checkbox"/> Industrial	Local Watershed Erosion
		<input type="checkbox"/> Agricultural	<input type="checkbox"/> None
		<input type="checkbox"/> Residential	<input checked="" type="checkbox"/> Moderate
		<input type="checkbox"/> Other _____	<input type="checkbox"/> Heavy

RIPARIAN VEGETATION

Indicate the dominant type and record the dominant species

Trees Shrubs Species: SALIX, CORNUS, ACENEG, ACESAI

Grasses Herbaceous

Estimate buffer width (left) 100 ft (right) 35 ft

STREAM CHARACTERIZATION		INSTREAM FEATURES	
Stream Subsystem	Stream Modifications	Avg. Stream Width <u>15</u> ft	Avg. Stream Depth <u>1</u> ft
<input checked="" type="checkbox"/> Perennial	<input type="checkbox"/> None	Surface Velocity <u>0.1</u> ⁰⁰ ft/sec	Est. Flow <u>6.00</u> cfs
<input type="checkbox"/> Intermittent	<input type="checkbox"/> Dredged	(at thalweg)	
<input type="checkbox"/> Lake Outlet Influenced	<input type="checkbox"/> Canopy Removal	Est. Survey Reach Length <u>150</u> ft	
<input type="checkbox"/> Dam influenced	<input type="checkbox"/> Snagging	<u>150x15</u>	
Stream Origin	<input type="checkbox"/> Impounded	Survey Reach Area _____ ft ²	High Water Mark <u>2.5</u> ft
<input type="checkbox"/> Spring Fed	<input type="checkbox"/> Relocated	Canopy Cover: <u>50</u> % Shaded	
<input type="checkbox"/> Lake/Pond	<input type="checkbox"/> Bank Stabilization		
<input type="checkbox"/> Swamp, Marsh, Bog	<input type="checkbox"/> Habitat Improvement		
<input checked="" type="checkbox"/> Mixture of origins	Stream Type		
<input type="checkbox"/> Other _____	<input type="checkbox"/> Coldwater		
	<input checked="" type="checkbox"/> Warmwater		

AQUATIC VEGETATION

Rooted emergent Free Floating

Rooted submergent Floating algae

Rooted floating 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

Globbs

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

Sediment Odors

Normal/None

Sewage

Petroleum

Chemical

Anaerobic

Other _____

Deposits

None

Sludge

Sawdust

Paper fiber

Sand

Relict shells

Other _____

Looking at stones that are not deeply embedded, are the undersides black in color? Yes No

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"		Muck-Mud	black, very fine organic (FPOM)	90
Cobble	2.5"-10"		Other		5 TRASH
Gravel	0.1"-2.5"				
Sand	Gritty (course)	5%			
Silt	Gritty (fine)	45%			
Clay	slick <i>Mock</i>	50%			

Proportion of Reach Represented by Stream Morphology Types	Additional Structure Available for Macroinvertebrate Colonization			
	Extensive	Moderate	Sparse	Absent
<input type="checkbox"/> Riffle _____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Run _____ %	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Pool _____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Depositional <u>100</u> %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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 MAB 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): ops beam shocker boat shocker other

Species	COMSTHENA	BLUNTNSE MINNOW	LM BASS	JAWY DARTER	CRK CHUB	CRK 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									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 ft*

Area Sampled (sq ft):

Sampling Time: *45 mins*

Probes: *1*

Gear: boat / ss / bps

Passes: *2*

Number of Anomalies: *0*

Comments: *Lots of TRASH AND SHEEN IN CREEK*

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	_____	Percichthyidae (Temp. bass)	_____
Chestnut lamprey (a/l)	Fathead minnow	_____	*White bass	_____
American brook lamprey (a/l)	Bluntnose minnow	<u>3</u>	*White perch	_____
Lepisosteiidae (Gars)	Suckermouth minnow	_____	Centrarchidae (Sunfishes)	_____
*Spotted gar	Silverjaw minnow	_____	*Rock bass	_____
*Longnose gar	Northern redbelly dace	_____	*Green sunfish	<u>2</u>
Amiidae (Bowfins)	Southern redbelly dace	_____	*Pumpkinseed	_____
*Bowfin	Finescale dace	_____	*Warmouth	_____
Clupeidae (Herrings)	Blacknose dace	_____	*Orangespotted sunfish	_____
*Alewife	Longnose dace	_____	*Bluegill	_____
*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	<u>1</u>
*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	<u>11</u>
Cyprinidae (Minnows and Carp)	*River redhorse	_____	Blackside darter	_____
Central stone roller	*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	_____
*Honeyhead chub	*Black bullhead	_____	Anguillidae (Eels)	_____
*River chubb	*Brown bullhead	_____	*American eel	_____
*Creek chub	*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

MACROINVERTEBRATES

Station: _____

Area Sampled: 150x15

Time Sampled: 1:15 (15 MIN)

- PORIFERA _____
- PLATYHELMINTHES _____
- Turbellaria (1)
- NEMATOMORPHA _____
- BRYOZOA _____
- ANNELIDA _____
- Hirudinea :: (4)
- Oligochaeta :: (6)
- ARTHROPODA _____
- Crustacea _____
- Amphipoda :: (3)
- Decapoda U (7)
- Isopoda _____
- Arachnoidea _____
- Hydracarina _____
- Insecta _____
- Ephemeroptera _____
- Ametropodidae _____
- Baetiscidae _____
- Baetidae _____
- Caenidae _____
- Ephemerellidae _____
- Ephemeridae _____
- Heptageniidae _____
- Isonychiidae _____
- Leptophlebiidae _____
- Metretopodidae _____
- Polymiarcyidae _____
- Potamanthidae _____
- Siphonuridae _____
- Tricorythidae _____
- Odonata _____
- Anisoptera _____
- Aeshnidae _____
- Cordulegastridae _____
- Corduliidae _____
- Gomphidae X (9)
- Libellulidae U :: (3)
- Macomiidae _____
- Zygoptera _____
- Calopterygidae _____
- Coenagrionidae X: (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 _____
- Psychomyiidae _____
- Rhyacophilidae _____
- Sericosomatidae _____
- Uenidae (Neophylax) _____
- Lepidoptera _____
- Noctuidae _____
- Pyrallidae _____
- Coleoptera* _____
- Dryopidae _____
- Dytiscidae : (2)
- Elmidae _____
- Gyrinidae (a) (1)
- Haliplidae (a) (1)
- Heteroceridae _____
- Hydraenidae _____
- Hydrophilidae _____
- Lampyridae (a) (1)
- Noteridae (a) (1)
- Psephenidae (a) (1)
- Ptilodactylidae (a) (1)
- Sciirtidae (a) (1)

- Diptera _____
- Athericidae _____
- Ceratopogonidae _____
- Chaoboridae _____
- Chironomidae X X X X X (52)
- Culicidae _____
- Dixidae _____
- Dolichopodidae _____
- Empididae _____
- Ephydriidae _____
- Muscidae _____
- Psychodidae _____
- Ptychopteridae _____
- Sciomyzidae _____
- Simuliidae _____
- Stratiomyidae _____
- Syrphidae _____
- Tabanidae _____
- Thaumaleidae _____
- Tipulidae _____
- MOLLUSCA _____
- Gastropoda _____
- Ancylidae _____
- Bithyniidae _____
- Hydrobiidae _____
- Lymnaeidae _____
- Physidae X X X X X X X (19)
- Planorbidae _____
- Pleuroceridae _____
- Pomatiospidae _____
- Valvatidae _____
- Viviparidae • (1)
- Pelecypoda _____
- Dreissenidae _____
- Pisidiidae _____
- Sphaeriidae X X U (28)
- Unionidae _____

Other taxa or comments:

(CORUSCULOUS U) (7)

- SAMPLED ENTIRE FISHERIES REACH

* record # of adults (a) or larvae (l) as indicated

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

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 <u>0</u>	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	<u>0</u>			
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 <u>6</u> (LB)	Left Bank	10	9	8	7	<u>6</u>	5	4	3	2	1	0	Right Bank	10	9	8	<u>7</u>	6	5	4	3	2	1	0
SCORE <u>7</u> (RB)	Left Bank	10	9	8	7	<u>6</u>	5	4	3	2	1	0	Right Bank	10	9	8	<u>7</u>	6	5	4	3	2	1	0
9. Vegetative Protection (score each bank)	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 <u>6</u> (LB)	Left Bank	10	9	8	7	<u>6</u>	5	4	3	2	1	0	Right Bank	10	9	8	7	<u>6</u>	5	4	3	2	1	0
SCORE <u>6</u> (RB)	Left Bank	10	9	8	7	<u>6</u>	5	4	3	2	1	0	Right Bank	10	9	8	7	<u>6</u>	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 <u>9</u> (LB)	Left Bank	10	<u>9</u>	8	7	6	5	4	3	2	1	0	Right Bank	10	9	8	7	6	5	<u>4</u>	3	2	1	0
SCORE <u>4</u> (RB)	Left Bank	10	9	8	7	6	5	4	3	2	1	0	Right Bank	10	9	8	7	6	5	<u>4</u>	3	2	1	0

38

25 TOTAL FROM 1st PAGE

Total Score 63

25
1
84
25
15

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		2s R 8E S	
LAT(dd) 42° 18' 47.5852		LONG(dd) 83° 26' 45.5682	
STORET #		RIVER BASIN ROUGE RIVER	
HUC CODE 040900040202		ECOREGION MAUMEE LAKE PLANE	
INVESTIGATOR(S) M. BERNINGER S. KOGGE T. ESTROM		DATE 7/31/12 TIME 3:50 AM (PM)	
REASON FOR SURVEY <input checked="" type="checkbox"/> Targeted: comment <input type="checkbox"/> Randomized: VSEC # VSEC description (eg. cold small)			

WEATHER CONDITIONS Current <input checked="" type="checkbox"/> Sunny <input checked="" type="checkbox"/> Partly Cloudy <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy		Has there been a significant rain in the last 7 days? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know Air Temperature _____ °F	
WATERSHED FEATURES Predominant Surrounding Land Use <input type="checkbox"/> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Other _____		Local Watershed NPS Pollution <input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious Sources Local Watershed Erosion <input checked="" type="checkbox"/> None <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy	

RIPARIAN VEGETATION Indicate the dominant type and record the dominant species <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Shrubs Species: SALIX, ACENEG, ACCSAI <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous		Estimate buffer width (left) 25 ft (right) 50 ft	
---	--	--	--

STREAM CHARACTERIZATION Stream Subsystem <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Lake Outlet Influenced <input type="checkbox"/> Dam Influenced Stream Origin <input type="checkbox"/> Spring Fed <input type="checkbox"/> Lake/Pond <input type="checkbox"/> Swamp, Marsh, Bog <input checked="" type="checkbox"/> Mixture of origins <input type="checkbox"/> Other _____		Stream Modifications <input type="checkbox"/> None <input type="checkbox"/> Dredged <input type="checkbox"/> Canopy Removal <input type="checkbox"/> Snagging <input type="checkbox"/> Impounded <input type="checkbox"/> Relocated <input type="checkbox"/> Bank Stabilization <input type="checkbox"/> Habitat Improvement Stream Type <input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater	
INSTREAM FEATURES Avg. Stream Width 16 ft Avg. Stream Depth .6 ft Surface Velocity _____ ft/sec Est. Flow 40 cfs (at thalweg) Est. Survey Reach Length 160 ft Survey Reach Area 160 x .5 ft ² High Water Mark 1.5 ft Canopy Cover: 45 % Shaded			

AQUATIC VEGETATION <input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free Floating <input type="checkbox"/> Floating algae <input type="checkbox"/> Attached algae		Portion of the reach with aquatic vegetation _____ % Nuisance aquatic plants or slimes present? Yes <input type="checkbox"/> No <input type="checkbox"/> Dominant species present	
--	--	---	--

WATER QUALITY Temperature 72 °F Solids, Turbidity <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Floating solids <input type="checkbox"/> Suspended solids <input type="checkbox"/> Settleable solids <input type="checkbox"/> Foams		Color <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Stained <input type="checkbox"/> Opaque <input type="checkbox"/> Colored _____ <input type="checkbox"/> Other _____	
Surface Oils <input checked="" type="checkbox"/> None <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Slick <input type="checkbox"/> Other _____		Water Odors <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____	

SEDIMENT Sediment Samples Taken <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ <input type="checkbox"/> MS <input type="checkbox"/> GS <input type="checkbox"/> VOA <input type="checkbox"/> OS/BNA		Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	
Sediment Odors <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> Other _____		Deposits <input checked="" type="checkbox"/> None <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input type="checkbox"/> Other _____	
Looking at stones that are not deeply embedded, are the undersides black in color? <input type="checkbox"/> Yes <input type="checkbox"/> No			

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)	52
Boulder	>10"	2%	Muck-Mud	black, very fine organic (FPOM)	5%
Cobble	2.5"-10"	5	Other	XXXXXX	
Gravel	0.1"-2.5"	3			
Sand	Gritty (course)	90			
Silt	Gritty (fine)				
Clay	slick				

Proportion of Reach Represented by Stream Morphology Types	Additional Structure Available for Macroinvertebrate Colonization			
	Extensive	Moderate	Sparse	Absent
<input type="checkbox"/> Riffle _____ %				
<input checked="" type="checkbox"/> Run <u>100</u> %				
<input type="checkbox"/> Pool _____ %				
<input type="checkbox"/> Depositional _____ %				
	Undercut banks	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Overhanging vegetation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Large woody debris	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Aquatic macrophytes	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Rootwads	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

14.0
Avg 0.4 ← 13.5

0.1
0.4
0.4
0.4
0.1

NEUTRAL BOYANT OBJECT

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	Johnny DARTER	CRK HUB	COM. SHINER	GRN SUNFISH	LGM BASS		ln
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							ln
length (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

Gear: boat / ss bps

Passes: 2

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	_____	Perchichthyidae (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	<u>1</u>
Amiidae (Bowfins)		Southern redbelly dace	_____	*Pumpkinseed	_____
*Bowfin	_____	Finescale dace	_____	*Warmouth	_____
Clupeidae (Herrings)		Blacknose dace	_____	*Orangespotted sunfish	_____
*Alewife	_____	Longnose dace	_____	*Bluegill	_____
*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	<u>1</u>
*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	<u>74</u>
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	_____
*Honeyhead chub	_____	*Black bullhead	_____	Anguillidae (Eels)	
*River chub	_____	*Brown bullhead	_____	*American eel	_____
*Creek chub	_____	*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	<u>3</u>	Aphredoderidae (Pirate perch)		Other family/species:	
Central bignmouth 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 3*

Area Sampled:

Time Sampled: *45 min*

- PORIFERA _____
- PLATYHELMINTHES _____
- Turbellaria *:: (4)*
- NEMATOMORPHA _____
- BRYOZOA _____
- ANNELIDA _____
- Hirudinea *.. (2)*
- Oligochaeta *• (1)*
- ARTHROPODA _____
- Crustacea _____
- Amphipoda _____
- Decapoda *✗ (10)*
- Isopoda *U (7)*
- Arachnoidea _____
- Hydracarina _____
- Insecta _____
- Ephemeroptera _____
- Ametropodidae _____
- Baetiscidae _____
- Baetidae _____
- Caenidae _____
- Ephemerellidae _____
- Ephemeridae _____
- Heptageniidae _____
- Isonychiidae _____
- Leptophlebiidae _____
- Metretopodidae _____
- Polymitarcylidae _____
- Potamanthidae _____
- Siphonuridae _____
- Tricorythidae _____
- Odonata _____
- Anisoptera _____
- Aeshnidae *• (1)*
- Cordulegastriidae _____
- 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 _____
- Rhyacophiliidae _____
- Sericostomatidae _____
- Uenoidae (*Neophylax*) _____
- Lepidoptera _____
- Noctuidae _____
- Pyalidae _____
- Coleoptera* _____
- Dryopidae _____
- Dytiscidae _____
- Elmidae _____
- Gyrinidae (a) _____ (l)
- Halplidae (a) _____ (l)
- Heteroceridae _____
- Hydraenidae _____
- Hydrophilidae _____
- Lampyridae (a) _____ (l)
- Noteridae (a) _____ (l)
- Psephenidae(a) _____ (l) *✗✗✗ (48)*
- Ptilodactylidae (a) _____ (l)
- Scirtidae (a) _____ (l)

- Diptera _____
- Athericidae _____
- Ceratopogonidae _____
- Chaoboridae _____
- Chironomidae *✗✗✗✗ (42)*
- Culicidae _____
- Dixidae _____
- Dolichopodidae _____
- Empididae _____
- Ephydriidae _____
- Muscidae _____
- Psychodidae _____
- Ptychopteridae _____
- Sciomyzidae _____
- Simuliidae _____
- Stratiomyidae _____
- Syrphidae _____
- Tabanidae _____
- Thaumaleidae _____
- Tipulidae _____
- MOLLUSCA _____
- Gastropoda _____
- Ancylidae *:: (4)*
- Bithyniidae _____
- Hydrobiidae _____
- Lymnaeidae _____
- Physidae *✗ (12)*
- Planorbidae _____
- Pleuroceridae _____
- Portiatiopsidae _____
- Valvatidae _____
- Viviparidae _____
- Peletypoda _____
- Dreissenidae _____
- Pisicidae _____
- Sphaeriidae *✗ U (17)*
- Unionidae _____

Other taxa or comments:

* record # of adults (a) or larvae (l) as indicated

Stream #3 Site 3

Appendix J (continued)
7/31/12

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

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 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)	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.
Note: determine left or right side by facing downstream.				
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

(22) TOTAL FROM PAGE 1

Total Score 59

13
10
57

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 75 R 8E S	
LAT(dd) _____ LONG(dd) _____		RIVER BASIN KOGGE RIVER	
STORET # _____		HUC CODE 040900040202	ECOREGION MANABEE LAKE PLANE
INVESTIGATOR(S) M. BERNZUGER S. KOGGE AT. ESTROM	DATE 8-01-2012	REASON FOR SURVEY <input type="checkbox"/> Targeted: comment _____ <input checked="" type="checkbox"/> Randomized: VSEC # _____ VSEC description (eg. cold small) _____	
TIME 8:36 AM PM			

WEATHER CONDITIONS Current <input checked="" type="checkbox"/> Sunny <input type="checkbox"/> Partly Cloudy <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy		Has there been a significant rain in the last 7 days? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't Know	
		Air Temperature 72 °F	

RIPARIAN VEGETATION Indicate the dominant type and record the dominant species <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Shrubs Species: <i>Red canopy grass</i> <input checked="" type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous <i>Common buckthorn</i> Estimate buffer width (left) 125 ft (right) 125 ft <i>cut bushes</i>		WATERSHED FEATURES Predominant Surrounding Land Use <input checked="" type="checkbox"/> Forest <input checked="" type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Other _____	
		Local Watershed NPS Pollution <input type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input checked="" type="checkbox"/> Obvious Sources	
		Local Watershed Erosion <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy	

STREAM CHARACTERIZATION Stream Subsystem <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Lake Outlet Influenced <input type="checkbox"/> Dam Influenced		Stream Modifications <input checked="" type="checkbox"/> None <input type="checkbox"/> Dredged <input type="checkbox"/> Canopy Removal <input type="checkbox"/> Snagging <input type="checkbox"/> Impounded <input type="checkbox"/> Relocated <input type="checkbox"/> Bank Stabilization <input type="checkbox"/> Habitat Improvement	
Stream Origin <input type="checkbox"/> Spring Fed <input type="checkbox"/> Lake/Pond <input type="checkbox"/> Swamp, Marsh, Bog <input checked="" type="checkbox"/> Mixture of origins <input type="checkbox"/> Other _____		Stream Type <input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater	
		INSTREAM FEATURES Avg. Stream Width 14 ft Avg. Stream Depth .8 ft Surface Velocity _____ ft/sec Est. Flow 55 cfs (at thalweg) Est. Survey Reach Length 140 ft Survey Reach Area _____ ft ² High Water Mark 3.5 ft Canopy Cover: 85 % Shaded	

AQUATIC VEGETATION <input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating		<input type="checkbox"/> Free Floating <input type="checkbox"/> Floating algae <input type="checkbox"/> Attached algae	
		Portion of the reach with aquatic vegetation < 1 % Nuisance aquatic plants or slimes present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Dominant species present _____	

WATER QUALITY Temperature 70 °F		Solids, Turbidity <input type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input checked="" type="checkbox"/> Turbid (Very) <input type="checkbox"/> Floating solids <input checked="" type="checkbox"/> Suspended solids <input checked="" type="checkbox"/> Settleable solids <input checked="" type="checkbox"/> Foams	
Water Samples Taken <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ <input type="checkbox"/> GA <input type="checkbox"/> GN <input type="checkbox"/> MA <input type="checkbox"/> MN <input type="checkbox"/> VOA <input type="checkbox"/> ON		Color <input type="checkbox"/> Clear <input type="checkbox"/> Stained <input type="checkbox"/> Opaque <input checked="" type="checkbox"/> Colored Gray <input type="checkbox"/> Other _____	
		Surface Oils <input type="checkbox"/> None <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Slick <input type="checkbox"/> Other _____	
		Water Odors <input type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____	

SEDIMENT Sediment Samples Taken <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ <input type="checkbox"/> MS <input type="checkbox"/> GS <input type="checkbox"/> VOA <input type="checkbox"/> OS/BNA		Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	
		Sediment Odors <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> Other _____	
Looking at stones that are not deeply embedded, are the undersides black in color? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Deposits <input checked="" type="checkbox"/> None <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input type="checkbox"/> Other _____	

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	Muck-Mud	black, very fine organic (FPOM)	20
Cobble	2.5"-10"	10	Other		
Gravel	0.1"-2.5"	10			
Sand	Gritty (course)	25			
Silt	Gritty (fine)	25			
Clay	sllick	25			

Proportion of Reach Represented by Stream Morphology Types	Additional Structure Available for Macroinvertebrate Colonization																														
<input type="checkbox"/> Riffle _____ % <input checked="" type="checkbox"/> Run <u>15</u> % <input type="checkbox"/> Pool _____ % <input checked="" type="checkbox"/> Depositional <u>85</u> %	<table border="1"> <thead> <tr> <th></th> <th>Extensive</th> <th>Moderate</th> <th>Sparse</th> <th>Absent</th> </tr> </thead> <tbody> <tr> <td>Undercut banks</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Overhanging vegetation</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Large woody debris</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Aquatic macrophytes</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>Rootwads</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </tbody> </table>		Extensive	Moderate	Sparse	Absent	Undercut banks	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Overhanging vegetation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Large woody debris	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Aquatic macrophytes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Rootwads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Extensive	Moderate	Sparse	Absent																											
Undercut banks	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																											
Overhanging vegetation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																											
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Aquatic macrophytes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>																											
Rootwads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>																											

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

The diagram shows a cross-section of a stream channel. On the left bank, there are depth measurements: 0.15 ft, 0.3 ft, 0.7 ft (labeled '7 ft'), 0.5 ft, and 0.15 ft (labeled '0.6 ft Aug'). On the right bank, there are depth measurements: 0.1 ft, 0.2 ft, 0.5 ft, 0.5 ft, and 0.1 ft. A vertical arrow on the right bank indicates a '17 ft' depth. A horizontal scale bar at the bottom indicates a width of 15 ft. A '0.6 ft Aug' measurement is also noted near the bottom right of the channel.

TIME #1
 60 sec's
 55 sec
 52 sec's

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	=====	Perchichthyidae (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	<u>(3)</u>
Amiidae (Bowfins)		Southern redbelly dace	=====	*Pumpkinseed	=====
*Bowfin	=====	Finescale dace	=====	*Warmouth	=====
Clupeidae (Herrings)		Blacknose dace	=====	*Orangespotted sunfish	=====
*Alewife	=====	Longnose dace	=====	*Bluegill	<u>(1)</u>
*Gizzard shad	=====	Redside dace	=====	*Longear sunfish	=====
Salmonidae (Salmon/Trout)		*Pearl dace	=====	*White crappie	=====
*Rainbow trout	=====	Cottidae (Sculpins)		*Black crappie	=====
*Brown trout	=====	Mottled sculpin	<u>(1)</u>	*Largemouth bass	=====
*Brook trout	=====	Slimy sculpin	=====	*Smallmouth bass	=====
*Coho	=====	Catostomidae (Suckers)		Percidae (Perch)	
*Chinook	=====	*Longnose sucker	<u>(12)</u>	N. sand darter	=====
Umbridae (Mudminnow)		*White sucker	=====	Rainbow darter	=====
Central mudminnow	<u>(1)</u>	*Creek chubsucker	=====	Iowa darter	=====
Esocidae (Pike)		*Lake chubsucker	=====	Greenside darter	=====
*Grass pike	=====	*Northern hog sucker	=====	Fantail darter	=====
*Northern pike	=====	*Spotted sucker	=====	Orangethroat darter	=====
*Muskegunge	=====	*Silver redhorse	=====	Johnny darter	<u>(117)</u>
Cyprinidae (Minnows and Carp)		*River redhorse	=====	Blackside darter	=====
Central stoneroller	<u>(2)</u>	*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	=====
*Honeyhead chub	=====	*Black bullhead	=====	Anguillidae (Eels)	
*River chub	=====	*Brown bullhead	=====	*American eel	=====
*Creek chub	<u>(51)</u>	*Yellow bullhead	=====	Gadidae (Cod)	
*Golden shiner	=====	Stonecat	=====	*Burrbot	=====
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	<u>(6)</u>	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 _____
 - Isonychidae _____
 - Leptophlebiidae _____
 - Metretropodidae _____
 - Polymitarcyidae _____
 - Potamanthidae _____
 - Siphonuridae _____
 - Tricorythidae _____
 - Odonata
 - Anisoptera
 - Aeshnidae _____
 - Cordulegastriidae _____
 - Corduliidae _____
 - Gomphidae _____
 - Libellulidae _____
 - Macomiidae _____
 - Zygoptera
 - Calopterygidae _____
 - Coenagrionidae 1 (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~~: (22)
 - Hydroptilidae _____
 - Lepidostomatidae _____
 - Leptoceridae _____
 - Limnephilidae :: (3)
 - Molannidae _____
 - Odontoceridae _____
 - Philopotamidae _____
 - Phryganeidae _____
 - Polycentropodidae _____
 - Psychomyiidae _____
 - Rhyacophiliidae _____
 - Sericostomatidae _____
 - Uenocidae (Neophylax) _____
- Lepidoptera
 - Noctuidae _____
 - Pyralidae _____
- Coleoptera*
 - Dryopidae _____
 - Dytiscidae _____
 - Eimidae _____
 - Gyrinidae (a) (1)
 - Halplidae (a) (1)
 - Heteroceridae _____
 - Hydraenidae _____
 - Hydrophilidae _____
 - Lampyridae (a) (1)
 - Noteridae (a) (1)
 - Psephenidae (a) (1)
 - Ptilodactylidae (a) (1)
 - Scirtidae (a) (1)

- Diptera
 - Athericidae _____
 - Ceratopogonidae _____
 - Chaoboridae _____
 - Chironomidae ~~70~~ (70)
 - Culicidae _____
 - Dixidae _____
 - Dolichopodidae _____
 - Empididae _____
 - Ephyridae _____
 - Muscidae _____
 - Psychodidae _____
 - Ptychopteridae _____
 - Sciomyzidae _____
 - Simuliidae _____
 - Stratiomyidae _____
 - Syrphidae _____
 - Tabanidae _____
 - Thaumaleidae _____
 - Tipulidae _____
- MOLLUSCA
 - Gastropoda
 - Ancylidae ~~29~~ (29)
 - Bithyniidae _____
 - Hydrobiidae _____
 - Lymnaeidae _____
 - Physidae :: (4)
 - Planorbidae * (1)
 - Pleuroceridae _____
 - Pomatiospidae _____
 - Valvatidae _____
 - Viviparidae (8)
 - Pelecypoda
 - Dreissenidae _____
 - Pisidiidae _____
 - Sphaeriidae _____
 - Unionidae _____

Other taxa or comments:

UP ROWN CASES ::

SPAZZTAIL
(Columbia)

UNKNOWN EPHEM - ::
(collected)

UNKNOWN BEETLE

* record # of adults (a) or larvae (l) as indicated

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 <u>5</u>	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	<u>5</u> 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 <u>7</u>	20 19 18 17 16	15 14 13 12 11	10 9 8 <u>7</u> 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 <u>5</u>	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	<u>5</u> 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 <u>3</u>	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 <u>3</u> 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 <u>8</u>	10 9	<u>8</u> 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 <u>1</u>	10 9	8 7 6	5 4 3	2 <u>1</u> 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 <u>16</u>	20 19 18 17 <u>16</u>	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

4/16/29
5

15

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 <u>6</u>	20	19	18	17	16	15	14	13	12	11	10	9	8	7	<u>6</u>	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 <u>2</u> (LB)	Left Bank 10 9					8 7 6					5 4 3					<u>0</u> <u>1</u> 0					
SCORE <u>1</u> (RB)	Right Bank 10 9					8 7 6					5 4 3					<u>2</u> <u>1</u> 0					
9. Vegetative Protection (score each bank)	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 <u>0</u> (LB)	Left Bank 10 9					8 7 6					5 4 3					2 1 <u>0</u>					
SCORE <u>0</u> (RB)	Right Bank 10 9					8 7 6					5 4 3					2 1 <u>0</u>					
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 <u>8</u> (LB)	Left Bank 10 9					<u>8</u> 7 6					5 4 3					2 1 0					
SCORE <u>8</u> (RB)	Right Bank 10 9					<u>8</u> 7 6					5 4 3					2 1 0					

15 TOTAL FROM PAGE 1
25
0

Total Score 70

APPENDIX J. STREAM CARD

Shaded fields are entered into database

STREAM NAME <u>STREAM #2 SITE #5 WILLOW CREEK</u>		LOCATION (road crossing) Ford Road and I-275 bike path (east of HWY)	
COUNTY/TOWNSHIP <u>WAYNE COUNTY / CANTON TOWNSHIP</u>		T <u>25</u> R <u>8E</u> S	
LAT(dd)	LONG (dd)	RIVER BASIN <u>ROUGE RIVER</u>	
STORET #	HUC CODE <u>040900040202</u>	ECOREGION <u>MAUMEE LAKE PLANE</u>	
INVESTIGATOR(S) <u>M. BERNINGER</u> <u>S. KOGGE</u> <u>T. ESTROM</u>	DATE <u>8/1/12</u> TIME <u>11:39</u> <u>AM</u> PM	REASON FOR SURVEY <input type="checkbox"/> Targeted: comment _____ <input type="checkbox"/> Randomized: VSEC # _____ VSEC description (eg. cold small) _____	

WEATHER CONDITIONS		WATERSHED FEATURES	
Current <input checked="" type="checkbox"/> Sunny <input type="checkbox"/> Partly Cloudy <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy	Has there been a significant rain in the last 7 days? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Don't Know Air Temperature <u>85</u> °F	Predominant Surrounding Land Use <input type="checkbox"/> Forest <input checked="" type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input checked="" type="checkbox"/> Residential <input checked="" type="checkbox"/> Other <u>HWY ROW</u>	Local Watershed NPS Pollution <input type="checkbox"/> No evidence <input checked="" type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious Sources Local Watershed Erosion <input type="checkbox"/> None <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Heavy
RIPARIAN VEGETATION Indicate the dominant type and record the dominant species <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs Species: <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous Estimate buffer width (left) _____ ft (right) _____ ft			

STREAM CHARACTERIZATION		INSTREAM FEATURES	
Stream Subsystem <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Lake Outlet Influenced <input type="checkbox"/> Dam Influenced	Stream Modifications <input type="checkbox"/> None <input type="checkbox"/> Dredged <input type="checkbox"/> Canopy Removal <input type="checkbox"/> Snagging <input type="checkbox"/> Impounded <input type="checkbox"/> Relocated <input checked="" type="checkbox"/> Bank Stabilization <input type="checkbox"/> Habitat Improvement	Avg. Stream Width <u>13</u> ft Avg. Stream Depth <u>.5</u> ft Surface Velocity _____ ft/sec Est. Flow <u>45</u> cfs (at thalweg) Est. Survey Reach Length <u>130</u> ft <u>130 ± 15 ft</u> Survey Reach Area _____ ft ² High Water Mark <u>2.5</u> ft Canopy Cover: <u>55</u> % Shaded	
Stream Origin <input type="checkbox"/> Spring Fed <input type="checkbox"/> Lake/Pond <input type="checkbox"/> Swamp, Marsh, Bog <input checked="" type="checkbox"/> Mixture of origins <input type="checkbox"/> Other _____	Stream Type <input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater		

AQUATIC VEGETATION		Portion of the reach with aquatic vegetation <u>0</u> %
<input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating	<input type="checkbox"/> Free Floating <input type="checkbox"/> Floating algae <input type="checkbox"/> Attached algae	Nuisance aquatic plants or slimes present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
		Dominant species present _____

WATER QUALITY		Solids, Turbidity		Color		Surface Oils		Water Odors	
Temperature <u>75</u> °F		<input type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input checked="" type="checkbox"/> Turbid	<input type="checkbox"/> Clear <input checked="" type="checkbox"/> Stained <input checked="" type="checkbox"/> Opaque <input type="checkbox"/> Colored _____ <input type="checkbox"/> Other _____	<input type="checkbox"/> None <input checked="" type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input type="checkbox"/> Slick <input type="checkbox"/> Other _____	<input type="checkbox"/> None <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____				
Water Samples Taken <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ <input type="checkbox"/> GA <input type="checkbox"/> GN <input type="checkbox"/> MA <input type="checkbox"/> MN <input type="checkbox"/> VOA <input type="checkbox"/> ON	<input type="checkbox"/> Floating solids <input type="checkbox"/> Suspended solids <input type="checkbox"/> Settleable solids <input type="checkbox"/> Foams								

SEDIMENT		Sediment Odors		Deposits	
Sediment Samples Taken <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ <input type="checkbox"/> MS <input type="checkbox"/> GS <input type="checkbox"/> VOA <input type="checkbox"/> OS/BNA	Oils <input type="checkbox"/> Absent <input checked="" type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse	<input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> None <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input type="checkbox"/> Other _____		
Looking at stones that are not deeply embedded, are the undersides black in color? <input type="checkbox"/> Yes <input type="checkbox"/> No					

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"		Muck-Mud	black, very fine organic (FPOM)	50
Cobble	2.5"-10"		Other		
Gravel	0.1"-2.5"	5			
Sand	Gritty (course)	15			
Silt	Gritty (fine)	80			
Clay	slick				

Proportion of Reach Represented by Stream Morphology Types	Additional Structure Available for Macroinvertebrate Colonization			
	Extensive	Moderate	Sparse	Absent
<input type="checkbox"/> Riffle _____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Run _____ %	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Pool _____ %	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Depositional <u>100</u> %	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	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)

FISH

Station Number: STREAM #2 (Willow Creek) SITE #5

Length Sampled (ft): 10ft

Area Sampled (sq ft):

Sampling Time:

Probes: 1
Passes: 2

Gear: boat / ss / ops

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	=====	Percichthyidae (Temp. bass)	
Chestnut lamprey (a/l)	=====	Fathead minnow	=====	*White bass	=====
American brook lamprey (a/l)	=====	Bluntnose minnow	<u>29</u>	*White perch	=====
Lepisosteidae (Gars)		Suckermouth minnow	=====	Centrarchidae (Sunfishes)	
*Spotted gar	=====	Silverjaw minnow	=====	*Rock bass	=====
*Longnose gar	=====	Northern redbelly dace	=====	*Green sunfish	<u>14</u>
Amiidae (Bowfins)		Southern redbelly dace	=====	*Pumpkinseed	=====
*Bowfin	=====	Finescale dace	=====	*Warmouth	=====
Clupeidae (Herrings)		Blacknose dace	=====	*Orangespotted sunfish	=====
*Alewife	=====	Longnose dace	=====	*Bluegill	<u>2</u>
*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	<u>1</u>	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	=====
*Muskegon	=====	*Silver redhorse	=====	Johnny darter	<u>31</u>
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	=====
*Honeyhead chub	=====	*Black bullhead	=====	Anguillidae (Eels)	
*River chub	=====	*Brown bullhead	=====	*American eel	=====
*Creek chub	<u>83</u>	*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	<u>5</u>	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

Station: STREAM #2 SITE 5

MACROINVERTEBRATES
Area Sampled: 130A & 130B

Time Sampled: 45 mins

- PORIFERA**
- PLATYHELMINTHES**
- Turbellaria _____
- NEMATOMORPHA** _____
- BRYOZOA** _____
- ANNELIDA**
- Hirudinea _____
- Oligochaeta _____
- ARTHROPODA**
- Crustacea**
- Amphipoda 2 _____
- Decapoda 16 _____
- Isopoda 4 _____
- Arachnida**
- Hydracarina _____
- Insecta**
- Ephemeroptera**
- Ametropodidae _____
- Baetiscidae _____
- Baetidae _____
- Caenidae _____
- Ephemerellidae _____
- Ephemeridae _____
- Heptageniidae _____
- Isonychiidae _____
- Leptophlebiidae _____
- Metretopodidae _____
- Polymitarcyidae _____
- Potamanthidae _____
- Siphonuridae _____
- Tricorythidae _____
- Odonata**
- Anisoptera**
- Aeshnidae _____
- Cordulegastridae _____
- Corduliidae _____
- Gomphidae _____
- Libellulidae _____
- Macomiidae _____
- Zygoptera**
- Calopterygidae _____
- Coenagrionidae _____
- Lestidae _____
- Plecoptera**
- Capniidae _____
- Chloroperlidae _____
- Leuctridae _____
- Nemouridae _____
- Peltoperlidae _____
- Perlidae _____
- Perlodidae _____
- Pteronarcyidae _____
- Taeniopterygidae _____

- Hemiptera**
- Belostomatidae _____
- Corixidae _____
- Gelastocoridae _____
- Gerridae 4 _____
- Mesovellidae _____
- 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 _____
- Colleoptera***
- 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) _____

- Diptera**
- Athericidae _____
- Ceratopogonidae _____
- Chaoboridae _____
- Chironomidae 72 _____
- Culicidae _____
- Dixidae _____
- Dolichopodidae _____
- Empididae _____
- Ephydriidae _____
- Muscidae _____
- Psychodidae _____
- Ptychopteridae _____
- Sciomyzidae _____
- Simuliidae _____
- Stratiomyidae _____
- Syrphidae _____
- Tabanidae _____
- Thaumaleidae _____
- Tipulidae _____
- MOLLUSCA**
- Gastropoda**
- Ancylidae _____
- Bithyniidae _____
- Hydrobiidae _____
- Lymnaeidae _____
- Physidae _____
- Planorbidae _____
- Pleuroceridae _____
- Pomatopsidae _____
- Valvatidae _____
- Viviparidae 2 _____
- Pelecypoda**
- Dreissenidae _____
- Pisidiidae _____
- Sphaeriidae _____
- Unionidae _____

Other taxa or comments:
 CORBICULIDAE 4
 CHANGE ON SITE #4

* record # of adults (a) or larvae (l) as indicated

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	2	1	0	0	0	0	0	0	0
SCORE 2 (RB)	Right Bank	10	9	8	7	6	5	4	3	2	1	0	2	1	0	0	0	0	0	0	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	2	1	0	0	0	0	0	0	0
SCORE 1 (RB)	Right Bank	10	9	8	7	6	5	4	3	2	1	0	2	1	0	0	0	0	0	0	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	2	1	0	0	0	0	0	0	0
SCORE 9 (RB)	Right Bank	10	9	8	7	6	5	4	3	2	1	0	2	1	0	0	0	0	0	0	0

(2) TOTAL FROM PAGE 1

Total Score 52

15
18
51

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 7 _S R 8 _E S	
LAT (dd) 42° 20' 04" 8159	LONG (dd) 83° 26' 31" 6090	RIVER BASIN ROUGE RIVER	
STORET #		HUC CODE 040900040202	ECOREGION MAUMEE LAKE PLANE
INVESTIGATOR(S) T. ESTROM S. KOGGE M. BERNINGER		DATE 8/1/12	REASON FOR SURVEY <input checked="" type="checkbox"/> Targeted: comment <input type="checkbox"/> Randomized: VSEC # VSEC description (eg. cold small)
WEATHER CONDITIONS Current <input checked="" type="checkbox"/> Sunny <input type="checkbox"/> Partly Cloudy <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy		WATERSHED FEATURES Predominant Surrounding Land Use <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Residential <input checked="" type="checkbox"/> Other ROAD ROW	
Has there been a significant rain in the last 7 days? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Don't Know Air Temperature 85 °F		Local Watershed NPS Pollution <input checked="" type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious Sources Local Watershed Erosion <input type="checkbox"/> None <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Heavy	
RIPARIAN VEGETATION Indicate the dominant type and record the dominant species <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Shrubs Species: <u>ASPE, KENYA</u> <input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Herbaceous Estimate buffer width (left) _____ ft (right) _____ ft		INSTREAM FEATURES Avg. Stream Width <u>16</u> ft Avg. Stream Depth <u>1.5</u> ft Surface Velocity _____ ft/sec Est. Flow <u>65</u> cfs (at thalweg) Est. Survey Reach Length <u>170</u> ft Survey Reach Area <u>170x17</u> ft ² High Water Mark _____ ft Canopy Cover: <u>65</u> % Shaded	
STREAM CHARACTERIZATION Stream Subsystem <input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Lake Outlet Influenced <input type="checkbox"/> Dam Influenced Stream Origin <input type="checkbox"/> Spring Fed <input type="checkbox"/> Lake/Pond <input type="checkbox"/> Swamp, Marsh, Bog <input type="checkbox"/> Mixture of origins <input type="checkbox"/> Other _____		Stream Modifications <input type="checkbox"/> None <input type="checkbox"/> Dredged <input type="checkbox"/> Canopy Removal <input type="checkbox"/> Snagging <input type="checkbox"/> Impounded <input type="checkbox"/> Relocated <input type="checkbox"/> Bank Stabilization <input type="checkbox"/> Habitat Improvement Stream Type <input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater	
AQUATIC VEGETATION <input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free Floating <input type="checkbox"/> Floating algae <input type="checkbox"/> Attached algae		Portion of the reach with aquatic vegetation _____ % Nuisance aquatic plants or slimes present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Dominant species present _____	
WATER QUALITY Temperature <u>72</u> °F Water Samples Taken <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ <input type="checkbox"/> GA <input type="checkbox"/> GN <input type="checkbox"/> MA <input type="checkbox"/> MN <input type="checkbox"/> VOA <input type="checkbox"/> ON		Solids, Turbidity <input type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input checked="" type="checkbox"/> Turbid <input type="checkbox"/> Floating solids <input type="checkbox"/> Suspended solids <input type="checkbox"/> Settleable solids <input type="checkbox"/> Foams Color <input type="checkbox"/> Clear <input type="checkbox"/> Stained <input checked="" type="checkbox"/> Opaque <input type="checkbox"/> Colored _____ <input type="checkbox"/> Other _____	
SEDIMENT Sediment Samples Taken <input checked="" type="checkbox"/> None <input type="checkbox"/> Other _____ <input type="checkbox"/> MS <input type="checkbox"/> GS <input type="checkbox"/> VOA <input type="checkbox"/> OS/BNA Looking at stones that are not deeply embedded, are the undersides black in color? <input type="checkbox"/> Yes <input type="checkbox"/> No		Surface Oils <input checked="" type="checkbox"/> None <input type="checkbox"/> Sheen <input type="checkbox"/> Globbs <input type="checkbox"/> Flecks <input type="checkbox"/> Slick <input type="checkbox"/> Other _____ Water Odors <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____	

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"		Muck-Mud	black, very fine organic (FPOM)	15
Cobble	2.5"-10"		Other		
Gravel	0.1"-2.5"				
Sand	Gritty (course)	90			
Silt	Gritty (fine)				
Clay	slick	10			

Proportion of Reach Represented by Stream Morphology Types		Additional Structure Available for Macroinvertebrate Colonization			
	%	Extensive	Moderate	Sparse	Absent
<input type="checkbox"/> Riffle	10	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Run		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Pool	90	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Depositional		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

8.5" 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 ANALYSIS NOT COMPLETED DUE TO EQUIPMENT FAILURE, (COULD NOT PUSH ENOUGH VOLTS TO BE EFFECTIVE) EICURO-FISHING WAS NOT COMPLETED, MAY COME BACK IN FUTURE TO COMPLETE*

Petromyzontidae (Lampreys)	Sand shiner	Gasterosteidae (Sticklebacks)
Sea lamprey (all)	Redfin shiner	Brook stickleback
Silver lamprey (all)	Mimic shiner	Threespine stickleback
Northern brook lamprey (all)	Brassy minnow	Perchichthyidae (Temp. bass)
Chestnut lamprey (all)	Fathead minnow	*White bass
American brook lamprey (all)	Bluntnose minnow	*White perch
Lepisosteidae (Gars)	Suckermouth minnow	Centrarchidae (Sunfishes)
*Spotted gar	Silverjaw minnow	*Rock bass
*Longnose gar	Northern redbelly dace	*Green sunfish
Amiidae (Bowfins)	Southern redbelly dace	*Pumpkinseed
*Bowfin	Finescale dace	*Warmouth
Clupeidae (Herrings)	Blacknose dace	*Orangespotted sunfish
*Alewife	Longnose dace	*Bluegill
*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
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
*Honeyhead chub	*Black bullhead	Anguillidae (Eels)
*River chub	*Brown bullhead	*American eel
*Creek chub	*Yellow bullhead	Gadidae (Cod)
*Golden shiner	Stoneycat	*Burbot
Pugnose shiner	Tadpole madtom	Sciaenidae (Drums)
Emerald shiner	Brindled madtom	*Freshwater drum
Bigeye shiner	*Channel catfish	Gobiidae (Loaches)
Ironcolor shiner	*Flathead catfish	Oriental weatherfish
*Common shiner	Aphredoderidae (Pirate perch)	Other family/species:
Central bigmouth shiner	Pirate perch	
Blackchin shiner	Atherinidae (Silverstiles)	
Blacknose shiner	Brook silverstide	
Spottail shiner	Cyprinodontidae (Topminnows)	
Silver shiner	Banded killifish	
Rosyface shiner	Blackstripe topminnow	
Spotfin shiner		

* = Measure length

08/01/2012

MACROINVERTEBRATES

Station: Site 6, Stream 1

Area Sampled:

Time Sampled: 30 min

- 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 _____
- Siphonuridae _____
- Tricorythidae _____
- Odonata _____
- Anisoptera _____
- Aeshnidae * (1)
- Cordulegastridae _____
- Corduliidae _____
- Gomphidae _____
- Libellulidae _____
- Macomiidae _____
- 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)
- Halplidae (s) _____ (l)
- Heteroceridae _____
- Hydraenidae _____
- Hydrophilidae _____
- Lampyridae (a) _____ (l)
- Noteridae (a) _____ (l)
- Psephenidae (a) _____ (l)
- Ptilodactylidae (a) _____ (l)
- Scirtidae (a) _____ (l)

- Diptera _____
- Athericidae _____
- Ceratopogonidae _____
- Chaoboridae _____
- Chironomidae : (14)
- Culicidae _____
- Dixidae _____
- Dolichopodidae _____
- Empididae _____
- Ephydriidae _____
- 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:

* record # of adults (a) or larvae (l) as indicated

08/01/2012

Appendix J (continued)

Site 6, Stream 4

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 road crossing at upstream end of site

TONQUASH 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 <u>8</u>	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 <u>1</u> (LB)	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>1</u> (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 <u>6</u> (LB)	Left Bank	10	9			8	7	6	5	4	3	2	1	0							
SCORE <u>6</u> (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 <u>9</u> (LB)	Left Bank	10	9			8	7	6	5	4	3	2	1	0							
SCORE <u>9</u> (RB)	Right Bank	10	9			8	7	6	5	4	3	2	1	0							

22/8/0

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