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	Evaluator
Proposed Project Site Name or DNRE File #:	Name:
I-275, WC004	Name: S. Kogge, R. Roos
·	Address: 11191 Marwill Ave
Date of Evaluation: 7/23/2012	City: West Olive State: MI Zip: 49460
County: Wayne	Phone: 616-847-1680
Township: Canton	Email: stu.kogge@cardno.com
Town:2S	
Range: 8E	Is a Wetland Delineation Report available? YES NO Date Completed:
Section: 21	If "YES NO Date Completed:
Decimal Lat/Long: 42.3339, -83.4429	person/firm/agency):
Check ($$) each box below when item is complete.	
	/ for more information
<u> </u>	acres
Location Map. A county road map showing the	
<u> </u>	s, etc. Attach a map to the end of this document.
Color Photographs. Photos should show the v	
types, hydrologic features, and any other pertir document.	nent site features. Attach to the end of this
★ Landscape Sketch or Aerial Photograph. Clearly label the Proposed Project Site and	Matland Fuglishing Area Indicate the leasting of
the MiRAM Boundary.	Wetland Evaluation Area. Indicate the location of
	wetland community types identified within the
	e: marsh, wet meadow, hardwood swamp, conifer
	communities may be further classified as natural
	dominantly structured by natural processes rather Examples include: bog, prairie fen, muskeg, wet
prairie, southern wet meadow, etc.	Examples include, bog, praine ten, muskeg, wet
3. Identify and label all hydrologic features, su	ch as: streams, 100-year floodplains, ponds, vernal
pools, and small patches of open water with	·
4. Identify and label surrounding upland featur	res.
5. Include north arrow and map scale informat	ion.
6. Attach the landscape sketch or aerial photo	to the end of this document.
Comments: List any important site features or apport or near the Wetland Evaluation Area	parent disturbance events that have occurred within
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	J. S.			
Rhamnus frangula				
Ulmus americana				
Herbaceous Stratum (non-woody plants, regardle	uss 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 Hydrologic Condition and Interactions Hydrologic Alterations Substrate/Soil Disturbances Habitat Structure Development Habitat Alterations Habitat/Wetland Condition Amphibian Breeding Pools Approximately how much of the Wetland Evaluations enspection? Mas vegetation within the Wetland Evaluation Are				
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.

An	swer <u>all</u> of the foll	owing metrics.	
1.	Is any part of the V actually contain ha Piping Plover (Chan Benzie, Charlevoix, Isle, and Schoolcraf www.fws.gov/midwe Hines's Emerald Dra counties: Alpena, Ma	Idlife Service (USFWS) Critical Habitat. Wetland located within an area designated as Critical Habitat and does the Wetland bitat suitable for either species listed below? adrius melodus) Critical Habitat Units are designated only within the following counties: Alger, Cheboygan, Chippewa, Emmet, Iosco, Leelanau, Luce, Mackinac, Mason, Muskegon, Presque to See URL below for Unit locations. Institute of the Service (USFWS) Critical Habitat Units are designated only within the following ackinac, and Presque Isle. See URL below for Unit locations. Institute of the Wetland of the Wetla	YES NO If "yes", the Wetland has high functional value.
2.		Indangered (T/E) Species. Ited T/E plant or animal species occur within the Wetland? Complete the following or this metric. Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c. 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. 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. 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. Did the DNRE review confirm potential T/E occurrence in the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric. The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE.	YES NO If "yes", the Wetland has high functional value.
3.	Are more than 5 acc Community Type*? S1 or S2 N Has the Wercommunity to Manual for r Southern (see figure for See figure fo	tural Community Type. Theres or more than 25% of the Wetland comprised of a Rare Wetland Natural of Check (√) all Rare Wetland Natural Community Types. Italiand been identified by the Evaluator — or other persons — as being an S1 or S2 natural type as defined by the Michigan Natural Features Inventory (MNFI)? See the MiRAM User's nore information. Bog, defined as any bog occurring below the northern limit of Michigan's Floristic Tension Zone for approximate location). Ith/Mature Forested Wetland. Lacks evidence of any significant harvesting. Dominated by the tory trees (mean overstory DBH ≥20 inches, including at least two trees/acre having DBH and the canopy is multi-aged and multi-layered. Aggregations of canopy trees are interspersed gaps and large snags. Large nursery logs and tip-up mounds litter the forest floor. Does the tland have all/most of these characteristics? I Community Type is less than 5 acres and less than 25% of the Wetland, the rare community and evaluated separately.	YES NO If "yes", the Wetland has high functional value. Floristic Tension Zone
4.	Great Lakes Coalls any part of the Vincluding Lake St.	Vetland within 1,000 feet of the ordinary high water mark of any of the Great Lakes,	☐ YES ☑ NO If "yes", the Wetland has high functional value.

Quantitative Rating

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

Metric 1. Wetland Size and Distribution Maximum 9 points.

1a.	Wetland Size Estimate the size of the Wetland (i.e., Wetland Evaluation Area). Select a size class. Maximum 6 points.		Score
50	acres Select this option if the wetland's actual size ≥ 50 acres.	6 pts	
25	acres to <50 acres	5 pts	
10	acres to <25 acres	4 pts	0.0
3	acres to <10 acres	3 pts	0.0
1/4	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 wetlar remaining within a 2-mile radius from the Wetland's center. For the purpose of this submetric 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.	, areas	Score
0 to	20% of surrounding 2-mile radius is wetland	3 pts	
>20 to 80% of surrounding 2-mile radius is wetland 2 pts		3.0	
>809	% 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 aeri Wetland.	Step 1: Using the most recent aerial photograph available, sketch a 150-foot wide "buffer zone" aroun Wetland			ind the
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:		Non-Buffers Include:		
 shrubland, young forest, natural gra: abandoned row crop field (vegetated) hay field (non-row crop), lightly graz lightly managed forest (selectively lown designated wildlife area, lightly managed) other wetland, lake, river 	d & naturalizing) ed pasture ogged)	 lawns, golf courses, manicured par residential, commercial, industrial roadways (including shoulders), pa row crop field conservation tillage, heavily grazed clear-cutting, mining, construction a 	rking lots	
				Score
Wide Buffer Width:	≥150 feet arou	und the perimeter	6 pts	
Medium Buffer Width:	75 to <150 feet around the perimeter 4 pts		0.0	
Narrow Buffer Width:	25 to <75 feet around the perimeter 2 pt			
Very Narrow Buffer Width:	0 (no buffer) to	o <25 feet around the perimeter	0 pt	

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

- Step 1: Using the most recent aerial photograph available, sketch a 1,000-foot wide "land use zone" around the Wetland.
- Step 2: Estimate percent coverages comprised by each of the four types of land use listed below.
- Step 3: If any land use type comprises more than 25% of the total land use, it is considered to be a "dominant" land use type for the purposes of MiRAM and will receive points. Sum the available points from all dominant land use types and then average the score. Round to the nearest 0.5 increment. Maximum 6 points.

Type of Land Use	Examples within each	Type of Land Use		Score
Very Low Intensity:	maturing forestnatural grassland, prairie	designated wildlife areaother wetland, lake, river	6 pts	
Low Intensity:	shrubland/young forestrecent selective logginghay field (non-row crop)	lightly managed parklandold field, lightly grazed pastureone-lane road/two track	4 pts	1.0
Moderately High Intensity:	residential & lawnsmanicured parklandgolf course	conservation tillagerecent clear-cut (<10 years)two-lane road	2 pts	
High Intensity:	 commercial, industrial high-density residential heavily grazed pasture row crop field 	multi-lane paved roadwayconstruction activityparking lotmining	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.		
Precipitation: Directly and/or as runoff from upland areas.	1 pt	1.0
Groundwater: Seeps or evidence, such as significant amounts of skunk cabbage (Symplocarpus foetidus) or other fen-adapted species.	2 pts	0.0
Seasonal/Intermittent Surface Water: Seasonal inundation from a lake, pond, or stream. (A Wetland can only receive points for this source of water or the next, not both.)	2 pts	0.0
Perennial Surface Water: Perennial inundation from a lake, stream or pond.	5 pts	0.0

3b. Connectivity: Select all that apply. Maximum 8 points.		
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 Select the option(s) from below that best describe(s) the dominant hydrologic characteristic of the Wetland. For the purposes of this submetric, "dominant" is defined as comprising at least 25% of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, select all that apply and average the points. Round to the nearest 0.5 increment. Maximum 4 points.		Score
Permanently Inundated 4	4 pts	
Permanently Saturated to Regularly Inundated 3 pts		1.0
Regularly Saturated to Seasonally Inundated 2 pts		
Seasonally Saturated in the Upper 12 Inches of Soil	1 pt	

3d. Alterations to Na	tural Hydrologic Regime			
This submetric evaluates the intactness of the natural hydrologic regime of the Wetland. Check ($\sqrt{\ }$) all forms of past or ongoing hydrologic alteration(s) that are potentially influencing the Wetland.				
	ar the wetland	point source discharge(s) (non-stormw	ater)	
☐ tile(s) in or near t	he wetland	☐ filling/grading activities in or near the w	etland	
dike(s) in or near	the wetland	x road bed(s)/RR grades(s) in or near the	e wetland	
weir(s) in or near	the wetland	dredging activities in or near the wetlar	nd	
stormwater input	s (addition of water)	other (specify)		
stream channeliz	ation	other (specify)		
regime. For this submetr "Minor" is defined as affer impact the Substrate/Soil	ic, "significant" is defined as affect cting less than approximately 10% (submetric 4a) and/or Habitat (sub	,	e Wetlan n may als	d.
hydrologic regime. If unc nearest 0.5 increment. If	ertain, select adjoining options and	lack of) alteration(s) to the Wetland's rd average the available points. Round egime has been significantly altered, it a points.	to the	Score
No Hydrologic Alterations Apparent:	There has been no significant alto hydrologic regime, and/or ongoin	eration(s) to the Wetland's natural g minor alteration(s) is/are rare.	8 pts	
Recovered:	Significant hydrologic alteration(s prior to the assessment, and/or o alteration(s) is/are only occasional	ngoing minor hydrologic	6 pts	
Recovering:	A single significant hydrologic alterprior to the assessment, and/or o alteration(s) is/are frequent.		4 pts	4.0
Recent or No Recovery:	Multiple significant hydrologic alte 20 years prior to the assessment 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

is teration
Score
1.0
etion is etland. and. s ago. , plant nity metric
Score
3.0
a e il

4c. Habitat Structure Development

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

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

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

Maximu	m 7 points.		Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	
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	2.0
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
 ☐ 1. Contains USFWS-designated Critical Habitat ☐ 2. Federal or State-listed T/E Plant or Animal Species ☐ 3. S1, S2, or S3 Natural Community Type (at least 5 acres or 25% of the Wetland) ☐ 4. Southern Bog (at least 5 acres or 25% of the Wetland) ☐ 5. Old-Growth/Mature Forested Wetland (at least 5 acres or 25% of the Wetland) ☐ 6. Great Lakes Coastal Wetland 	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

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 <u>may exist in overlapping layers</u>, 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

,				
	>25% of Wetland • area	Native species dominate the	High native diversity	3 pts
		coverage	Moderate to low native diversity	2 pts
		Invasive or non-native species dominate the coverage	Moderate to high native diversity	2 pts
Vegetation Component ▶			Low native diversity	1 pt
is >1/4 acre	<25% of Wetland ▶ area	Native species dominate the	Moderate to high native diversity	2 pts
		coverage	Low native diversity	1 pt
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt
			Low native diversity	0 pt
		Native species dominate the	Moderate to high native diversity	2 pts
Vegetation Component	ponent	coverage	Low native diversity	1 pt
		Invasive or non-native species dominate the coverage		0 pt
is <¼ acre	<25% of Wetla	and area ▶		0 pt

Score
0.0
Score
0.0
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 <u>at</u> or <u>below</u> 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	
Moderate:	1.0 acre to <2.5 acres	2 pts	0.0
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

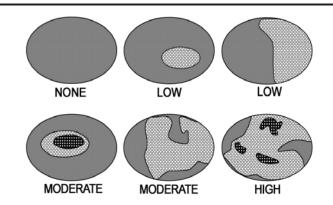
Native, non-invasive: Male and female portions of the flower spike are not separated (or only slightly separated) on most of the stems within the same local stand. Female flower spikes are light brown and are 0.8-1.2 inches thick at maturity (before expanding when dried). Most leaf blades are approximately 0.5 to 1 inch wide at widest part. Typically, not tightly packed into an area (non-invasive).broad-leaved cattail (*T. latifolia*)

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

6d. Horizontal (Plan View) Interspersion

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

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



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

6e. Habitat Features

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

1. Hummocks/Tussocks/Tree Mounds, e.g., sedge/grass tussocks, decaying nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of all raised features (hummocks/tussocks/tree mounds) and includes the depressional matrix within				
any group of raised features.				Score
Virtually Absent: 0 pt <5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	0

2. Coarse Woody Del e.g., fallen trees and/or l		rage width ≥6 inches; each a	it least 10 feet long.	Score
Virtually Absent: 0 pt	Sparse: 1 pt	Moderate: 2 pts	Dense: 3 pts	0.0
< 1 per acre	1 to 5 per acre	6 to 10 per acre	>10 per acre	

3. Large Standing Trees, Living or Dead (≥12 inches DBH).				Score
Virtually Absent: 0 pt	Sparse: 1 pt	Moderate: 2 pts	Dense: 3 pts	1.0
< 1 per acre	1 to 5 per acre	6 to 10 per acre	>10 per acre	

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



Metric 7. Scenic, Recreational, and Cultural Value Maximum 3 points.

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

0.0 Metric 7 Total (3 points max.)

☐YES ⊠NO

MiRAM Summary

Narrative Rating

□YES ⊠NO Question 2: Threatened or Endangered (T/E) Species Habitat Question 3: Rare Wetland Natural Community Type ☐YES ☒NO Question 4: Great Lakes Coastal Wetland ☐YES ⊠NO **Quantitative Rating** Score Maximum Metric 1: Wetland Size and Distribution 9 3 Metric 2: Upland Buffers and Intensity of Surrounding Land Use 12 1 Metric 3: Hydrology 26 10 Metric 4: Habitat Alteration and Habitat Structure Development 20 6 Metric 5: Special Situations 10 5 Metric 6: Vegetation, Interspersion, and Habitat Features 20 -1 Metric 7: Scenic, Recreational, and Cultural Value 3 0 **Seasonally Adjusted Score** (add 10 pts if outside the growing season) 0 10

Grand Total
Add totals from
all seven metrics

24 100 Max.

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

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

Background Information

Wetland	Evaluator
Proposed Project Site Name or DNRE File #:	Name: S. Kogge, R. Roos
I-275, WC017	Address: 11181 Marwill Ave
Date of Evaluation: 7/23/2012	City: West Olive State: MI Zip: 49460
County: Wayne	Phone: 616-847-1680
Township: Canton	Email: stu.kogge@cardno.com
Town:2S	
Range: 8E	Is a Wetland Delineation Report available?
Section: 12	If "YES NO Date Completed:
Decimal Lat/Long: 42.3292, -83.4429	person/firm/agency):
Check ($\sqrt{\ }$) each box below when item is complete.	
MiRAM Boundary. See MiRAM User's Manua	al for more information
Size of the Wetland Evaluation Area: 0.4	acres
Location Map. A county road map showing th	ne location of the Wetland Evaluation Area, north
	ks, etc. <i>Attach</i> a map to the end of this document.
X Color Photographs Photos should show the	wetland vegetation components, habitat/community
types, hydrologic features, and any other pert	
document.	
X Landscape Sketch or Aerial Photograph.	
	d Wetland Evaluation Area. Indicate the location of
Wetland Evaluation Area. Examples inclusive swamp, shrub swamp, etc. Some wetland communities. Natural communities are pre-	I wetland community types identified within the de: marsh, wet meadow, hardwood swamp, conifer communities may be further classified as <u>natural</u> edominantly structured by natural processes rather Examples include: bog, prairie fen, muskeg, wet
	uch as: streams, 100-year floodplains, ponds, vernal thin a marsh or swamp.
4. Identify and label surrounding upland feature	ires.
5. Include north arrow and map scale informa	ation.
6. Attach the landscape sketch or aerial phot	o to the end of this document.
Comments: List any important site features or ago or near the Wetland Evaluation Are	pparent disturbance events that have occurred within a.
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, regardle	ss 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 Hydrologic Condition and Interactions Hydrologic Alterations Substrate/Soil Disturbances Habitat Structure Development Habitat Alterations Habitat/Wetland Condition Amphibian Breeding Pools Approximately how much of the Wetland Evaluations Polymers Has vegetation within the Wetland Evaluation Are	 Vegetation Diversity Vegetation Condition Amount of Open Water Percent of Invasive/Non-native Species Community Interspersion Vertical/Horizontal Structure S1, S2, or S3 Natural Community ion Area was reviewed during the field
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.

An	swer <u>all</u> of the foll	owing metrics.	
1.	U.S. Fish and Wildlife Service (USFWS) Critical Habitat. Is any part of the Wetland located within an area designated as Critical Habitat and does the Wetland actually contain habitat suitable for either species listed below? Piping Plover (Charadrius melodus) Critical Habitat Units are designated only within the following counties: Alger, Benzie, Charlevoix, Cheboygan, Chippewa, Emmet, Iosco, Leelanau, Luce, Mackinac, Mason, Muskegon, Presque Isle, and Schoolcraft. See URL below for Unit locations. www.fws.gov/midwest/endangered/pipingplover/final_rule.pdf Hines's Emerald Dragonfly (Somatochlora Hineana) Critical Habitat Units are designated only within the following counties: Alpena, Mackinac, and Presque Isle. See URL below for Unit locations. www.fws.gov/midwest/endangered/insects/hed/pdf/hinesfCH_FR.pdf		YES NO If "yes", the Wetland has high functional value.
2.	Therefore I as Follows and I (TIF) On a disc		YES NO If "yes", the Wetland has high functional value.
3.	Are more than 5 acc Community Type*? S1 or S2 N Has the Wercommunity to Manual for r Southern (see figure for See figure fo	tural Community Type. Theres or more than 25% of the Wetland comprised of a Rare Wetland Natural of Check (√) all Rare Wetland Natural Community Types. Italiand been identified by the Evaluator — or other persons — as being an S1 or S2 natural type as defined by the Michigan Natural Features Inventory (MNFI)? See the MiRAM User's nore information. Bog, defined as any bog occurring below the northern limit of Michigan's Floristic Tension Zone for approximate location). Ith/Mature Forested Wetland. Lacks evidence of any significant harvesting. Dominated by the tory trees (mean overstory DBH ≥20 inches, including at least two trees/acre having DBH and the canopy is multi-aged and multi-layered. Aggregations of canopy trees are interspersed gaps and large snags. Large nursery logs and tip-up mounds litter the forest floor. Does the tland have all/most of these characteristics? I Community Type is less than 5 acres and less than 25% of the Wetland, the rare community and evaluated separately.	YES NO If "yes", the Wetland has high functional value. Floristic Tension Zone
4.	Great Lakes Coalls any part of the Vincluding Lake St.	Vetland within 1,000 feet of the ordinary high water mark of any of the Great Lakes,	☐ YES ☑ NO If "yes", the Wetland has high functional value.

Quantitative Rating

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

Metric 1. Wetland Size and Distribution Maximum 9 points.

1a.	Wetland Size Estimate the size of the Wetland (i.e., Wetland Evaluation Area). Select a size class. Maximum 6 points.		Score
50	acres Select this option if the wetland's actual size ≥ 50 acres.	6 pts	
25	acres to <50 acres	5 pts	
10	acres to <25 acres	4 pts	2.0
3	acres to <10 acres	3 pts	
1/4	acre to <3 acres	2 pts	
less	than ¼ acre	0 pt	

1b. Wetlan	d 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			
>20 to 80% of surrounding 2-mile radius is wetland 2 pts		3.0	
>80% of surro	unding 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 aeria Wetland.	l photograph ava	ailable, sketch a 150-foot wide "buffer z	zone" arou	nd the	
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:		Non-Buffers Include:			
 shrubland, young forest, natural grass abandoned row crop field (vegetated of hay field (non-row crop), lightly grazed lightly managed forest (selectively log designated wildlife area, lightly manage other wetland, lake, river 	& naturalizing) d pasture ged)	 lawns, golf courses, manicured part residential, commercial, industrial roadways (including shoulders), part row crop field conservation tillage, heavily grazed clear-cutting, mining, construction at 	rking lots pasture		
				Score	
Wide Buffer Width:	≥150 feet arou	ınd the perimeter	6 pts		
Medium Buffer Width:	75 to <150 fee	t around the perimeter	4 pts	0.0	
Narrow Buffer Width:	25 to <75 feet	around the perimeter	2 pt		
Very Narrow Buffer Width:	0 (no buffer) to	<25 feet around the perimeter	0 pt		

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

- Step 1: Using the most recent aerial photograph available, sketch a 1,000-foot wide "land use zone" around the Wetland.
- Step 2: Estimate percent coverages comprised by each of the four types of land use listed below.
- Step 3: If any land use type comprises more than 25% of the total land use, it is considered to be a "dominant" land use type for the purposes of MiRAM and will receive points. Sum the available points from all dominant land use types and then average the score. Round to the nearest 0.5 increment. Maximum 6 points.

Type of Land Use	Examples within each	Type of Land Use		Score
Very Low Intensity:	maturing forestnatural grassland, prairie	designated wildlife areaother wetland, lake, river	6 pts	
Low Intensity:	shrubland/young forestrecent selective logginghay field (non-row crop)	lightly managed parklandold field, lightly grazed pastureone-lane road/two track	4 pts	1.0
Moderately High Intensity:	residential & lawnsmanicured parklandgolf course	conservation tillagerecent clear-cut (<10 years)two-lane road	2 pts	
High Intensity:	 commercial, industrial high-density residential heavily grazed pasture row crop field 	multi-lane paved roadwayconstruction activityparking lotmining	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.		
Precipitation: Directly and/or as runoff from upland areas. 1 pt		1.0
Groundwater: Seeps or evidence, such as significant amounts of skunk cabbage (Symplocarpus foetidus) or other fen-adapted species.		0.0
Seasonal/Intermittent Surface Water: Seasonal inundation from a lake, pond, or stream. (A Wetland can only receive points for this source of water or the next, not both.) 2 pts		0.0
Perennial Surface Water: Perennial inundation from a lake, stream or pond.	5 pts	0.0

3b. Connectivity: Select all that apply. Maximum 8 points.		Score
100-Year Floodplain. As defined in the Floodplain Authority under Part 31 of the NREPA.	2 pts	0.0
Between a Stream/Lake/Pond and Human Land Use. The Wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the Wetland before it discharges into the surface waterbody.	2 pts	0.0
Wetland/Upland Complex. The Wetland is part of a large scale (10+ acres) non-linear complex of wetlands with small areas of unmanicured/undeveloped vegetated uplands that do not restrict movement of organisms between the wetland areas.	2 pts	0.0
Riparian Corridor. The Wetland is part of a linear <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 Select the option(s) from below that best describe(s) the dominant hydrologic characteristic of the Wetland. For the purposes of this submetric, "dominant" is defined as comprising at least 25% of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, select all that apply and average the points. Round to the nearest 0.5 increment. Maximum 4 points.		Score
Permanently Inundated 4 pts		
Permanently Saturated to Regularly Inundated 3 pts		2.0
Regularly Saturated to Seasonally Inundated 2 pts		
Seasonally Saturated in the Upper 12 Inches of Soil	1 pt	

3d. Alterations to Natural Hydrologic Regime						
This submetric evaluates the intactness of the natural hydrologic regime of the Wetland. Check ($\sqrt{\ }$) all forms of past or ongoing hydrologic alteration(s) that are potentially influencing the Wetland.						
☑ ditch(es) in or near the wetland ☐ point source discharge(s) (non-stormwater)			ater)			
☐ tile(s) in or near t	he wetland	☐ filling/grading activities in or near the w	etland			
dike(s) in or near	the wetland	x road bed(s)/RR grades(s) in or near the	e wetland			
weir(s) in or near	the wetland	dredging activities in or near the wetlar	nd			
stormwater input	s (addition of water)	other (specify)				
stream channeliz	ation	other (specify)				
regime. For this submetr "Minor" is defined as affer impact the Substrate/Soil	ic, "significant" is defined as affect cting less than approximately 10% (submetric 4a) and/or Habitat (sub	,	e Wetlan n may als	d.		
Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's natural hydrologic regime. If uncertain, select adjoining options and average the available points. Round to the nearest 0.5 increment. If the Wetland's natural hydrologic regime has been significantly altered, it shall receive no more than 6 points for this submetric. Maximum 8 points.				Score		
No Hydrologic Alterations Apparent:	There has been no significant alto hydrologic regime, and/or ongoin	eration(s) to the Wetland's natural g minor alteration(s) is/are rare.	8 pts			
Recovered:	Significant hydrologic alteration(s prior to the assessment, and/or o alteration(s) is/are only occasional	ngoing minor hydrologic	6 pts			
Recovering:	A single significant hydrologic alterprior to the assessment, and/or o alteration(s) is/are frequent.		4 pts	6.0		
Recent or No Recovery:	Multiple significant hydrologic alte 20 years prior to the assessment is/are ongoing.		1 pt			
			•			

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

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

 4a. Substrate/Soil Disturbance This submetric evaluates the intactness or lack of disturbance to the Wetland's substrate and soil. Check (√) all possible forms of past or ongoing substrate/soil disturbance that are observed within the Wetland. ☑ human-induced erosion or exposure ☑ human-induced sedimentation or burial ☑ intensive grazing (hooves) ☑ filling ☑ off-road vehicle use ☑ grading 				
For this submetric, defined as affecting	a disturbance is significant or minor in relation "significant" is defined as affecting approximately 10% of the Wetlar plogic regime (Submetric 3d) and/or an alter	nately 10% or greater of the Wetland nd. A substrate disturbance may als		
substrate. If uncer	elow that best describes the extent of (or lactain, select adjoining options and average the Wetland's substrate has been significantly a 4 points.	e points. Round to the nearest	than	Score
No Substrate Disturbance Apparent:	There has been no significant disturbanc and/or ongoing minor disturbance events		4 pts	
Recovered:	Significant substrate disturbance occurre the assessment, and/or ongoing minor su only occasional (e.g., light sedimentation	ubstrate disturbance events are	3 pts	2.0
Recovering:	A single significant substrate disturbance prior to the assessment, and/or ongoing events are frequent.		2 pts	
Recent or No Recovery:	Multiple significant substrate disturbance years prior to the assessment, and/or sig		1 pt	
4b. Habitat Alteration This submetric evaluates the intactness of the natural habitat within the Wetland. A "significant" alteration is defined as affecting 10% or greater of the Wetland. "Minor" alternation affects less than 10% of the Wetland. Check (√) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland. barriers such as road bed(s)/RR grades(s) A herbicide/chemical treatment selective cutting dredging dredging dredging filling/grading filling/grading plowing/disking/farming other (specify) 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				Vetland. and. rs ago. s, plant unity
3d) and/or a substrate Select an option belo	atural processes. A habitat alteration may also be disturbance (Submetric 4a). w that best describes the extent of (or lack of) altens and average the available points. Round to the	eration(s) to the Wetland's habitat. If und	clear,	Score
No Habitat Alterations Apparent:	There has been no significant alteration to and/or ongoing minor alteration(s) is/are raises.	the Wetland's natural habitat,	9 pts	00016
Recovered:	Significant habitat alteration(s) occurred mo assessment, and/or ongoing minor habitat a occasional.		6 pts	3.0
Recovering:	A single, significant habitat alteration occur assessment, and/or ongoing minor habitat		3 pts	
Recent or No Recovery:	Multiple significant habitat alterations have to the assessment, and/or significant altera		1 pt	

4c. Habitat Structure Development

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

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

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

Maximum 7 points.			Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	
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	1.0
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
 ☐ 1. Contains USFWS-designated Critical Habitat ☐ 2. Federal or State-listed T/E Plant or Animal Species ☐ 3. S1, S2, or S3 Natural Community Type (at least 5 acres or 25% of the Wetland) ☐ 4. Southern Bog (at least 5 acres or 25% of the Wetland) ☐ 5. Old-Growth/Mature Forested Wetland (at least 5 acres or 25% of the Wetland) ☐ 6. Great Lakes Coastal Wetland 	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 <i>or</i> 2) more than 75% covered by highly-invasive vegetation. See Submetric 6c for a list of highly-invasive species.	0.0

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 <u>may exist in overlapping layers</u>, 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

			<u> </u>	
		Native species dominate the	High native diversity	3 pts
	>25% of	coverage	Moderate to low native diversity	2 pts
	Wetland > area	Invasive or non-native species	Moderate to high native diversity	2 pts
Vegetation Component ▶		dominate the coverage	Low native diversity	1 pt
is >1/4 acre	acre <25% of Wetland area >25% of Wetland area >25% of Wetland area >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 Native species dominate the	Moderate native diversity	1 pt
			Low native diversity	0 pt
			Moderate to high native diversity	2 pts
		coverage	Low native diversity	1 pt
Vegetation Component		Invasive or non-native species dominate the coverage		0 pt
is <¼ acre	<25% of Wetla	and area ▶		0 pt

Forest Overstory Component, qualitative cover score derived from table maximum 3 points.	Score
Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height. The Wetland does not have a forested component if the trees are widely scattered (e.g., a savanna), located only thinly along the Wetland's margin, or if it is clear that most of the trees are actually located on upland around the perimeter of the Wetland.	0.0
Shrub/Sapling Component, qualitative cover score derived from table maximum 3 points.	Score
Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	0.0
Herbaceous Component, qualitative cover score derived from table maximum 3 points.	Score
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 (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>) within the herbaceous component because of their tendency to hold their stems and leaves well above the water. All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	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 <u>at</u> or <u>below</u> 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	
Moderate:	1.0 acre to <2.5 acres	2 pts	0.0
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

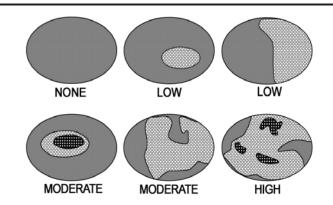
Native, non-invasive: Male and female portions of the flower spike are not separated (or only slightly separated) on most of the stems within the same local stand. Female flower spikes are light brown and are 0.8-1.2 inches thick at maturity (before expanding when dried). Most leaf blades are approximately 0.5 to 1 inch wide at widest part. Typically, not tightly packed into an area (non-invasive).broad-leaved cattail (*T. latifolia*)

Estimate the total coverage. Maximum 1 point.			Score
Virtually Absent:	<1% aerial coverage of highly-invasive species	1 pt	
Nearly Absent:	1% to <5% aerial coverage of highly-invasive species	0 pt	-5.0
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	
Wetland has a moderate degree of interspersion	3 pts	0.0
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pt	

6e. Habitat Features

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

(remnants of large logs),	root tip-up mounds (uproot s (hummocks/tussocks/tree	sedge/grass tussocks, decay ed trees), etc. Percent cove mounds) and includes the d	rage is based on total	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	Sparse: 1 pt	Moderate: 2 pts	Dense: 3 pts	1.0
< 5% of the area	5% to 10% of the area	11% to 50% of the area	>50% of the area	



Metric 7. Scenic, Recreational, and Cultural Value Maximum 3 points.

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

0.0 Metric 7 Total (3 points max.)

MiRAM Summary

Narrative Rating			
Question 1: U.S. Fish and Wildlife Service (USF	WS) Critical Habitat	□YES 🛛	NO
Question 2: Threatened or Endangered (T/E) Sp	ecies Habitat	□YES 🏻	NO
Question 3: Rare Wetland Natural Community T	ype	□YES 🛛	NO
Question 4: Great Lakes Coastal Wetland		□YES 🏻	NO
Quantitative Rating		Score	Maximum
Metric 1: Wetland Size and Distribution		5.0	9
Metric 2: Upland Buffers and Intensity of Surrou	nding Land Use	1.0	12
Metric 3: Hydrology		9.0	26
Metric 4: Habitat Alteration and Habitat Structure	e Development	6.0	20
Metric 5: Special Situations		0.0	10
Metric 6: Vegetation, Interspersion, and Habitat	Features	-3	20
Metric 7: Scenic, Recreational, and Cultural Value	ıe	0	3
Seasonally Adjusted Score (add 10 pts if outsic	le the growing season)	0	10
	Grand Total Add totals from all seven metrics	18.0	100 Max.

Scoring comments:

Background Information

Daong: Jan				
Wetland	Evaluator			
Proposed Project Site Name or DNRE File #:	Name: S. Kogge, R. Roos			
I-275, WC018	Address: 11181 Marwill Ave			
Date of Evaluation: 7/23/2012	City: West Olive State: MI Zip: 49460			
County: Wayne	Phone: 616-847-1680			
Township: Canton	Email: stu.kogge@cardno.com			
Town:2S				
Range: 8E Is a Wetland Delineation Report available				
Section: 12	YES NO Date Completed:			
Decimal Lat/Long: 42.3261, -83.4427	person/firm/agency):			
Check ($\sqrt{\ }$) each box below when item is complete.				
MiRAM Boundary. See MiRAM User's Manua	al for more information			
-	acres			
Location Map. A county road map showing th	e location of the Wetland Evaluation Area, north			
	ks, etc. Attach a map to the end of this document.			
	wetland vegetation components, habitat/community			
types, hydrologic features, and any other perti document.	nent site features. Attach to the end of this			
Landscape Sketch or Aerial Photograph.Clearly label the Proposed Project Site and the MiRAM Boundary.	Wetland Evaluation Area. Indicate the location of			
•	wetland community types identified within the			
Wetland Evaluation Area. Examples include	de: marsh, wet meadow, hardwood swamp, conifer			
	communities may be further classified as <u>natural</u> dominantly structured by natural processes rather			
	Examples include: bog, prairie fen, muskeg, wet			
prairie, southern wet meadow, etc.				
Identify and label all hydrologic features, suppose, and small patches of open water wit	uch as: streams, 100-year floodplains, ponds, vernal			
Identify and label surrounding upland features.	•			
Include north arrow and map scale informa				
6. <i>Attach</i> the landscape sketch or aerial photo				
o. Attach the landscape sketch of aerial photo	to the end of this document.			
Comments: List any important site features or ap or near the Wetland Evaluation Area	parent disturbance events that have occurred within a.			
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	g		
Rhamnus frangula			
Salix exigua			
Ulmus americana			
Herbaceous Stratum (non-woody plants, regardle	ss 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 Hydrologic Condition and Interactions Hydrologic Alterations Substrate/Soil Disturbances Habitat Structure Development Habitat Alterations Habitat/Wetland Condition Amphibian Breeding Pools Approximately how much of the Wetland Evaluat	 Vegetation Diversity Vegetation Condition Amount of Open Water Percent of Invasive/Non-native Species Community Interspersion Vertical/Horizontal Structure S1, S2, or S3 Natural Community 		
inspection? 90%	sa mac remote during the new		
Has vegetation within the Wetland Evaluation Are within the past 5 years? ☐ NO	ea been altered and/or buffer areas impacted		

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.

An	swer <u>all</u> of the foll	owing metrics.	
1.	Is any part of the V actually contain ha Piping Plover (Chan Benzie, Charlevoix, Isle, and Schoolcraf www.fws.gov/midwe Hines's Emerald Dra counties: Alpena, Ma	Idlife Service (USFWS) Critical Habitat. Vetland located within an area designated as Critical Habitat and does the Wetland bitat suitable for either species listed below? **adrius melodus**) Critical Habitat Units are designated only within the following counties: Alger, Cheboygan, Chippewa, Emmet, Iosco, Leelanau, Luce, Mackinac, Mason, Muskegon, Presque t. See URL below for Unit locations. **est/endangered/pipingplover/final_rule.pdf** **agonfly** (Somatochlora Hineana) Critical Habitat Units are designated only within the following ackinac, and Presque Isle. See URL below for Unit locations. **est/endangered/insects/hed/pdf/hinesfCH_FR.pdf**	YES NO If "yes", the Wetland has high functional value.
2.		Indangered (T/E) Species. Interest T/E plant or animal species occur within the Wetland? Complete the following ser this metric. Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c. 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. 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. 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. Did the DNRE review confirm potential T/E occurrence in the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric. The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE.	YES NO If "yes", the Wetland has high functional value.
3.	Are more than 5 acc Community Type*? S1 or S2 N Has the Wercommunity to Manual for r Southern (see figure for See figure fo	tural Community Type. There or more than 25% of the Wetland comprised of a Rare Wetland Natural Processor more than 25% of the Wetland Community Types. Italiand been identified by the Evaluator — or other persons — as being an S1 or S2 natural type as defined by the Michigan Natural Features Inventory (MNFI)? See the MiRAM User's more information. Bog, defined as any bog occurring below the northern limit of Michigan's Floristic Tension Zone or approximate location). Ith/Mature Forested Wetland. Lacks evidence of any significant harvesting. Dominated by tory trees (mean overstory DBH ≥20 inches, including at least two trees/acre having DBH and the canopy is multi-aged and multi-layered. Aggregations of canopy trees are interspersed gaps and large snags. Large nursery logs and tip-up mounds litter the forest floor. Does the stand have all/most of these characteristics? It Community Type is less than 5 acres and less than 25% of the Wetland, the rare community and evaluated separately.	YES NO If "yes", the Wetland has high functional value. Floristic Tension Zone
4.	Great Lakes Coalls any part of the Vincluding Lake St.	Vetland within 1,000 feet of the ordinary high water mark of any of the Great Lakes,	☐ YES ☑ NO If "yes", the Wetland has high functional

Quantitative Rating

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

Metric 1. Wetland Size and Distribution Maximum 9 points.

1a.	Wetland Size Estimate the size of the Wetland (i.e., Wetland Evaluation Area). Select a size class. Maximum 6 points.		Score
50	acres Select this option if the wetland's actual size ≥ 50 acres.	6 pts	
25	acres to <50 acres	5 pts	
10	acres to <25 acres	4 pts	2.0
3	acres to <10 acres	3 pts	
1/4	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 wetlar remaining within a 2-mile radius from the Wetland's center. For the purpose of this submetric 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.	, areas e	Score
0 to	20% of surrounding 2-mile radius is wetland	3 pts	
>20 to 80% of surrounding 2-mile radius is wetland 2 pts		3.0	
>809	% 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	ne Wetland's P	Perimeter		
Wetland.	Step 1: Using the most recent aerial photograph available, sketch a 150-foot wide "buffer zone" arour 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 a Step 4: Select the buffer width that	long the Wetland	d's perimeter.	7 100 1661).	
Buffers Include:		Non-Buffers Include:		
 shrubland, young forest, natural gras abandoned row crop field (vegetated hay field (non-row crop), lightly graze lightly managed forest (selectively log designated wildlife area, lightly mana other wetland, lake, river 	& naturalizing) d pasture gged)	 lawns, golf courses, manicured pa residential, commercial, industrial roadways (including shoulders), pa row crop field conservation tillage, heavily grazed clear-cutting, mining, construction 	arking lots	
				Score
Wide Buffer Width:	≥150 feet arou	nd the perimeter	6 pts	
Medium Buffer Width:	75 to <150 fee	t around the perimeter	4 pts	1.0
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	and Use Examples within each Type of Land Use			Score
Very Low Intensity:	maturing forestnatural grassland, prairie	designated wildlife areaother wetland, lake, river	6 pts	
Low Intensity:	shrubland/young forestrecent selective logginghay field (non-row crop)	lightly managed parklandold field, lightly grazed pastureone-lane road/two track	4 pts	1.0
Moderately High Intensity:	residential & lawnsmanicured parklandgolf course	conservation tillagerecent clear-cut (<10 years)two-lane road	2 pts	
High Intensity:	 commercial, industrial high-density residential heavily grazed pasture row crop field 	multi-lane paved roadwayconstruction activityparking lotmining	1 pt	

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

Metric 3. Hydrology Limited to 26 points.

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

3b. Connectivity: Select all that apply. Maximum 8 points.		
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 Select the option(s) from below that best describe(s) the dominant hydrologic characteristic of Wetland. For the purposes of this submetric, "dominant" is defined as comprising at least 25% the Wetland's area. If the Wetland contains several areas that have distinctly different hydrolo characteristics, select all that apply and average the points. Round to the nearest 0.5 increme Maximum 4 points.	<u>∕o</u> of ogic	Score
Permanently Inundated 4 pts		
Permanently Saturated to Regularly Inundated 3 pts		2.0
Regularly Saturated to Seasonally Inundated 2 pts		
Seasonally Saturated in the Upper 12 Inches of Soil	1 pt	

3d. Alterations to Natural Hydrologic Regime				
This submetric evaluation Check ($\sqrt{\ }$) all form	This submetric evaluates the intactness of the natural hydrologic regime of the Wetland. Check $(\sqrt{\ })$ all forms of past or ongoing hydrologic alteration(s) that are potentially influencing the Wetla			etland.
	ar the wetland	point source discharge(s) (non-stormw	ater)	
☐ tile(s) in or near t	he wetland	☐ filling/grading activities in or near the w	etland	
dike(s) in or near	the wetland	x road bed(s)/RR grades(s) in or near the	e wetland	
weir(s) in or near	the wetland	dredging activities in or near the wetlar	nd	
stormwater input	s (addition of water)	other (specify)		
stream channeliz	ation	other (specify)		
regime. For this submetr "Minor" is defined as affer impact the Substrate/Soil	ic, "significant" is defined as affect cting less than approximately 10% (submetric 4a) and/or Habitat (sub	,	e Wetlan n may als	d.
hydrologic regime. If unc nearest 0.5 increment. If	ertain, select adjoining options and	lack of) alteration(s) to the Wetland's rd average the available points. Round egime has been significantly altered, it a points.	to the	Score
No Hydrologic Alterations Apparent:	There has been no significant alto hydrologic regime, and/or ongoin	eration(s) to the Wetland's natural g minor alteration(s) is/are rare.	8 pts	
Recovered:	Significant hydrologic alteration(s prior to the assessment, and/or o alteration(s) is/are only occasional	ngoing minor hydrologic	6 pts	
Recovering:	A single significant hydrologic alterprior to the assessment, and/or o alteration(s) is/are frequent.		4 pts	6.0
Recent or No Recovery:	Multiple significant hydrologic alte 20 years prior to the assessment is/are ongoing.		1 pt	
			•	

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

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

4a. Substrate/Soil Disturbance This submetric evaluates the intactness or lack of disturbance to the Wetland's substrate and soil. Check (√) all possible forms of past or ongoing substrate/soil disturbance that are observed within the Wetland.				
human-in	duced erosion or exposure			
For this submetric, defined as affecting	a disturbance is significant or minor in relation to the Wetland's overall area. "significant" is defined as affecting approximately 10% or greater of the Wetland g less than approximately 10% of the Wetland. A substrate disturbance may alsologic regime (Submetric 3d) and/or an alteration of habitat (Submetric 4b).			
substrate. If uncer	elow that best describes the extent of (or lack of) disturbances to the Wetland's tain, select adjoining options and average the points. Round to the nearest he Wetland's substrate has been significantly altered, it should receive no more n 4 points.	than	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	3.0	
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		
This subme defined as a Check (√) a Subarriers so selective of clearcuttin makes mowing of coarse words intensive of the coarse words are subarriers end of the coarse words are subarriers ar	This submetric evaluates the intactness of the natural habitat within the Wetland. A "significant" alteration is defined as affecting 10% or greater of the Wetland. "Minor" alternation affects less than 10% of the Wetland. Check (√) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland. barriers such as road bed(s)/RR grades(s)			
	ow that best describes the extent of (or lack of) alteration(s) to the Wetland's habitat. If unons and average the available points. Round to the nearest 0.5 increment. Maximum 9 p		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	6.0	
Recovering:	A single, significant habitat alteration occurred within 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are frequent.	3 pts		
Recent or No Recovery:	Multiple significant habitat alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt		

4c. Habitat Structure Development

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

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

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

Maximu	Maximum 7 points.		
Excellent:	Wetland appears to represent the best of its type.	7 pts	
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	4.0
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
 1. Contains USFWS-designated Critical Habitat 2. Federal or State-listed T/E Plant or Animal Species 3. S1, S2, or S3 Natural Community Type (at least 5 acres or 25% of the Wetland) 4. Southern Bog (at least 5 acres or 25% of the Wetland) 5. Old-Growth/Mature Forested Wetland (at least 5 acres or 25% of the Wetland) 6. Great Lakes Coastal Wetland 	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

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 <u>may exist in overlapping layers</u>, 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	High native diversity	3 pts
		coverage	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 <1/a> acre ►	>25% of Wetland	Native species dominate the	Moderate to high native diversity	2 pts
		coverage	Low native diversity	1 pt
	area	Invasive or non-native species dominate the coverage		0 pt
	<25% of Wetla	and area ▶		0 pt

Forest Overstory Component, qualitative cover score derived from table maximum 3 points.	Score
Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height. The Wetland does not have a forested component if the trees are widely scattered (e.g., a savanna), located only thinly along the Wetland's margin, or if it is clear that most of the trees are actually located on upland around the perimeter of the Wetland.	0.0
Shrub/Sapling Component, qualitative cover score derived from table maximum 3 points.	Score
Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	0.0
Herbaceous Component, qualitative cover score derived from table maximum 3 points.	Score
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 (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>) within the herbaceous component because of their tendency to hold their stems and leaves well above the water. All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	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 <u>at</u> or <u>below</u> 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 or	pen water coverage. Maximum 3 points.		Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	0.0
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

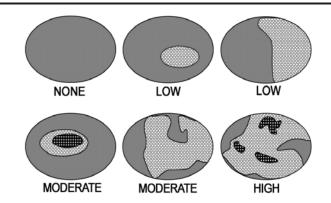
Native, non-invasive: Male and female portions of the flower spike are not separated (or only slightly separated) on most of the stems within the same local stand. Female flower spikes are light brown and are 0.8-1.2 inches thick at maturity (before expanding when dried). Most leaf blades are approximately 0.5 to 1 inch wide at widest part. Typically, not tightly packed into an area (non-invasive).broad-leaved cattail (*T. latifolia*)

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

6d. Horizontal (Plan View) Interspersion

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

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



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

6e. Habitat Features

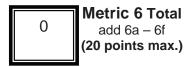
Determine the amount of each habitat feature that is present in the Wetland. **Maximum 3 points for each habitat feature.**

1. Hummocks/Tussocks/Tree Mounds, e.g., sedge/grass tussocks, decaying nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of all raised features (hummocks/tussocks/tree mounds) and includes the depressional matrix within				
any group of raised features.			Score	
Virtually Absent: 0 pt <5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	0

2. Coarse Woody Debris (CWD). Per log, average width ≥6 inches; each at least 10 feet long. e.g., fallen trees and/or large branches, etc.				Score
Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	0.0

3. Large Standing Trees, Living or Dead (≥12 inches DBH).			Score	
Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	0.0

4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat.				Score
Virtually Absent: 0 pt < 5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	1.0



Metric 7. Scenic, Recreational, and Cultural Value Maximum 3 points.

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

0.0 Metric 7 Total (3 points max.)

MiRAM Summary

Narrative Rating		
Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat	□YES 🛛	NO
Question 2: Threatened or Endangered (T/E) Species Habitat	□YES 🛛	NO
Question 3: Rare Wetland Natural Community Type	□YES 🛛	NO
Question 4: Great Lakes Coastal Wetland	□YES 🛚	NO
Quantitative Rating	Score	_ Maximum
Metric 1: Wetland Size and Distribution	5.0	9
Metric 2: Upland Buffers and Intensity of Surrounding Land Use	2.0	12
Metric 3: Hydrology	9.0	26
Metric 4: Habitat Alteration and Habitat Structure Development	13.0	20
Metric 5: Special Situations	0.0	10
Metric 6: Vegetation, Interspersion, and Habitat Features	0.0	20
Metric 7: Scenic, Recreational, and Cultural Value	0.0	3
Seasonally Adjusted Score (add 10 pts if outside the growing season	on)	10
Grand Total Add totals from all seven metrics	29.0	100 Max.

Scoring comments:			

Background Information

Wetland	Evaluator				
Proposed Project Site Name or DNRE File #:	Name: S. Kogge, R. Roos				
I-275, WC050	Address: 11181 Marwill Ave				
Date of Evaluation: 7/23/2012	City: West Olive State: MI Zip: 49460				
County: Wayne	Phone: 616-847-1680				
Township: Canton	Email: stu.kogge@cardno.com				
Town:2S					
Range: 8E	Is a Wetland Delineation Report available?				
Section: 13	YES NO Date Completed:				
Decimal Lat/Long: 42.3145, -83.4437	If "YES", completed by (name of person/firm/agency):				
Check ($\sqrt{\ }$) 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 arrow, map scale information, roads, landmarks	e location of the Wetland Evaluation Area, north s, etc. <i>Attach</i> a map to the end of this document.				
Color Photographs. Photos should show the watypes, hydrologic features, and any other pertindecument.					
 Landscape Sketch or Aerial Photograph. Clearly label the Proposed Project Site and the MiRAM Boundary. 	Wetland Evaluation Area. Indicate the location of				
Wetland Evaluation Area. Examples include swamp, shrub swamp, etc. Some wetland communities. Natural communities are precipilities.	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 <u>natural communities</u> . Natural communities are predominantly structured by natural processes rather than modern anthropogenic disturbances. Examples include: bog, prairie fen, muskeg, wet				
Identify and label all hydrologic features, suc pools, and small patches of open water with	ch as: streams, 100-year floodplains, ponds, vernal in a marsh or swamp.				
4. Identify and label surrounding upland feature					
5. Include north arrow and map scale informati	ion.				
6. Attach the landscape sketch or aerial photo	to the end of this document.				
Comments: List any important site features or apportant or near the Wetland Evaluation Area.	parent disturbance events that have occurred within.				
WC050 includes ditch along I-275 and adjacent dete	ention 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	mones burraina greater than electron tail,		
Harbacoous Stratum (non-woody plants, regardle	ss of size, and woody plants less than 3.28 feet tall)		
Agrostis gigantea	Juncus tenius		
Apocynum cannabinum	Lythrum salicaria		
Bidens frondosus	Phragmites australis		
Brassica nigra	Poa pratensis		
Cirsium arvense	Rumex crispus		
Carex vulpinoidea	Scirpus pendulus		
Dipsacus laciniatus	Solidago canadensis		
Juncus dudleyi	Typha x glauca		
Checklist of features and conditions to observe during Hydrologic Condition and Interactions Hydrologic Alterations Substrate/Soil Disturbances Habitat Structure Development Habitat Alterations Habitat/Wetland Condition Amphibian Breeding Pools Approximately how much of the Wetland Evaluat inspection?	 Vegetation Diversity Vegetation Condition Amount of Open Water Percent of Invasive/Non-native Species Community Interspersion Vertical/Horizontal Structure S1, S2, or S3 Natural Community 		
Has vegetation within the Wetland Evaluation Are	ea been altered and/or buffer areas impacted		
within the past 5 years? X YES NO	a soon altered allarer suller aleas illipaeted		

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.

An	swer <u>all</u> of the foll	owing metrics.	
1.	Is any part of the V actually contain ha Piping Plover (Chan Benzie, Charlevoix, Isle, and Schoolcraf www.fws.gov/midwe Hines's Emerald Dra counties: Alpena, Ma	Idlife Service (USFWS) Critical Habitat. Vetland located within an area designated as Critical Habitat and does the Wetland bitat suitable for either species listed below? **adrius melodus**) Critical Habitat Units are designated only within the following counties: Alger, Cheboygan, Chippewa, Emmet, Iosco, Leelanau, Luce, Mackinac, Mason, Muskegon, Presque t. See URL below for Unit locations. **est/endangered/pipingplover/final_rule.pdf** **agonfly** (Somatochlora Hineana) Critical Habitat Units are designated only within the following ackinac, and Presque Isle. See URL below for Unit locations. **est/endangered/insects/hed/pdf/hinesfCH_FR.pdf**	YES NO If "yes", the Wetland has high functional value.
2.		Indangered (T/E) Species. Interest T/E plant or animal species occur within the Wetland? Complete the following ser this metric. Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c. 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. 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. 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. Did the DNRE review confirm potential T/E occurrence in the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric. The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE.	YES NO If "yes", the Wetland has high functional value.
3.	Are more than 5 acc Community Type*? S1 or S2 N Has the Wercommunity to Manual for r Southern (see figure for See figure fo	tural Community Type. There or more than 25% of the Wetland comprised of a Rare Wetland Natural Processor more than 25% of the Wetland Community Types. Italiand been identified by the Evaluator — or other persons — as being an S1 or S2 natural type as defined by the Michigan Natural Features Inventory (MNFI)? See the MiRAM User's more information. Bog, defined as any bog occurring below the northern limit of Michigan's Floristic Tension Zone or approximate location). Ith/Mature Forested Wetland. Lacks evidence of any significant harvesting. Dominated by tory trees (mean overstory DBH ≥20 inches, including at least two trees/acre having DBH and the canopy is multi-aged and multi-layered. Aggregations of canopy trees are interspersed gaps and large snags. Large nursery logs and tip-up mounds litter the forest floor. Does the stand have all/most of these characteristics? It Community Type is less than 5 acres and less than 25% of the Wetland, the rare community and evaluated separately.	YES NO If "yes", the Wetland has high functional value. Floristic Tension Zone
4.	Great Lakes Coalls any part of the Vincluding Lake St.	Vetland within 1,000 feet of the ordinary high water mark of any of the Great Lakes,	☐ YES ☑ NO If "yes", the Wetland has high functional

Quantitative Rating

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

Metric 1. Wetland Size and Distribution Maximum 9 points.

1a.	Wetland Size Estimate the size of the Wetland (i.e., Wetland Evaluation Area). Select a size class. Maximum 6 points.		Score
50	acres Select this option if the wetland's actual size ≥ 50 acres.	6 pts	
25	acres to <50 acres	5 pts	
10	acres to <25 acres	4 pts	0.0
3	acres to <10 acres	3 pts	0.0
1/4	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 wetlar remaining within a 2-mile radius from the Wetland's center. For the purpose of this submetric 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.	, areas	Score
0 to	20% of surrounding 2-mile radius is wetland	3 pts	
>20 to 80% of surrounding 2-mile radius is wetland 2 pts		3.0	
>809	% 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 aeri Wetland.	Step 1: Using the most recent aerial photograph available, sketch a 150-foot wide "buffer zone" aroun Wetland			ind the
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:		Non-Buffers Include:		
 shrubland, young forest, natural gra: abandoned row crop field (vegetated) hay field (non-row crop), lightly graz lightly managed forest (selectively lown designated wildlife area, lightly managed) other wetland, lake, river 	d & naturalizing) ed pasture ogged)	 lawns, golf courses, manicured par residential, commercial, industrial roadways (including shoulders), pa row crop field conservation tillage, heavily grazed clear-cutting, mining, construction a 	rking lots	
				Score
Wide Buffer Width:	≥150 feet arou	und the perimeter	6 pts	
Medium Buffer Width:	75 to <150 fee	et around the perimeter	4 pts	0.0
Narrow Buffer Width:	25 to <75 feet	around the perimeter	2 pt	
Very Narrow Buffer Width:	0 (no buffer) to	o <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	and Use Examples within each Type of Land Use		Score	
Very Low Intensity:	maturing forestnatural grassland, prairie	designated wildlife areaother wetland, lake, river	6 pts	
Low Intensity:	shrubland/young forestrecent selective logginghay field (non-row crop)	lightly managed parklandold field, lightly grazed pastureone-lane road/two track	4 pts	1.0
Moderately High Intensity:	residential & lawnsmanicured parklandgolf course	conservation tillagerecent clear-cut (<10 years)two-lane road	2 pts	
High Intensity:	 commercial, industrial high-density residential heavily grazed pasture row crop field 	multi-lane paved roadwayconstruction activityparking lotmining	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.		
Precipitation: Directly and/or as runoff from upland areas.	1 pt	1.0
Groundwater: Seeps or evidence, such as significant amounts of skunk cabbage (Symplocarpus foetidus) or other fen-adapted species.	2 pts	0.0
Seasonal/Intermittent Surface Water: Seasonal inundation from a lake, pond, or stream. (A Wetland can only receive points for this source of water or the next, not both.)	2 pts	0.0
Perennial Surface Water: Perennial inundation from a lake, stream or pond.	5 pts	0.0

3b. Connectivity: Select all that apply. Maximum 8 points.		Score
100-Year Floodplain. As defined in the Floodplain Authority under Part 31 of the NREPA.	2 pts	0.0
Between a Stream/Lake/Pond and Human Land Use. The Wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the Wetland before it discharges into the surface waterbody.	2 pts	2.0
Wetland/Upland Complex. The Wetland is part of a large scale (10+ acres) non-linear complex of wetlands with small areas of unmanicured/undeveloped vegetated uplands that do not restrict movement of organisms between the wetland areas.	2 pts	0.0
Riparian Corridor. The Wetland is part of a linear <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 Select the option(s) from below that best describe(s) the dominant hydrologic characteristic of Wetland. For the purposes of this submetric, "dominant" is defined as comprising at least 25 the Wetland's area. If the Wetland contains several areas that have distinctly different hydrocharacteristics, select all that apply and average the points. Round to the nearest 0.5 incren Maximum 4 points.	<u>%</u> of logic	Score
Permanently Inundated	4 pts	
Permanently Saturated to Regularly Inundated 3 pts		3.0
Regularly Saturated to Seasonally Inundated 2 pts		
Seasonally Saturated in the Upper 12 Inches of Soil	1 pt	

3d. Alterations to Natural Hydrologic Regime				
	This submetric evaluates the intactness of the natural hydrologic regime of the Wetland. Check $(\sqrt{\ })$ all forms of past or ongoing hydrologic alteration(s) that are potentially influencing the Wetland			etland.
ditch(es) in or ne	ar the wetland	point source discharge(s) (non-stormwa	ater)	
☐ tile(s) in or near t	the wetland	☐ filling/grading activities in or near the w	etland	
dike(s) in or near	the wetland	☐ road bed(s)/RR grades(s) in or near the	e wetland	
weir(s) in or near	the wetland	dredging activities in or near the wetlan	ıd	
★ stormwater input	s (addition of water)	other (specify)		
stream channeliz	ration	other (specify)		
regime. For this submetr "Minor" is defined as affe	ic, "significant" is defined as affect	tion to the Wetland's overall area and I ing approximately 10% or greater of the of the Wetland. A hydrologic alteration ometric 4b).	e Wetlan	d.
hydrologic regime. If unc nearest 0.5 increment. If	Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's natural hydrologic regime. If uncertain, select adjoining options and average the available points. Round to the nearest 0.5 increment. If the Wetland's natural hydrologic regime has been significantly altered, it shall receive no more than 6 points for this submetric. Maximum 8 points.			Score
No Hydrologic Alterations Apparent:	There has been no significant alto hydrologic regime, and/or ongoin	eration(s) to the Wetland's natural g minor alteration(s) is/are rare.	8 pts	
Recovered:	Significant hydrologic alteration(s prior to the assessment, and/or o alteration(s) is/are only occasional	ngoing minor hydrologic	6 pts	
Recovering:	A single significant hydrologic alterior to the assessment, and/or o alteration(s) is/are frequent.		4 pts	6.0
Recent or No Recovery:	Multiple significant hydrologic alter 20 years prior to the assessment is/are ongoing.		1 pt	

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

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

4a. Substrate/Soil Disturbance This submetric evaluates the intactness or lack of disturbance to the Wetland's substrate and soil. Check (√) all possible forms of past or ongoing substrate/soil disturbance that are observed within the Wetland.				
☐ human-in	duced erosion or exposure duced sedimentation or burial intensive grazing (hooves) off-road vehicle use construction vehicle use other (specify)			
For this submetric defined as affecting	a disturbance is significant or minor in relation to the Wetland's overall area. "significant" is defined as affecting approximately 10% or greater of the Wetlan gless than approximately 10% of the Wetland. A substrate disturbance may alsologic regime (Submetric 3d) and/or an alteration of habitat (Submetric 4b).			
substrate. If uncer	elow that best describes the extent of (or lack of) disturbances to the Wetland's tain, select adjoining options and average the points. Round to the nearest he Wetland's substrate has been significantly altered, it should receive no more n 4 points.	than	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	2.0	
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		
This subme defined as a Check (√) a □ barriers so □ selective o □ clearcuttir ☑ mowing o ☑ coarse wo ☑ intensive o ☑ nutrient eo Utilize aerial photogr Determine the approspecies diversity, hur	4b. Habitat Alteration This submetric evaluates the intactness of the natural habitat within the Wetland. A "significant" alteration is defined as affecting 10% or greater of the Wetland. "Minor" alternation affects less than 10% of the Wetland. Check (√) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland. □ barriers such as road bed(s)/RR grades(s) □ herbicide/chemical treatment □ selective cutting □ dredging □ dredging □ dredging □ filling/grading □ plowing/disking/farming □ plowing/disking/farming □ other (specify) □ 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			
	ow that best describes the extent of (or lack of) alteration(s) to the Wetland's habitat. If unons and average the available points. Round to the nearest 0.5 increment. Maximum 9 p		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	1.0	
Recovering:	A single, significant habitat alteration occurred within 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are frequent.	3 pts		
Recent or No Recovery:	Multiple significant habitat alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt		

4c. Habitat Structure Development

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

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

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

Maximum 7 points.			Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	
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	1.0
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
	 □ 1. Contains USFWS-designated Critical Habitat □ 2. Federal or State-listed T/E Plant or Animal Species □ 3. S1, S2, or S3 Natural Community Type (at least 5 acres or 25% of the Wetland) □ 4. Southern Bog (at least 5 acres or 25% of the Wetland) □ 5. Old-Growth/Mature Forested Wetland (at least 5 acres or 25% of the Wetland) □ 6. Great Lakes Coastal Wetland 	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. Lo	w-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 <i>or 2</i>) more than 75% covered by highly-invasive vegetation. See Submetric 6c for a list of highly-invasive species.	-10.0

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 <u>may exist in overlapping layers</u>, 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

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

Score
0.0
Score
0.0
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 <u>at</u> or <u>below</u> 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	
Moderate:	1.0 acre to <2.5 acres	2 pts	0.0
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

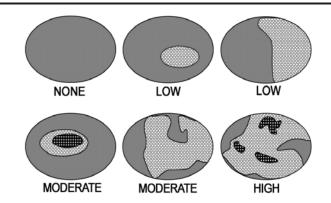
Native, non-invasive: Male and female portions of the flower spike are not separated (or only slightly separated) on most of the stems within the same local stand. Female flower spikes are light brown and are 0.8-1.2 inches thick at maturity (before expanding when dried). Most leaf blades are approximately 0.5 to 1 inch wide at widest part. Typically, not tightly packed into an area (non-invasive).broad-leaved cattail (*T. latifolia*)

Estimate the total coverage. Maximum 1 point.			Score
Virtually Absent:	<1% aerial coverage of highly-invasive species	1 pt	
Nearly Absent:	1% to <5% aerial coverage of highly-invasive species	0 pt	1.0
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	
Wetland has a moderate degree of interspersion	3 pts	0.0
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pt	

6e. Habitat Features

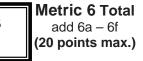
Determine the amount of each habitat feature that is present in the Wetland. **Maximum 3 points for each habitat feature.**

1. Hummocks/Tussocks/Tree Mounds, e.g., sedge/grass tussocks, decaying nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of all raised features (hummocks/tussocks/tree mounds) and includes the depressional matrix within any group of raised features.				Score
Virtually Absent: 0 pt Sparse: 1 pt Moderate: 2 pts Dense: 3 pts <5% of the area 5% to 10% of the area 11% to 50% of the area >50% of the area				

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

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



Metric 7. Scenic, Recreational, and Cultural Value Maximum 3 points.

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

1.0 Metric 7 Total (3 points max.)

MiRAM Summary

Narrative Rating

 Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat
 □YES ☑NO

 Question 2: Threatened or Endangered (T/E) Species Habitat
 □YES ☑NO

 Question 3: Rare Wetland Natural Community Type
 □YES ☑NO

 Question 4: Great Lakes Coastal Wetland
 □YES ☑NO

Quantitative Rating

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.

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

Background Information

2 43.	
Wetland	Evaluator
Proposed Project Site Name or DNR	S. Kogge, R. Roos
I-275, WC058	Address: 11181 Marwill Ave
Date of Evaluation: 7/24/2012	City: West Olive State: MI Zip: 49460
County: Wayne	Phone: 616-847-1680
Township: Canton	Email: stu.kogge@cardno.com
Town:2S	
Range: 8E	Is a Wetland Delineation Report available?
Section: 13	YES NO Date Completed:
Decimal Lat/Long: 42.3198, -83.4452	If "YES", completed by (name of person/firm/agency):
Check (√) each box below when item	is complete.
	User's Manual for more information
Size of the Wetland Evaluation	
	ap showing the location of the Wetland Evaluation Area, north ads, landmarks, etc. <i>Attach</i> a map to the end of this document.
Color Photographs. Photos sho	uld show the wetland vegetation components, habitat/community
types, hydrologic features, and a	ny other pertinent site features. Attach to the end of this
document.	
X Landscape Sketch or Aerial Ph	otograph.
 Clearly label the Proposed Pr the MiRAM Boundary. 	oject Site and Wetland Evaluation Area. Indicate the location of
Wetland Evaluation Area. Ex swamp, shrub swamp, etc. S communities. Natural communities.	of all general wetland community types identified within the camples include: marsh, wet meadow, hardwood swamp, conifer some wetland communities may be further classified as <u>natural</u> unities are predominantly structured by natural processes rather listurbances. Examples include: bog, prairie fen, muskeg, wet
Identify and label all hydrolog	ic features, such as: streams, 100-year floodplains, ponds, vernal pen 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 or near the Wetland Eventual WC058 includes detention basin.	features or apparent disturbance events that have occurred within valuation 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) 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) Phragmites australis Amaranthus blitoides Apocynum cannabinum Poa pratensis Cirseim arvense Polygonum persicaria Carex cristatella Scirpus atrovirens Juncus dudleyi Solidago canadensis Lythrum salicaria Typha x glauca Nymphaea orodata Verbena hastata Parthenocissus quinquefolia Vitis riparia Checklist of features and conditions to observe during the field inspection: Hydrologic Condition and Interactions **Vegetation Diversity** Hydrologic Alterations **Vegetation Condition** Substrate/Soil Disturbances Amount of Open Water Habitat Structure Development Percent of Invasive/Non-native Species Community Interspersion ☐ Habitat Alterations Vertical/Horizontal Structure Habitat/Wetland Condition S1, S2, or S3 Natural Community **Amphibian Breeding Pools** Approximately how much of the Wetland Evaluation Area was reviewed during the field inspection? 50

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

Has vegetation within the Wetland Evaluation Area been altered and/or buffer areas impacted

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.

An	swer <u>all</u> of the foll		
1.	Is any part of the V actually contain ha Piping Plover (Chan Benzie, Charlevoix, Isle, and Schoolcraf www.fws.gov/midwe Hines's Emerald Dra counties: Alpena, Ma	Idlife Service (USFWS) Critical Habitat. Wetland located within an area designated as Critical Habitat and does the Wetland bitat suitable for either species listed below? adrius melodus) Critical Habitat Units are designated only within the following counties: Alger, Cheboygan, Chippewa, Emmet, Iosco, Leelanau, Luce, Mackinac, Mason, Muskegon, Presque to See URL below for Unit locations. Institute of the Service (USFWS) Critical Habitat Units are designated only within the following ackinac, and Presque Isle. See URL below for Unit locations. Institute of the Wetland of the Wetla	YES NO If "yes", the Wetland has high functional value.
2.		Indangered (T/E) Species. Ited T/E plant or animal species occur within the Wetland? Complete the following or this metric. Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c. 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. 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. 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. Did the DNRE review confirm potential T/E occurrence in the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric. The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE.	YES NO If "yes", the Wetland has high functional value.
3.	Are more than 5 acc Community Type*? S1 or S2 N Has the Wercommunity to Manual for r Southern (see figure for See figure fo	tural Community Type. Theres or more than 25% of the Wetland comprised of a Rare Wetland Natural of Check (√) all Rare Wetland Natural Community Types. Italiand been identified by the Evaluator — or other persons — as being an S1 or S2 natural type as defined by the Michigan Natural Features Inventory (MNFI)? See the MiRAM User's nore information. Bog, defined as any bog occurring below the northern limit of Michigan's Floristic Tension Zone for approximate location). Ith/Mature Forested Wetland. Lacks evidence of any significant harvesting. Dominated by the tory trees (mean overstory DBH ≥20 inches, including at least two trees/acre having DBH and the canopy is multi-aged and multi-layered. Aggregations of canopy trees are interspersed gaps and large snags. Large nursery logs and tip-up mounds litter the forest floor. Does the tland have all/most of these characteristics? I Community Type is less than 5 acres and less than 25% of the Wetland, the rare community and evaluated separately.	YES NO If "yes", the Wetland has high functional value. Floristic Tension Zone
4.	Great Lakes Coalls any part of the Vincluding Lake St.	Vetland within 1,000 feet of the ordinary high water mark of any of the Great Lakes,	☐ YES ☑ NO If "yes", the Wetland has high functional value.

Quantitative Rating

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

Metric 1. Wetland Size and Distribution Maximum 9 points.

1a.	Wetland Size Estimate the size of the Wetland (i.e., Wetland Evaluation Area). Select a size class. Maximum 6 points.		Score
50	acres Select this option if the wetland's actual size ≥ 50 acres.	6 pts	
25	acres to <50 acres	5 pts	
10	acres to <25 acres	4 pts	3.0
3	acres to <10 acres	3 pts	0.0
1/4	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 wetlar remaining within a 2-mile radius from the Wetland's center. For the purpose of this submetric 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.	, areas	Score
0 to	20% of surrounding 2-mile radius is wetland	3 pts	
>20 to 80% of surrounding 2-mile radius is wetland 2 pts		3.0	
>809	% 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 aeria Wetland.	l photograph avai	ilable, sketch a 150-foot wide "buffer z	zone" arou	nd the	
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:		Non-Buffers Include:			
 shrubland, young forest, natural grassland, prairie abandoned row crop field (vegetated & naturalizing) hay field (non-row crop), lightly grazed pasture lightly managed forest (selectively logged) designated wildlife area, lightly managed parkland other wetland, lake, river lawns, golf courses, manicured parkland residential, commercial, industrial roadways (including shoulders), parking lots conservation tillage, heavily grazed pasture clear-cutting, mining, construction activity 					
				Score	
Wide Buffer Width:	≥150 feet arour	nd the perimeter	6 pts		
Medium Buffer Width: 75 to <150 feet around the perimeter 4 pts		4 pts	0.0		
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	and Use Examples within each Type of Land Use			Score
Very Low Intensity:	maturing forestnatural grassland, prairie	designated wildlife areaother wetland, lake, river	6 pts	
Low Intensity:	shrubland/young forestrecent selective logginghay field (non-row crop)	lightly managed parklandold field, lightly grazed pastureone-lane road/two track	4 pts	1.0
Moderately High Intensity:	residential & lawnsmanicured parklandgolf course	conservation tillagerecent clear-cut (<10 years)two-lane road	2 pts	
High Intensity:	commercial, industrial high-density residential heavily grazed pasture row crop field	 multi-lane paved roadway construction activity parking lot mining 	1 pt	

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

Metric 3. Hydrology Limited to 26 points.

3a. Sources of Water: Select all that apply. Maximum 8 points.		
Precipitation: Directly and/or as runoff from upland areas.	1 pt	1.0
Groundwater: Seeps or evidence, such as significant amounts of skunk cabbage (Symplocarpus foetidus) or other fen-adapted species.	2 pts	0.0
Seasonal/Intermittent Surface Water: Seasonal inundation from a lake, pond, or stream. (A Wetland can only receive points for this source of water or the next, not both.)		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.		
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 Select the option(s) from below that best describe(s) the dominant hydrologic characteristic of the Wetland. For the purposes of this submetric, "dominant" is defined as comprising at least 25% of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, select all that apply and average the points. Round to the nearest 0.5 increment. Maximum 4 points.		Score
Permanently Inundated	4 pts	
Permanently Saturated to Regularly Inundated 3 pts		3.0
Regularly Saturated to Seasonally Inundated 2 pts		
Seasonally Saturated in the Upper 12 Inches of Soil	1 pt	

3d. Alterations to Natural Hydrologic Regime					
This submetric evaluates the intactness of the natural hydrologic regime of the Wetland. Check ($\sqrt{\ }$) all forms of past or ongoing hydrologic alteration(s) that are potentially influencing the Wetlar				etland.	
☐ ditch(es) in or near the wetland ☑ point source discharge(s) (non-stormwater)					
☐ tile(s) in or near t	the wetland	☐ filling/grading activities in or near the w	etland		
dike(s) in or near	the wetland	x road bed(s)/RR grades(s) in or near the	e wetland		
weir(s) in or near	the wetland	dredging activities in or near the wetlan	ıd		
x stormwater input	s (addition of water)	other (specify)			
stream channeliz	ration	other (specify)			
regime. For this submetr "Minor" is defined as affe	ic, "significant" is defined as affect	tion to the Wetland's overall area and I ing approximately 10% or greater of the of the Wetland. A hydrologic alteration ometric 4b).	e Wetlan	d.	
Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's natural hydrologic regime. If uncertain, select adjoining options and average the available points. Round to the nearest 0.5 increment. If the Wetland's natural hydrologic regime has been significantly altered, it shall receive no more than 6 points for this submetric. Maximum 8 points.			Score		
No Hydrologic Alterations Apparent:	There has been no significant alto hydrologic regime, and/or ongoin	eration(s) to the Wetland's natural g minor alteration(s) is/are rare.	8 pts		
Recovered:	Significant hydrologic alteration(s prior to the assessment, and/or o alteration(s) is/are only occasional	ngoing minor hydrologic	6 pts		
Recovering:	A single significant hydrologic alterior to the assessment, and/or o alteration(s) is/are frequent.		4 pts	6.0	
Recent or No Recovery:	Multiple significant hydrologic alte 20 years prior to the assessment is/are ongoing.		1 pt		
	<u> </u>				

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

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

4a. Substrate/Soil Disturbance This submetric evaluates the intactness or lack of disturbance to the Wetland's substrate and soil. Check (√) all possible forms of past or ongoing substrate/soil disturbance that are observed within the Wetland				
	duced erosion or exposure			
For this submetric, defined as affecting	a disturbance is significant or minor in relation to the Wetland's overall area. "significant" is defined as affecting approximately 10% or greater of the Wetland gless than approximately 10% of the Wetland. A substrate disturbance may alsologic regime (Submetric 3d) and/or an alteration of habitat (Submetric 4b).			
substrate. If uncer	elow that best describes the extent of (or lack of) disturbances to the Wetland's tain, select adjoining options and average the points. Round to the nearest ne Wetland's substrate has been significantly altered, it should receive no more n 4 points.	than	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	3.0	
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		
defined as a Check (√) a □ barriers so is selective o is clearcuttir is mowing o is coarse wo □ intensive o is nutrient el Utilize aerial photogr Determine the approspecies diversity, hur succession or other is consideration.	tric evaluates the intactness of the natural habitat within the Wetland. A "significating 10% or greater of the Wetland. "Minor" alternation affects less than 10° all possible forms of past or ongoing habitat alteration(s) that are observed within uch as road bed(s)/RR grades(s) Letting Sedimentation Letting Sedimenta	% of the Veting the Weting the We	Vetland. land. ars ago. is, plant bunity	
	we that best describes the extent of (or lack of) alteration(s) to the Wetland's habitat. If under sand average the available points. Round to the nearest 0.5 increment. Maximum 9 p		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	6.0	
Recovering:	A single, significant habitat alteration occurred within 20 years prior to the assessment, and/or ongoing minor habitat alteration(s) is/are frequent.	3 pts		
Recent or No Recovery:	Multiple significant habitat alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt		

4c. Habitat Structure Development

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

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

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

Maximu	m 7 points.		Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	
Good:	Wetland appears to be a good example of its type but because of past or present disturbance, or other reasons, is not excellent.		3.0
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.		
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
 ☐ 1. Contains USFWS-designated Critical Habitat ☐ 2. Federal or State-listed T/E Plant or Animal Species ☐ 3. S1, S2, or S3 Natural Community Type (at least 5 acres or 25% of the Wetland) ☐ 4. Southern Bog (at least 5 acres or 25% of the Wetland) ☐ 5. Old-Growth/Mature Forested Wetland (at least 5 acres or 25% of the Wetland) ☐ 6. Great Lakes Coastal Wetland 	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

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 <u>may exist in overlapping layers</u>, 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

			<u> </u>	
		Native species dominate the	High native diversity	3 pts
	>25% of	coverage	Moderate to low native diversity	2 pts
	Wetland > area		Moderate to high native diversity	2 pts
Vegetation Component ►		dominate the coverage	Low native diversity	1 pt
is >1/4 acre	<25% of Wetland ▶ area	Native species dominate the	Moderate to high native diversity	2 pts
		coverage	Low native diversity	1 pt
		Invasive or non-native species dominate the coverage	Moderate native diversity	1 pt
			Low native diversity	0 pt
		Native species dominate the	Moderate to high native diversity	2 pts
Vegetation Component	>25% of Wetland	coverage	Low native diversity	1 pt
	area	Invasive or non-native species dominate the coverage		0 pt
is <¼ acre	<25% of Wetla	and area ▶		0 pt

Forest Overstory Component, qualitative cover score derived from table maximum 3 points.	Score
Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height. The Wetland does not have a forested component if the trees are widely scattered (e.g., a savanna), located only thinly along the Wetland's margin, or if it is clear that most of the trees are actually located on upland around the perimeter of the Wetland.	0.0
Shrub/Sapling Component, qualitative cover score derived from table maximum 3 points.	Score
Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	0.0
Herbaceous Component, qualitative cover score derived from table maximum 3 points.	Score
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 (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>) within the herbaceous component because of their tendency to hold their stems and leaves well above the water. All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	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 <u>at</u> or <u>below</u> 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	
Moderate:	1.0 acre to <2.5 acres	2 pts	2.0
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

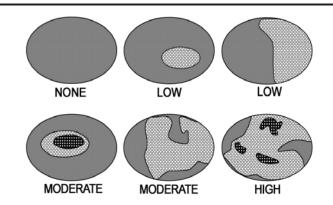
Native, non-invasive: Male and female portions of the flower spike are not separated (or only slightly separated) on most of the stems within the same local stand. Female flower spikes are light brown and are 0.8-1.2 inches thick at maturity (before expanding when dried). Most leaf blades are approximately 0.5 to 1 inch wide at widest part. Typically, not tightly packed into an area (non-invasive).broad-leaved cattail (*T. latifolia*)

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

6d. Horizontal (Plan View) Interspersion

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

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



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

6e. Habitat Features

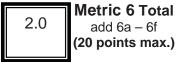
Determine the amount of each habitat feature that is present in the Wetland. **Maximum 3 points for each habitat feature.**

(remnants of large logs),	root tip-up mounds (uproot s (hummocks/tussocks/tree	sedge/grass tussocks, decay ed trees), etc. Percent cove mounds) and includes the d	rage is based on total	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 Tro	ees, Living or Dead (≥1	2 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	Sparse: 1 pt	Moderate: 2 pts	Dense: 3 pts	2.0
< 5% of the area	5% to 10% of the area	11% to 50% of the area	>50% of the area	



Metric 7. Scenic, Recreational, and Cultural Value Maximum 3 points.

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

1.0 Metric 7 Total (3 points max.)

MiRAM Summary

Narrative Rating	
Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat	□YES ⊠NO
Question 2: Threatened or Endangered (T/E) Species Habitat	□YES ⊠NO
Question 3: Rare Wetland Natural Community Type	□YES ⊠NO
Question 4: Great Lakes Coastal Wetland	□YES ⊠NO
Quantitative Rating	Score M

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

	100 Max
--	------------

Scoring comments:		

Background Information

J					
Wetland	Evaluator				
Proposed Project Site Name or DNRE File #:	Name: S. Kogge, R. Roos				
I-275, WC067	Address: 11181 Marwill Ave				
Date of Evaluation: 7/23/2012	City: West Olive State: MI Zip: 49460				
County: Wayne	Phone: 616-847-1680				
Township: Canton	Email: stu.kogge@cardno.com				
Town:2S					
Range: 8E	Is a Wetland Delineation Report available?				
Section: 12	YES NO Date Completed: 7/16/2012				
Decimal Lat/Long: 42.3274, -83.4461	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					
Location Map. A county road map showing the arrow, map scale information, roads, landmark	s, etc. Attach a map to the end of this document.				
Color Photographs. Photos should show the vectors, hydrologic features, and any other pertindocument.					
	Wetland Evaluation Area. Indicate the location of				
Wetland Evaluation Area. Examples include swamp, shrub swamp, etc. Some wetland communities. Natural communities are precedent.	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 <u>natural communities</u> . Natural communities are predominantly structured by natural processes rather than modern anthropogenic disturbances. Examples include: bog, prairie fen, muskeg, wet				
pools, and small patches of open water with					
4. Identify and label surrounding upland featur	es.				
5. Include north arrow and map scale informat	ion.				
6. Attach the landscape sketch or aerial photo	to the end of this document.				
Comments: List any important site features or approximate or near the Wetland Evaluation Area	parent disturbance events that have occurred within				
WC067 includes detention basin.					

Field Datasheet

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

Forest Overstory Stratum (woody plants 3 inches or more DBH, regardless of height) Acer negundo Salix nigra Shrub/Sapling Stratum (woody plants less than 3 inches DBH and greater than 3.28 feet tall) Acer negundo Fraxinus pennsylvanica Morus alba Rhamnus cathartica Rosa multiflora Salix nigra Cornus foemina Populus deltoides Herbaceous Stratum (non-woody plants, regardless of size, and woody plants less than 3.28 feet tall) Aster lanceolatus Lythrum salicaria Bidens frondosus Polygonum pensylvanicum Brassica nigra Solidago canadensis Calystegia sepium Solanum dulcamara Eleocharis elliptica Teucrium canadense Elynus virginicus Toxicodendron radicans Impatiens capensis Verbena hastata Lysimachia nummularia Verbena urticifolia Checklist of features and conditions to observe during the field inspection: Hydrologic Condition and Interactions **Vegetation Diversity** Hydrologic Alterations **Vegetation Condition** Substrate/Soil Disturbances Amount of Open Water Habitat Structure Development Percent of Invasive/Non-native Species Community Interspersion ☐ Habitat Alterations Vertical/Horizontal Structure Habitat/Wetland Condition S1, S2, or S3 Natural Community **Amphibian Breeding Pools** 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

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.

An	swer <u>all</u> of the foll		
1.	Is any part of the V actually contain ha Piping Plover (Chan Benzie, Charlevoix, Isle, and Schoolcraf www.fws.gov/midwe Hines's Emerald Dra counties: Alpena, Ma	Idlife Service (USFWS) Critical Habitat. Vetland located within an area designated as Critical Habitat and does the Wetland bitat suitable for either species listed below? **adrius melodus**) Critical Habitat Units are designated only within the following counties: Alger, Cheboygan, Chippewa, Emmet, Iosco, Leelanau, Luce, Mackinac, Mason, Muskegon, Presque t. See URL below for Unit locations. **est/endangered/pipingplover/final_rule.pdf** **agonfly** (Somatochlora Hineana) Critical Habitat Units are designated only within the following ackinac, and Presque Isle. See URL below for Unit locations. **est/endangered/insects/hed/pdf/hinesfCH_FR.pdf**	YES NO If "yes", the Wetland has high functional value.
2.		Indangered (T/E) Species. Interest T/E plant or animal species occur within the Wetland? Complete the following ser this metric. Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c. 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. 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. 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. Did the DNRE review confirm potential T/E occurrence in the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric. The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE.	YES NO If "yes", the Wetland has high functional value.
3.	Are more than 5 acc Community Type*? S1 or S2 N Has the Wercommunity to Manual for r Southern (see figure for See figure fo	tural Community Type. There or more than 25% of the Wetland comprised of a Rare Wetland Natural Processor more than 25% of the Wetland Community Types. Italiand been identified by the Evaluator — or other persons — as being an S1 or S2 natural type as defined by the Michigan Natural Features Inventory (MNFI)? See the MiRAM User's more information. Bog, defined as any bog occurring below the northern limit of Michigan's Floristic Tension Zone or approximate location). Ith/Mature Forested Wetland. Lacks evidence of any significant harvesting. Dominated by tory trees (mean overstory DBH ≥20 inches, including at least two trees/acre having DBH and the canopy is multi-aged and multi-layered. Aggregations of canopy trees are interspersed gaps and large snags. Large nursery logs and tip-up mounds litter the forest floor. Does the stand have all/most of these characteristics? It Community Type is less than 5 acres and less than 25% of the Wetland, the rare community and evaluated separately.	YES NO If "yes", the Wetland has high functional value. Floristic Tension Zone
4.	Great Lakes Coalls any part of the Vincluding Lake St.	Vetland within 1,000 feet of the ordinary high water mark of any of the Great Lakes,	☐ YES ☑ NO If "yes", the Wetland has high functional

Quantitative Rating

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

Metric 1. Wetland Size and Distribution Maximum 9 points.

1a.	Wetland Size Estimate the size of the Wetland (i.e., Wetland Evaluation Area). Select a size class. Maximum 6 points.		Score
50	acres Select this option if the wetland's actual size ≥ 50 acres.	6 pts	
25	acres to <50 acres	5 pts	
10	acres to <25 acres	4 pts	3.0
3	acres to <10 acres	3 pts	0.0
1/4	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 wetlar remaining within a 2-mile radius from the Wetland's center. For the purpose of this submetric 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.	, areas	Score
0 to	20% of surrounding 2-mile radius is wetland	3 pts	
>20	>20 to 80% of surrounding 2-mile radius is wetland 2 pts		3.0
>809	% 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" aroun Wetland.				ind the		
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:		Non-Buffers Include:				
 shrubland, young forest, natural grassland, prairie abandoned row crop field (vegetated & naturalizing) hay field (non-row crop), lightly grazed pasture lightly managed forest (selectively logged) designated wildlife area, lightly managed parkland other wetland, lake, river lawns, golf courses, manicured parkland residential, commercial, industrial roadways (including shoulders), parking lot conservation tillage, heavily grazed pasture clear-cutting, mining, construction activity 		rking lots				
				Score		
Wide Buffer Width:	≥150 feet arou	nd the perimeter	6 pts			
Medium Buffer Width: 75 to <150 feet around the perimeter 4 pts		4 pts	2.0			
Narrow Buffer Width:	25 to <75 feet	around the perimeter	2 pt			
Very Narrow Buffer Width:	0 (no buffer) to	<25 feet around the perimeter	0 pt			

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

- Step 1: Using the most recent aerial photograph available, sketch a 1,000-foot wide "land use zone" around the Wetland.
- Step 2: Estimate percent coverages comprised by each of the four types of land use listed below.
- Step 3: If any land use type comprises more than 25% of the total land use, it is considered to be a "dominant" land use type for the purposes of MiRAM and will receive points. Sum the available points from all dominant land use types and then average the score. Round to the nearest 0.5 increment. Maximum 6 points.

Type of Land Use	Examples within each Type of Land Use			Score
Very Low Intensity:	maturing forestnatural grassland, prairie	designated wildlife areaother wetland, lake, river	6 pts	
Low Intensity:	shrubland/young forestrecent selective logginghay field (non-row crop)	lightly managed parklandold field, lightly grazed pastureone-lane road/two track	4 pts	1.0
Moderately High • manicured parkland		conservation tillagerecent clear-cut (<10 years)two-lane road	2 pts	
 commercial, industrial high-density residential heavily grazed pasture row crop field 		 multi-lane paved roadway construction activity parking lot mining 	1 pt	

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

Metric 3. Hydrology Limited to 26 points.

3a. Sources of Water: Select all that apply. Maximum 8 points.		
Precipitation: Directly and/or as runoff from upland areas. 1 pt		
Groundwater: Seeps or evidence, such as significant amounts of skunk cabbage (Symplocarpus foetidus) or other fen-adapted species.		
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.		
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		
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 Select the option(s) from below that best describe(s) the dominant hydrologic characteristic of the Wetland. For the purposes of this submetric, "dominant" is defined as comprising at least 25% of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, select all that apply and average the points. Round to the nearest 0.5 increment. Maximum 4 points.		
Permanently Inundated 4 pts		
Permanently Saturated to Regularly Inundated 3 pts		2.5
Regularly Saturated to Seasonally Inundated 2 pts		
Seasonally Saturated in the Upper 12 Inches of Soil	1 pt	

3d. Alterations to Natural Hydrologic Regime						
This submetric evaluates the intactness of the natural hydrologic regime of the Wetland. Check ($\sqrt{\ }$) all forms of past or ongoing hydrologic alteration(s) that are potentially influencing the Wetland.						
☑ ditch(es) in or near the wetland ☐ point source discharge(s) (non-stormwater)			ater)			
☐ tile(s) in or near t	he wetland	☐ filling/grading activities in or near the w	etland			
dike(s) in or near	the wetland	▼ road bed(s)/RR grades(s) in or near the	e wetland			
weir(s) in or near	the wetland	dredging activities in or near the wetlan	ıd			
x stormwater input	s (addition of water)	other (specify)				
x stream channeliz	ation	other (specify)				
regime. For this submetr "Minor" is defined as affe	ic, "significant" is defined as affect	tion to the Wetland's overall area and I ing approximately 10% or greater of th of the Wetland. A hydrologic alteratio ometric 4b).	e Wetlan	d.		
Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's natural hydrologic regime. If uncertain, select adjoining options and average the available points. Round to the nearest 0.5 increment. If the Wetland's natural hydrologic regime has been significantly altered, it shall receive no more than 6 points for this submetric. Maximum 8 points.				Score		
No Hydrologic Alterations Apparent:	There has been no significant alte hydrologic regime, and/or ongoin	eration(s) to the Wetland's natural g minor alteration(s) is/are rare.	8 pts			
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 4 pts alteration(s) is/are frequent.					
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.						
		·				

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					
Wetland. ☑ human-induced erosion or exposure ☐ human-induced sedimentation or burial ☐ intensive grazing (hooves) ☐ filling ☐ grading ☐ construction vehicle use ☑ dredging ☐ other (specify)					
For this submetric, defined as affecting	a disturbance is significant or minor in relation to the Wetland's overall area. "significant" is defined as affecting approximately 10% or greater of the Wetland gless than approximately 10% of the Wetland. A substrate disturbance may alsologic regime (Submetric 3d) and/or an alteration of habitat (Submetric 4b).				
substrate. If uncer	elow that best describes the extent of (or lack of) disturbances to the Wetland's tain, select adjoining options and average the points. Round to the nearest ne Wetland's substrate has been significantly altered, it should receive no more n 4 points.	than	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	3.0		
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			
This submetric evaluates the intactness of the natural habitat within the Wetland. A "significant" alteration is defined as affecting 10% or greater of the Wetland. "Minor" alternation affects less than 10% of the Wetland. Check (√) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland. barriers such as road bed(s)/RR grades(s)					
	we that best describes the extent of (or lack of) alteration(s) to the Wetland's habitat. If unions and average the available points. Round to the nearest 0.5 increment. Maximum 9 p		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.					

4c. Habitat Structure Development

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

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

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

Maximu	Maximum 7 points.		
Excellent:	Wetland appears to represent the best of its type.	7 pts	
Good:	Good: Wetland appears to be a good example of its type but because of past or present disturbance, or other reasons, is not excellent.		4.0
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.		

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

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 <u>may exist in overlapping layers</u>, 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

		Native species dominate the	High native diversity	3 pts
	>25% of Wetland > area	coverage	Moderate to low native diversity	2 pts
		Invasive or non-native species	Moderate to high native diversity	2 pts
Vegetation Component ►		dominate the coverage	Low native diversity	1 pt
is >1/4 acre		Native species dominate the	Moderate to high native diversity	2 pts
	<25% of Wetland ▶	coverage	Low native diversity	1 pt
	area	Invasive or non-native species	Moderate native diversity	1 pt
		dominate the coverage	Low native diversity	0 pt
		Native species dominate the	Moderate to high native diversity	2 pts
Vegetation Component is <1/4 acre	>25% of Wetland	coverage	Low native diversity	1 pt
	area	Invasive or non-native species dominate the coverage		0 pt
	<25% of Wetla	and area ▶		0 pt

Forest Overstory Component, qualitative cover score derived from table maximum 3 points.	Score
Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height. The Wetland does not have a forested component if the trees are widely scattered (e.g., a savanna), located only thinly along the Wetland's margin, or if it is clear that most of the trees are actually located on upland around the perimeter of the Wetland.	0.0
Shrub/Sapling Component, qualitative cover score derived from table maximum 3 points.	Score
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.	
Herbaceous Component, qualitative cover score derived from table maximum 3 points.	Score
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 (<i>Nuphar advena</i>) and American lotus (<i>Nelumbo lutea</i>) within the herbaceous component because of their tendency to hold their stems and leaves well above the water. All floating-leaf species (including <i>Nymphaea</i> spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).	2.0

6b. Open Water Component

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

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

- · Small ponds, streams, and pools.
- Seasonal standing water areas (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life.
- Aquatic bed areas, also known as submergent marsh or submerged aquatic vegetation (SAV). Aquatic
 bed is dominated by plants that grow <u>at</u> or <u>below</u> 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 or	pen water coverage. Maximum 3 points.		Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	2.0
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

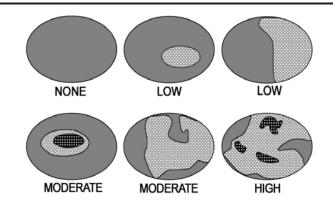
Native, non-invasive: Male and female portions of the flower spike are not separated (or only slightly separated) on most of the stems within the same local stand. Female flower spikes are light brown and are 0.8-1.2 inches thick at maturity (before expanding when dried). Most leaf blades are approximately 0.5 to 1 inch wide at widest part. Typically, not tightly packed into an area (non-invasive).broad-leaved cattail (*T. latifolia*)

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

6d. Horizontal (Plan View) Interspersion

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

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



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

6e. Habitat Features

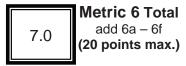
Determine the amount of each habitat feature that is present in the Wetland. **Maximum 3 points for each habitat feature.**

1. Hummocks/Tussocks/Tree Mounds, e.g., sedge/grass tussocks, decaying nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of all raised features (hummocks/tussocks/tree mounds) and includes the depressional matrix within				
any group of raised features.			Score	
Virtually Absent: 0 pt <5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	0

2. Coarse Woody Debris (CWD). Per log, average width ≥6 inches; each at least 10 feet long. e.g., fallen trees and/or large branches, etc.			Score	
Virtually Absent: 0 pt < 1 per acre	Sparse: 1 pt 1 to 5 per acre	Moderate: 2 pts 6 to 10 per acre	Dense: 3 pts >10 per acre	1.0

3. Large Standing Tro	ees, Living or Dead (≥1	2 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	Sparse: 1 pt	Moderate: 2 pts	Dense: 3 pts	2.0
< 5% of the area	5% to 10% of the area	11% to 50% of the area	>50% of the area	



Metric 7. Scenic, Recreational, and Cultural Value Maximum 3 points.

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

0.0 Metric 7 Total (3 points max.)

MiRAM Summary

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

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	_ iviaximum
6.0	9
3.0	12
18.5	26
13.0	20
5.0	10
7.0	20
0.0	3
	10
<u> </u>	_

Grand Total

Add totals from
all seven metrics

52.5	100 Max
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Scoring comments:		

Background Information

Daong. 33	
Wetland	Evaluator
Proposed Project Site Name or DNRE File #:	Name: S. Kogge, R. Roos
I-275, WC104	Address: 11181 Marwill Ave
Date of Evaluation: 7/23/2012	City: West Olive State: MI Zip: 49460
County: Wayne	Phone: 616-847-1680
Township: Canton	Email: stu.kogge@cardno.com
Town:2S	
Range: 8E	Is a Wetland Delineation Report available?
Section: 12	YES NO Date Completed: 7/23/12
Decimal Lat/Long: 42.3307, -83.4408	If "YES", completed by (name of person/firm/agency): Cardno JFNew
Check ($\sqrt{\ }$) each box below when item is comple	ete.
MiRAM Boundary. See MiRAM User's Ma	anual for more information
Size of the Wetland Evaluation Area: 2.2	
	ng the location of the Wetland Evaluation Area, north marks, etc. <i>Attach</i> a map to the end of this document.
	the wetland vegetation components, habitat/community pertinent site features. <i>Attach</i> to the end of this
document.	pertinent site leatures. Attach to the end of this
	1.
	e and Wetland Evaluation Area. Indicate the location of
Wetland Evaluation Area. Examples in swamp, shrub swamp, etc. Some wetl communities. Natural communities are	neral wetland community types identified within the nclude: marsh, wet meadow, hardwood swamp, conifer land communities may be further classified as <u>natural</u> e predominantly structured by natural processes rather ces. Examples include: bog, prairie fen, muskeg, wet
	es, such as: streams, 100-year floodplains, ponds, vernal or within a marsh or swamp.
4. Identify and label surrounding upland f	eatures.
Include north arrow and map scale info	ormation.
6. Attach the landscape sketch or aerial p	photo to the end of this document.
Comments: List any important site features of or near the Wetland Evaluation	or apparent disturbance events that have occurred within Area.
WC104 is a forested wetland within a moderate	e-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 llex verticillata Ulmus americana Lindera benzoin Rhamnus cathartica Rhamnus frangula Rubus allegnehiensis Herbaceous Stratum (non-woody plants, regardless of size, and woody plants less than 3.28 feet tall) Eupatorium perfoliatum Agrimonia parviflora Asclepias incarnata Euthamia graminifolia Aster lanceolatus Glyceria striata Boehmeria cylindrica Impatiens capensis Cinna arundinacea Juncus dudleyi Carex bebii Onoclea sensibilis Carex lacustris Phalaris arundinacea Carex vulpinoidea Polygonum virginianum Checklist of features and conditions to observe during the field inspection: Hydrologic Condition and Interactions **Vegetation Diversity** Hydrologic Alterations **Vegetation Condition** Substrate/Soil Disturbances Amount of Open Water Habitat Structure Development Percent of Invasive/Non-native Species ☐ Habitat Alterations Community Interspersion Vertical/Horizontal Structure Habitat/Wetland Condition Amphibian Breeding Pools S1, S2, or S3 Natural Community Approximately how much of the Wetland Evaluation Area was reviewed during the field inspection? 50

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

Has vegetation within the Wetland Evaluation Area been altered and/or buffer areas impacted

within the past 5 years?

YES

NO

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.

An	swer <u>all</u> of the foll		
1.	U.S. Fish and Wildlife Service (USFWS) Critical Habitat. Is any part of the Wetland located within an area designated as Critical Habitat and does the Wetland actually contain habitat suitable for either species listed below? Piping Plover (Charadrius melodus) Critical Habitat Units are designated only within the following counties: Alger, Benzie, Charlevoix, Cheboygan, Chippewa, Emmet, Iosco, Leelanau, Luce, Mackinac, Mason, Muskegon, Presque Isle, and Schoolcraft. See URL below for Unit locations. www.fws.gov/midwest/endangered/pipingplover/final_rule.pdf Hines's Emerald Dragonfly (Somatochlora Hineana) Critical Habitat Units are designated only within the following counties: Alpena, Mackinac, and Presque Isle. See URL below for Unit locations. www.fws.gov/midwest/endangered/insects/hed/pdf/hinesfCH_FR.pdf		YES NO If "yes", the Wetland has high functional value.
2.	Threatened or Endangered (T/E) Species. Do federal/state-listed T/E plant or animal species occur within the Wetland? Complete the following questions to answer this metric. a. YES NO Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c. b. YES NO Does the T/E survey indicate T/E species present within the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric. c. YES NO Has the Evaluator (or others known to the Evaluator) observed any T/E species within the Wetland? If "Yes," answer "Yes" to this metric. If "No," go to question d. d. YES NO Does the DNRE Endangered Species Assessment (ESA) web site interactive map, www.mcgi.state.mi.us/esa, indicate that there is a potential for unique natural features at or near your site of interest"?" If "No," answer "No" to this metric. If "Yes," request a DNRE formal review by submitting the online form. Type "MiRAM" within the "Project Information" field on the form. Go to question e. e. YES NO Did the DNRE review confirm potential T/E occurrence in the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric. The Evaluator may proceed with the Narrative Rating and Quantitative Rating		YES NO If "yes", the Wetland has high functional value.
3.	Are more than 5 acc Community Type*? S1 or S2 N Has the Wercommunity to Manual for r Southern (see figure for See figure fo	tural Community Type. Theres or more than 25% of the Wetland comprised of a Rare Wetland Natural of Check (√) all Rare Wetland Natural Community Types. Italiand been identified by the Evaluator — or other persons — as being an S1 or S2 natural type as defined by the Michigan Natural Features Inventory (MNFI)? See the MiRAM User's nore information. Bog, defined as any bog occurring below the northern limit of Michigan's Floristic Tension Zone for approximate location). Ith/Mature Forested Wetland. Lacks evidence of any significant harvesting. Dominated by the tory trees (mean overstory DBH ≥20 inches, including at least two trees/acre having DBH and the canopy is multi-aged and multi-layered. Aggregations of canopy trees are interspersed gaps and large snags. Large nursery logs and tip-up mounds litter the forest floor. Does the tland have all/most of these characteristics? I Community Type is less than 5 acres and less than 25% of the Wetland, the rare community and evaluated separately.	YES NO If "yes", the Wetland has high functional value. Floristic Tension Zone
4.	Great Lakes Coastal Wetland		☐ YES ☑ NO If "yes", the Wetland has high functional value.

Quantitative Rating

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

Metric 1. Wetland Size and Distribution Maximum 9 points.

1a.	Wetland Size Estimate the size of the Wetland (i.e., Wetland Evaluation Area). Select a size class. Maximum 6 points.		Score
50	acres Select this option if the wetland's actual size ≥ 50 acres.	6 pts	
25	acres to <50 acres	5 pts	
10	acres to <25 acres	4 pts	3.0
3	acres to <10 acres	3 pts	0.0
1/4	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 wetlar remaining within a 2-mile radius from the Wetland's center. For the purpose of this submetric 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.	, areas e	Score
0 to	20% of surrounding 2-mile radius is wetland	3 pts	
>20 to 80% of surrounding 2-mile radius is wetland 2 pts		3.0	
>809	% 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.

i					
2a. Average Buffer Width around the Wetland's Perimeter					
Step 1: Using the most recent a Wetland.	aerial photograph ava	ailable, sketch a 150-foot wide "buffe	er zone" arou	ind the	
Step 3: Average the buffer widt	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:		Non-Buffers Include:			
 shrubland, young forest, natural grassland, prairie abandoned row crop field (vegetated & naturalizing) hay field (non-row crop), lightly grazed pasture lightly managed forest (selectively logged) designated wildlife area, lightly managed parkland other wetland, lake, river 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 arou	and the perimeter	6 pts	4.0	
Medium Buffer Width:	75 to <150 fee	t around the perimeter	4 pts	4.0	
Narrow Buffer Width: 25 to <75 feet around the perimeter 2 pt					
Very Narrow Buffer Width: 0 (no buffer) to <25 feet around the perimeter 0 pt					

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

- Step 1: Using the most recent aerial photograph available, sketch a 1,000-foot wide "land use zone" around the Wetland.
- Step 2: Estimate percent coverages comprised by each of the four types of land use listed below.
- Step 3: If any land use type comprises more than 25% of the total land use, it is considered to be a "dominant" land use type for the purposes of MiRAM and will receive points. Sum the available points from all dominant land use types and then average the score. Round to the nearest 0.5 increment. Maximum 6 points.

Type of Land Use	Examples within each	Type of Land Use		Score
Very Low Intensity:	maturing forestnatural grassland, prairie	designated wildlife areaother wetland, lake, river	6 pts	
Low Intensity:	shrubland/young forestrecent selective logginghay field (non-row crop)	lightly managed parklandold field, lightly grazed pastureone-lane road/two track	4 pts	1.0
Moderately High Intensity:	residential & lawnsmanicured parklandgolf course	conservation tillagerecent clear-cut (<10 years)two-lane road	2 pts	
High Intensity:	commercial, industrial high-density residential heavily grazed pasture row crop field	 multi-lane paved roadway construction activity parking lot mining 	1 pt	

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

Metric 3. Hydrology Limited to 26 points.

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

3b. Connectivity: Select all that apply. Maximum 8 points.		Score
100-Year Floodplain. As defined in the Floodplain Authority under Part 31 of the NREPA.	2 pts	0.0
Between a Stream/Lake/Pond and Human Land Use. The Wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the Wetland before it discharges into the surface waterbody.	2 pts	0.0
Wetland/Upland Complex. The Wetland is part of a large scale (10+ acres) non-linear complex of wetlands with small areas of unmanicured/undeveloped vegetated uplands that do not restrict movement of organisms between the wetland areas.	2 pts	2.0
Riparian Corridor. The Wetland is part of a linear <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 Select the option(s) from below that best describe(s) the dominant hydrologic characteristic of Wetland. For the purposes of this submetric, "dominant" is defined as comprising at least 25% the Wetland's area. If the Wetland contains several areas that have distinctly different hydrolo characteristics, select all that apply and average the points. Round to the nearest 0.5 increme Maximum 4 points.	<u>∕o</u> of ogic	Score
Permanently Inundated 4 pts		
Permanently Saturated to Regularly Inundated 3 pts		2.0
Regularly Saturated to Seasonally Inundated 2 pts		
Seasonally Saturated in the Upper 12 Inches of Soil	1 pt	

3d. Alterations to Natural Hydrologic Regime					
This submetric evaluation Check ($\sqrt{\ }$) all form	This submetric evaluates the intactness of the natural hydrologic regime of the Wetland. Check ($\sqrt{\ }$) all forms of past or ongoing hydrologic alteration(s) that are potentially influencing the Wetland			etland.	
	ar the wetland	point source discharge(s) (non-stormw	ater)		
☐ tile(s) in or near t	he wetland	☐ filling/grading activities in or near the w	etland		
dike(s) in or near	the wetland	☐ road bed(s)/RR grades(s) in or near the	e wetland		
weir(s) in or near	the wetland	dredging activities in or near the wetlar	nd		
stormwater input	s (addition of water)	other (specify)			
stream channeliz	ation	other (specify)			
regime. For this submetr "Minor" is defined as affer impact the Substrate/Soil	ic, "significant" is defined as affect cting less than approximately 10% (submetric 4a) and/or Habitat (sub	,	e Wetlan n may als	d.	
hydrologic regime. If unc nearest 0.5 increment. If	ertain, select adjoining options and	lack of) alteration(s) to the Wetland's rd average the available points. Round egime has been significantly altered, it a points.	to the	Score	
No Hydrologic Alterations Apparent:	There has been no significant alto hydrologic regime, and/or ongoin	eration(s) to the Wetland's natural g minor alteration(s) is/are rare.	8 pts		
Recovered:	Significant hydrologic alteration(s prior to the assessment, and/or o alteration(s) is/are only occasional	ngoing minor hydrologic	6 pts		
Recovering:	A single significant hydrologic alterprior to the assessment, and/or o alteration(s) is/are frequent.		4 pts	6.0	
Recent or No Recovery:	Multiple significant hydrologic alte 20 years prior to the assessment 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

Wetland. ☑ human-induced erosion or exposure ☐ plowing, disking	i
★ human-induced sedimentation or burial ☐ intensive grazing (hooves)	
 ☒ filling ☒ off-road vehicle use ☒ construction vehicle use 	
	
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 defined as affecting less than approximately 10% of the Wetland. A substrate disturbance may also be an 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.	
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).	3.0
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.	
4b. Habitat Alteration This submetric evaluates the intactness of the natural habitat within the Wetland. A "significant" alt	eration is
defined as affecting 10% or greater of the Wetland. "Minor" alternation affects less than 10% of the	Wetland.
Check ($\sqrt{\ }$) all possible forms of past or ongoing habitat alteration(s) that are observed within the We \square barriers such as road bed(s)/RR grades(s) \square herbicide/chemical treatment	tland.
☐ selective cutting ヌ sedimentation	
☐ clearcutting ☐ dredging	
 ☐ mowing or shrub removal ☐ coarse woody debris (CWD) removal ☐ plowing/disking/farming 	
☐ intensive grazing ☐ other (specify)	
nutrient enrichment, e.g., nuisance algae	
Utilize aerial photography and field evidence to determine if any habitat alterations occurred prior to approximately 20 yes Determine the approximate pre-disturbance extent of vertical and horizontal habitat attributes, such as large, woody determines diversity, hummocks, patchiness, niche diversity, etc. Disregard changes that can be attributed to wetland com succession or other natural processes. A habitat alteration may also be an alteration of the natural hydrologic regime (\$3d) and/or a substrate disturbance (Submetric 4a).	ris, plant munity
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	9.0
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	
	1

4c. Habitat Structure Development

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

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

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

Maximu	Maximum 7 points.		Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	
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	5.0
Fair:	Wetland appears to be a moderately good example of its type but because of past or present disturbance, or other reasons, is not good.	3 pts	
Poor:	Wetland is a poor example of its type because of past or present disturbance, or other reasons.	1 pt	

17.0

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

Metric 5. Special Situations

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

5a. High Ecological Value. See Narrative Rating for definitions of each.10 points for each that apply.	Score
 ☐ 1. Contains USFWS-designated Critical Habitat ☐ 2. Federal or State-listed T/E Plant or Animal Species ☐ 3. S1, S2, or S3 Natural Community Type (at least 5 acres or 25% of the Wetland) ☐ 4. Southern Bog (at least 5 acres or 25% of the Wetland) ☒ 5. Old-Growth/Mature Forested Wetland (at least 5 acres or 25% of the Wetland) ☐ 6. Great Lakes Coastal Wetland 	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

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 <u>may exist in overlapping layers</u>, 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

	>25% of	Native species dominate the	High native diversity	3 pts
		coverage	Moderate to low native diversity	2 pts
	Wetland > area	Invasive or non-native species	Moderate to high native diversity	2 pts
Vegetation Component ►		dominate the coverage	Low native diversity	1 pt
is >1/4 acre	<25% of Wetland ▶ area	Native species dominate the	Moderate to high native diversity	2 pts
		coverage	Low native diversity	1 pt
		Invasive or non-native species	Moderate native diversity	1 pt
		dominate the coverage	Low native diversity	0 pt
		Native species dominate the	Moderate to high native diversity	2 pts
	>25% of Wetland area	coverage	Low native diversity	1 pt
Vegetation Component		Invasive or non-native species dominate the coverage		0 pt
is <¼ acre	<25% of Wetla	and area ▶		0 pt

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

6b. Open Water Component

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

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

- · Small ponds, streams, and pools.
- Seasonal standing water areas (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life.
- Aquatic bed areas, also known as submergent marsh or submerged aquatic vegetation (SAV). Aquatic
 bed is dominated by plants that grow <u>at</u> or <u>below</u> 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	
Moderate:	1.0 acre to <2.5 acres	2 pts	0.0
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

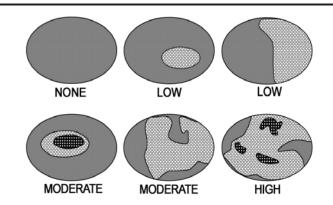
Native, non-invasive: Male and female portions of the flower spike are not separated (or only slightly separated) on most of the stems within the same local stand. Female flower spikes are light brown and are 0.8-1.2 inches thick at maturity (before expanding when dried). Most leaf blades are approximately 0.5 to 1 inch wide at widest part. Typically, not tightly packed into an area (non-invasive).broad-leaved cattail (*T. latifolia*)

Estimate the total coverage. Maximum 1 point.			Score
Virtually Absent:	<1% aerial coverage of highly-invasive species	1 pt	
Nearly Absent:	1% to <5% aerial coverage of highly-invasive species	0 pt	0.0
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	
Wetland has a moderate degree of interspersion	3 pts	2.0
Wetland has a low degree of interspersion	1 pt	
Wetland has no interspersion	0 pt	

6e. Habitat Features

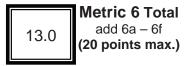
Determine the amount of each habitat feature that is present in the Wetland. **Maximum 3 points for each habitat feature.**

1. Hummocks/Tussocks/Tree Mounds, e.g., sedge/grass tussocks, decaying nursery logs (remnants of large logs), root tip-up mounds (uprooted trees), etc. Percent coverage is based on total area of all raised features (hummocks/tussocks/tree mounds) and includes the depressional matrix within				
any group of raised features.				Score
Virtually Absent: 0 pt <5% of the area	Sparse: 1 pt 5% to 10% of the area	Moderate: 2 pts 11% to 50% of the area	Dense: 3 pts >50% of the area	1

2. Coarse Woody Debris (CWD). Per log, average width ≥6 inches; each at least 10 feet long. e.g., fallen trees and/or large branches, etc.				Score
Virtually Absent: 0 pt	Sparse: 1 pt	Moderate: 2 pts	Dense: 3 pts	3.0
< 1 per acre	1 to 5 per acre	6 to 10 per acre	>10 per acre	

3. Large Standing Trees, Living or Dead (≥12 inches DBH).			Score	
Virtually Absent: 0 pt	Sparse: 1 pt	Moderate: 2 pts	Dense: 3 pts	3.0
< 1 per acre	1 to 5 per acre	6 to 10 per acre	>10 per acre	

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



Metric 7. Scenic, Recreational, and Cultural Value Maximum 3 points.

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

1.0 Metric 7 Total (3 points max.)

MiRAM Summary

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

Quantitative Rating

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
------	------------

Scoring comments:		

Background Information

Wetland	Evaluator
Proposed Project Site Name or DNRE File #:	Name: S. Kogge, R. Roos
I-275, WC106	
Date of Evaluation: 7/23/2012	Address: 11181 Marwill Ave City: West Olive State: MI Zip: 49460
County: Wayne	City: West Olive State: MI Zip: 49460 Phone: 616-847-1680
Township: Canton	Email: stu.kogge@cardno.com
Town:2S	sta.kogge@carano.com
Range: 8E	Is a Wetland Delineation Report available?
Section: 12	YES NO Date Completed:
Decimal Lat/Long: -83.4427, 42.3308	If "YES", completed by (name of person/firm/agency):
Check ($\sqrt{\ }$) 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 arrow, map scale information, roads, landmarks	location of the Wetland Evaluation Area, north s, etc. <i>Attach</i> a map to the end of this document.
Color Photographs. Photos should show the w types, hydrologic features, and any other pertin document.	
 Landscape Sketch or Aerial Photograph. Clearly label the Proposed Project Site and the MiRAM Boundary. 	Wetland Evaluation Area. Indicate the location of
Wetland Evaluation Area. Examples include swamp, shrub swamp, etc. Some wetland communities. Natural communities are pred than modern anthropogenic disturbances. Exprairie, southern wet meadow, etc.	vetland community types identified within the e: marsh, wet meadow, hardwood swamp, conifer communities may be further classified as <u>natural</u> dominantly structured by natural processes rather examples include: bog, prairie fen, muskeg, wet
Identify and label all hydrologic features, suc pools, and small patches of open water with	ch as: streams, 100-year floodplains, ponds, vernal in a marsh or swamp.
4. Identify and label surrounding upland feature	es.
5. Include north arrow and map scale informati	on.
6. Attach the landscape sketch or aerial photo	to the end of this document.
Comments: List any important site features or app 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, regardle	ss of size, and woody plants less than 3.28 feet tall)
Bidens comosus	Galium asprellum
Bidens frondosus	Juncus tenuis
Carex bebii	Juncus effusus
Carex vulpinoidea	Lythrum salicaria
Cyperus strigosus	Mentha arvensis
Dipsacus laciniatus	Scirpus atrovirens
Eupatorium maculatum	Scirpus cyperinus
Euthamia graminfolia	Solidago gigantea
Checklist of features and conditions to observe during Hydrologic Condition and Interactions Hydrologic Alterations Substrate/Soil Disturbances Habitat Structure Development Habitat Alterations Habitat/Wetland Condition Amphibian Breeding Pools Approximately how much of the Wetland Evaluat inspection?	 Vegetation Diversity Vegetation Condition Amount of Open Water Percent of Invasive/Non-native Species Community Interspersion Vertical/Horizontal Structure S1, S2, or S3 Natural Community ion Area was reviewed during the field
Has vegetation within the Wetland Evaluation Are within the past 5 years? ✓ YES ✓ NO	ea been altered and/or butter areas impacted

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.

An	swer <u>all</u> of the foll	owing metrics.	
1.	Is any part of the V actually contain ha Piping Plover (Chan Benzie, Charlevoix, Isle, and Schoolcraf www.fws.gov/midwe Hines's Emerald Dra counties: Alpena, Ma	Idlife Service (USFWS) Critical Habitat. Wetland located within an area designated as Critical Habitat and does the Wetland bitat suitable for either species listed below? adrius melodus) Critical Habitat Units are designated only within the following counties: Alger, Cheboygan, Chippewa, Emmet, Iosco, Leelanau, Luce, Mackinac, Mason, Muskegon, Presque to See URL below for Unit locations. Institute of the Service (USFWS) Critical Habitat Units are designated only within the following ackinac, and Presque Isle. See URL below for Unit locations. Institute of the Wetland of the Wetla	YES NO If "yes", the Wetland has high functional value.
2.		Indangered (T/E) Species. Ited T/E plant or animal species occur within the Wetland? Complete the following or this metric. Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c. 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. 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. 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. Did the DNRE review confirm potential T/E occurrence in the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric. The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE.	YES NO If "yes", the Wetland has high functional value.
3.	Are more than 5 acc Community Type*? S1 or S2 N Has the Wercommunity to Manual for r Southern (see figure for See figure fo	tural Community Type. Theres or more than 25% of the Wetland comprised of a Rare Wetland Natural of Check (√) all Rare Wetland Natural Community Types. Italiand been identified by the Evaluator — or other persons — as being an S1 or S2 natural type as defined by the Michigan Natural Features Inventory (MNFI)? See the MiRAM User's nore information. Bog, defined as any bog occurring below the northern limit of Michigan's Floristic Tension Zone for approximate location). Ith/Mature Forested Wetland. Lacks evidence of any significant harvesting. Dominated by the tory trees (mean overstory DBH ≥20 inches, including at least two trees/acre having DBH and the canopy is multi-aged and multi-layered. Aggregations of canopy trees are interspersed gaps and large snags. Large nursery logs and tip-up mounds litter the forest floor. Does the tland have all/most of these characteristics? I Community Type is less than 5 acres and less than 25% of the Wetland, the rare community and evaluated separately.	YES NO If "yes", the Wetland has high functional value. Floristic Tension Zone
4.	Great Lakes Coalls any part of the Vincluding Lake St.	Vetland within 1,000 feet of the ordinary high water mark of any of the Great Lakes,	☐ YES ☑ NO If "yes", the Wetland has high functional value.

Quantitative Rating

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

Metric 1. Wetland Size and Distribution Maximum 9 points.

1a.	Wetland Size Estimate the size of the Wetland (i.e., Wetland Evaluation Area). Select a size class. Maximum 6 points.		Score
50	acres Select this option if the wetland's actual size ≥ 50 acres.	6 pts	
25	acres to <50 acres	5 pts	
10	acres to <25 acres	4 pts	0.0
3	acres to <10 acres	3 pts	0.0
1/4	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	
>20 to 80% of surrounding 2-mile radius is wetland 2 pts		3.0	
>809	% 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 Wetland.	Step 1: Using the most recent aerial photograph available, sketch a 150-foot wide "buffer zone" arour 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:		Non-Buffers Include:			
 shrubland, young forest, natural grassland, prairie abandoned row crop field (vegetated & naturalizing) hay field (non-row crop), lightly grazed pasture lightly managed forest (selectively logged) designated wildlife area, lightly managed parkland other wetland, lake, river lawns, golf courses, manicured parkland roadways (including shoulders), parking lots row crop field conservation tillage, heavily grazed pasture clear-cutting, mining, construction activity 					
			1	Score	
Wide Buffer Width:	≥150 feet aroun	d the perimeter	6 pts	4.0	
Medium Buffer Width:	75 to <150 feet around the perimeter 4 pts		4 pts	4.0	
Narrow Buffer Width: 25 to <75 feet around the perimeter 2 pt		2 pt			
Very Narrow Buffer Width:	0 (no buffer) to <	<25 feet around the perimeter	0 pt		

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

- Step 1: Using the most recent aerial photograph available, sketch a 1,000-foot wide "land use zone" around the Wetland.
- Step 2: Estimate percent coverages comprised by each of the four types of land use listed below.
- Step 3: If any land use type comprises more than 25% of the total land use, it is considered to be a "dominant" land use type for the purposes of MiRAM and will receive points. Sum the available points from all dominant land use types and then average the score. Round to the nearest 0.5 increment. Maximum 6 points.

Type of Land Use	Examples within each Type of Land Use		Score	
Very Low Intensity:	maturing forestnatural grassland, prairie	designated wildlife areaother wetland, lake, river	6 pts	
Low Intensity:	shrubland/young forestrecent selective logginghay field (non-row crop)	lightly managed parklandold field, lightly grazed pastureone-lane road/two track	4 pts	1.0
Moderately High Intensity:	residential & lawnsmanicured parklandgolf course	conservation tillagerecent clear-cut (<10 years)two-lane road	2 pts	
High Intensity:	commercial, industrial high-density residential heavily grazed pasture row crop field	 multi-lane paved roadway construction activity parking lot mining 	1 pt	

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

Metric 3. Hydrology Limited to 26 points.

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

3b. Connectivity: Select all that apply. Maximum 8 points.		Score
100-Year Floodplain. As defined in the Floodplain Authority under Part 31 of the NREPA.	2 pts	0.0
Between a Stream/Lake/Pond and Human Land Use. The Wetland is located between a surface waterbody and any human land use, such that run-off from the adjacent land use could flow through the Wetland before it discharges into the surface waterbody.	2 pts	0.0
Wetland/Upland Complex. The Wetland is part of a large scale (10+ acres) non-linear complex of wetlands with small areas of unmanicured/undeveloped vegetated uplands that do not restrict movement of organisms between the wetland areas.	2 pts	2.0
Riparian Corridor. The Wetland is part of a linear <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 Select the option(s) from below that best describe(s) the dominant hydrologic characteristic of the Wetland. For the purposes of this submetric, "dominant" is defined as comprising at least 25% of the Wetland's area. If the Wetland contains several areas that have distinctly different hydrologic characteristics, select all that apply and average the points. Round to the nearest 0.5 increment. Maximum 4 points.		Score
Permanently Inundated 4 pts		
Permanently Saturated to Regularly Inundated 3 pts		1.0
Regularly Saturated to Seasonally Inundated 2 pts		
Seasonally Saturated in the Upper 12 Inches of Soil	1 pt	

3d. Alterations to Natural Hydrologic Regime					
This submetric evaluates the intactness of the natural hydrologic regime of the Wetland. Check ($\sqrt{\ }$) all forms of past or ongoing hydrologic alteration(s) that are potentially influencing the Wetland					
☐ ditch(es) in or near the wetland ☐ point source discharge(s) (non-stormwater)					
☐ tile(s) in or near t	☐ tile(s) in or near the wetland ☐ filling/grading activities in or near the wetland				
dike(s) in or near	the wetland	☐ road bed(s)/RR grades(s) in or near the	e wetland		
weir(s) in or near	the wetland	dredging activities in or near the wetlan	ıd		
stormwater input	s (addition of water)	other (specify)			
stream channeliz	ation	other (specify)			
regime. For this submetr "Minor" is defined as affe	ic, "significant" is defined as affecti	tion to the Wetland's overall area and I ing approximately 10% or greater of the of the Wetland. A hydrologic alteration ometric 4b).	e Wetlan	d.	
hydrologic regime. If unc nearest 0.5 increment. If	ertain, select adjoining options and	lack of) alteration(s) to the Wetland's rd average the available points. Round egime has been significantly altered, it a points.	to the	Score	
No Hydrologic Alterations Apparent:	There has been no significant alte hydrologic regime, and/or ongoing	eration(s) to the Wetland's natural g minor alteration(s) is/are rare.	8 pts		
Recovered:	Significant hydrologic alteration(s prior to the assessment, and/or o alteration(s) is/are only occasional	ngoing minor hydrologic	6 pts		
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		6.0			
Recent or No Recovery:	Multiple significant hydrologic alter 20 years prior to the assessment, 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

Check (√) a Wetland. ☑ human-in ☑ human-in ☑ filling ☑ grading ☐ dredging	ric evaluates the intactness or lack of distu	ate/soil disturbance that are observed □ plowing, disking □ intensive grazing (hooves) ☑ off-road vehicle use ☑ construction vehicle use □ other (specify)		e	
For this submetric, defined as affecting	disturbance is significant or minor in relati "significant" is defined as affecting approxing less than approximately 10% of the Wetla logic regime (Submetric 3d) and/or an alte	mately 10% or greater of the Wetland nd. A substrate disturbance may als			
substrate. If uncer	low that best describes the extent of (or laction, select adjoining options and average the Wetland's substrate has been significant a 4 points.	he points. Round to the nearest	than	Score	
No Substrate Disturbance Apparent:	There has been no significant disturban and/or ongoing minor disturbance event		4 pts		
Recovered:	Significant substrate disturbance occurre the assessment, and/or ongoing minor solly occasional (e.g., light sedimentation)	substrate disturbance events are	3 pts	3.0	
Recovering:	A single significant substrate disturbance prior to the assessment, and/or ongoing events are frequent.		2 pts		
Recent or No Recovery:	Multiple significant substrate disturbance years prior to the assessment, and/or significant significant significant substrate disturbance.		1 pt		
This submet defined as a Check (√) a ⊠ barriers su ☐ selective o ☐ clearcuttin ☒ mowing or ☐ coarse wo ☐ intensive o ☐ nutrient en	4b. Habitat Alteration This submetric evaluates the intactness of the natural habitat within the Wetland. A "significant" alteration is defined as affecting 10% or greater of the Wetland. "Minor" alternation affects less than 10% of the Wetland. Check (√) all possible forms of past or ongoing habitat alteration(s) that are observed within the Wetland. ☑ barriers such as road bed(s)/RR grades(s) ☐ herbicide/chemical treatment ☐ selective cutting ☐ sedimentation ☐ clearcutting ☐ dredging ☒ mowing or shrub removal ☒ filling/grading ☐ coarse woody debris (CWD) removal ☐ plowing/disking/farming ☐ intensive grazing ☐ other (specify) ☐ nutrient enrichment, e.g., nuisance algae				
species diversity, hur succession or other r 3d) and/or a substrate	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).				
	w that best describes the extent of (or lack of) allows and average the available points. Round to the			Score	
No Habitat Alterations Apparent:	There has been no significant alteration to and/or ongoing minor alteration(s) is/are ra		9 pts		
Recovered:	Significant habitat alteration(s) occurred m assessment, and/or ongoing minor habitat occasional.		6 pts	6.0	
Recovering:	A single, significant habitat alteration occu assessment, and/or ongoing minor habitat		3 pts		
Recent or No Recovery:	Multiple significant habitat alterations have to the assessment, and/or significant altera		1 pt		

4c. Habitat Structure Development

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

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

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

Maximu	Maximum 7 points.		Score
Excellent:	Wetland appears to represent the best of its type.	7 pts	
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	2.0
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	

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

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 <u>may exist in overlapping layers</u>, 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

			<u> </u>	
		Native species dominate the	High native diversity	3 pts
	>25% of	coverage	Moderate to low native diversity	2 pts
	Wetland > area	Invasive or non-native species	Moderate to high native diversity	2 pts
Vegetation Component ►		dominate the coverage	Low native diversity	1 pt
is >1/4 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	Moderate native diversity	1 pt
		dominate the coverage	Low native diversity	0 pt
		Native species dominate the	Moderate to high native diversity	2 pts
	onent	coverage	Low native diversity	1 pt
Vegetation Component		Invasive or non-native species dominate the coverage		0 pt
is <¼ acre	<25% of Wetla	and area ▶		0 pt

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

6b. Open Water Component

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

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

- · Small ponds, streams, and pools.
- Seasonal standing water areas (e.g., mudflats and dried-down vernal pools) that were inundated long enough during the growing season to support aquatic life.
- Aquatic bed areas, also known as submergent marsh or submerged aquatic vegetation (SAV). Aquatic
 bed is dominated by plants that grow <u>at</u> or <u>below</u> 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 or	pen water coverage. Maximum 3 points.		Score
High:	2.5 acres or more	3 pts	
Moderate:	1.0 acre to <2.5 acres	2 pts	0.0
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

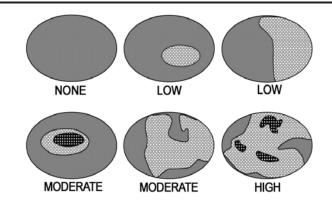
Native, non-invasive: Male and female portions of the flower spike are not separated (or only slightly separated) on most of the stems within the same local stand. Female flower spikes are light brown and are 0.8-1.2 inches thick at maturity (before expanding when dried). Most leaf blades are approximately 0.5 to 1 inch wide at widest part. Typically, not tightly packed into an area (non-invasive).broad-leaved cattail (*T. latifolia*)

Estimate the total coverage. Maximum 1 point.			
Virtually Absent:	<1% aerial coverage of highly-invasive species	1 pt	
Nearly Absent:	1% to <5% aerial coverage of highly-invasive species	0 pt	0.0
Low:	5% to <25% aerial coverage of highly-invasive species	-1 pt	
Moderate:	25% to <75% aerial coverage of highly-invasive species	-3 pts	
Extensive:	≥75% aerial coverage of highly-invasive species	-5 pts	

6d. Horizontal (Plan View) Interspersion

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

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



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

6e. Habitat Features

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

(remnants of large logs),	root tip-up mounds (uproot s (hummocks/tussocks/tree	sedge/grass tussocks, decay ed trees), etc. Percent cove mounds) and includes the d	rage is based on total	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	Sparse: 1 pt	Moderate: 2 pts	Dense: 3 pts	0.0
< 1 per acre	1 to 5 per acre	6 to 10 per acre	>10 per acre	

3. Large Standing Tro	ees, Living or Dead (≥1	2 inches DBH).		Score
Virtually Absent: 0 pt	Sparse: 1 pt	Moderate: 2 pts	Dense: 3 pts	0.0
< 1 per acre	1 to 5 per acre	6 to 10 per acre	>10 per acre	

4. Amphibian Breeding/Nursery Habitat , e.g., temporary pools with standing water of sufficient duration and depth to support frog and/or salamander reproduction. Permanent areas of vegetated standing water along the edges of ponds, lakes, and some streams also serve as amphibian habitat.				
Virtually Absent: 0 pt	Sparse: 1 pt	Moderate: 2 pts	Dense: 3 pts	0.0
< 5% of the area	5% to 10% of the area	11% to 50% of the area	>50% of the area	



Metric 7. Scenic, Recreational, and Cultural Value Maximum 3 points.

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

0.0 Metric 7 Total (3 points max.)

MiRAM Summary

Narrative Rating

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

Quantitative Rating

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
Seasona	Ily 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









APPENDIX F: Stream Assessment (Procedure 51) Field Forms



Shaded fields are entered into datab	986		
ST# STE	TONQUESH CREEK	LOCATION (road crossing) WHREEN & HAGEETY PD	
		T 7.50 R 06	s ₁₂
LAT(dd) DMS COUNTY 42° 20' 06.26	LONG (ad)	RIVER BASIN ROUSE PTUER	
STORET#		HUC CODE 040900040	ECOREGION 202 Maunee Lake Plane
INVESTIGATOR(S) M. BELNENGER T. ESTREM S. KOGGR	DATE 7/31/12 TIME AM PM	REASON FOR SURVEY	
WEATHER CONDITIONS Current Sunny Pairtly Cloudy Cloudy Rairty RIPARIAN VEGETATION Indicate the dominant type and re Trees Shrubs Herbaceous	Species:	WATERSHED FEATURES Predominant Surrounding Land Use ☐ Forest ☒ Commercial ☒ Field/Pasture ☒ Industrial ☐ Agricultural ☐ Residential ☐ Other	Local Watershed NPS Pollution No evidence Some potential sources Obvious Sources Local Watershed Erosion None Moderate Heavy
Estimate buffer width (left) 50		IIINSTREAM FEATURES	
Stream Subsystem Perennial Intermittent Lake Outlet Influenced Dam Influenced	Stream Modifications None Dredged Canopy Removal Snagging	Avg. Stream Width 15 ft Surface Velocity ft/sec (at thalweg)	
Stream Origin Spring Fed Lake/Pond Swamp, Marsh, Bog Mixture of origins	☐ Impounded ☐ Relocated ☐ Bank Stabilization ☐ Habitat Improvement Stream Type ☐ Coldwater ☑ Warmwater	Survey Reach Length 200 survey Reach Area 3500 st ² Canopy Cover: 65 % Shade	High Water Mark 7-8 ft
AQUATIC VEGETATION			
Rooted emergent Rooted submergent Rooted floating	☐ Free Floating ☐ Floating algae ☐ Attached algae	Portion of the reach with aquatic Nuisance aquatic plants or slimes Dominant species present	
WATER QUALITY Temperalure 72 °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 Water Odors None Normal/None Sheen Sewage Globs Petroleum Flecks Chemical Slick Fishy Other Other
SEDIMENT			process
Sediment Samples Taken None Other MS GS VOA OS/BNA Looking at stones that are not deeply embedded, are the	Oils Absent Slight Moderate Profuse	Sediment Odors Normal/None Sewage Petroleum Chemical Anaerobic Other	Deposits None Sludge Sawdust Paper fiber Sand Relict shells
lundersides black in color?	es []No	Soul Control	Other

TONGUESH CREEK STIE # APPENDIX J (Continued) ORGANIC SUBSTRATE COMPONENTS (should add up to 100%) (does not necessarily add up to 100%) Substrate Characteristic % Composition in Sampling Reach Substrate Diameter % Composition in Sampling Reach Type Type Sticks, wood, coarse Detritus Bedrock 10 Boülder >10" plant material (CPOM) 2.5"-10" Muck-Mud black, very fine Cobble 5 0.1 -2.5 organic (FPOM) Gravel Other Gritty (course) Sand SAND/GRAVEL 85 Gritty (fine) Silt slick Clay Additional Structure Available for Macroinvertebrate Colonization Proportion of Reach Represented by Stream Extensive Moderate Sparse Morphology Types ☐ Riffle /0 Undercut banks 12 Overhanging vegetation Run 35 X ☐ Pool Large woody debris Aquatic macrophytes M Depositional 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 HOW 105 5.5 3 8 14 1-0.5 TIME#1 18 Sec 085 ft/Sec #2 17 .88 #3 18 Sec .83 .85 ft/sec Auch.

MACROINVERTEBRATES Area Sampled: 210 x 15

Station: ST# SITE	Area Sampled: Zlox IS	Time Sampled: 20 mENS
PORIFERA	Hemiptera	Diptera
PLATYHELMINTHES	Belostomalidae	Athericidae
Turbellaria	Corixidae : (3)	Ceratopogonidae 🕻 🕢
NEMATOMORPHA		ChaoboridaeM
BRYOZOA		Chironomidae S S S S S S S S
ANNELIDA	Mesovellidae	Culicidae
Hirudinea	Naucoridae	
Oligochaeta;	Nepidae	
ARTHROPODA	Notonectidae	
Crustacea	Pleidae	
Amphipoda ##	Saldidae	
Decapoda S S 3 (23)	Veliida e	Psychodidae
Isopoda	Megaloptera	Ptychopteridae
Arachnoidea	Corydalidae	
Hydracarina (1)	Sialidae	1.0 ((5)
Insecta	Neuroptera	Stratiomyidae
Ephemeroptera	Sisyridae	Syrphidae
Ametropodidae	Trichoptera	Tabanidae
Baetiscidae	Brachycentridae	
Baetidae (2)	Glossosomatidae	
		MOLLUSCA
Caeridae		Gastropoda
Ephemerellidae	Ludrontilidah	
Ephemeridae	Hydroptilidae	Bithynildae
Heptagenildae	Lepidostornatidae	Hydrobiidae
Isonychildae	Leptoceridae	
Leptophlesiidae	Limnephilidae	Lymnaeidae
Metretopodidae	Molannidae	Physidae Physidae
Polymitarcyldae	Odontoceridae	Planorbidae
Potamanthidae	Philopotamidae	Pleuroceridae
Siphlonuridae	Phryganeidae	Poinatiopsidae
I ricorytnidae	Polycentropodidae	
Odonata	Psychomylidae	
Anisoptera	Rhyacophilidae	
Aeshnidae	Sericostomatidae	Dreissenidae
Cordulegastridae		Pisidildae
Cordullidae		Sphaeriidae
Gomphidae	Noctuidae	Unionidae
Libelliildae	Pyralidae	
Macomildae	Coleoptera*	Other taxa or comments:
Zygoptera	Dryopidale	HEN.
Calopterygidae (1)	Dytiscidae	
Coeriagrionidae 🛮 🗷 : (24)	Elmidae 4	UNKNOW MAYFLIE DO
Lestidae	Gyrinidae (a) (I)	
Plecoptera	Haliplidae (a)(l)	
Capniidae	Heteroceridae	
Chloroperlidae	Hydraenidae	
Leuctridae	Hydrophilidae	
Nemouridae	Lampyridae (a) (I)	amer for
Peltoperlidae	Noteridae (a) (1)	
Perlidae	Psephenidae(a)(l)	was .
Perlodidae	Ptilodactylidae (a)(!)	
Pteronarcyidae		
Taeniopterygidae	* record # of adults (a) or larvae (i) as indicated	

Date 7/3//12

Species	The state of the same of the same state of the s		אבא Gear type (circle	print and the street of the st	Travel Ed	- (KEL		- The same of
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Number of Anomalies	Number/Species of tagged/fin clipped fish				
Description: ONE SMALL GRU SUNTISH	U FACTAL ABNORMALITY (NO DPPUSAVI				

Appendix J (continued)

FISH

Station Number: ST# | STTE | - TONQUESH CREEK Length Sampled (ft): 230 fs

Area Sampled (sq ft): 2300

Sampling Time:

Probes:

#Passes: Z

Gear: boat / ss/

45 mins
Number of Anomalies:

Comments:

THE RESERVE OF THE PARTY OF THE					_
Petromyzontidae (Lampreys)		Sand shiner	20 along 41 and 20 and 20	Gasterosteidae (Sticklebacks)	
Sea famprey (a/l)		Redfin shiner	***************************************	Brook stickleback	1
Silver lamprey (a/l)		Mimic shiner	-/	Threespine stickleback	-
Northern brook lamprey (a/l)		Brassy minnow	A B	Perchicthyldae (Temp. bass)	
Chestnut lamprey (a/l)		Fathead minnow	28	*White bass	
American brook lamprey (a/l)	(managed in S	Bluntnose minnow	-	*White perch	-
Lepisosteidae (Gars)		Suckermouth minnow		Centrarchidae (Sunfishes)	
*Spotted gar		Silverjaw minnow		*Rock bass	70-700-0
*Longnose gar		Northern redbelly dace	1107-111	*Green sunfish	3
Amiidae (Bowfins)		Southern redbelly dace		*Pumpkinseed	
*Bowfin		Finescale dace		*Warmouth	
Clupeldae (Herrings)		Blacknose dace	16	*Orangespotted sunfish	
*Allewife		Longnose dace		*Bluegill	1
*Gizzard shad	30,000000	Redside dace	A 100	*Longear sunfish	-
Salmonidae (Salmon/Trout)		*Pearl dace		*White crappie	
*Rainbow trout		Cottidae (Sculpins)		*Black crappie	
*Brown trout		Mottled sculpin		*Largemouth bass	-
				*Smallmouth bass	-
*Brook trout		Slimy sculpin		Percidae (Perch)	-
*Coho		Catostomidae (Suckers)			
*Chinook		*Longnose sucker		N. satid darter	-
Umbridae (Mudminnow)		*White sucker	-	Rainbow darter	Anna anna
Central mudminnow		*Creek chubsucker	*1177	lowa darter	
Esocidae (Pike)		*Lake chubsucker		Greenside darter	
*Grass pike	-	*Northern hog sucker	-	Fantail darter	
*Northern pike		*Spotted sucker		Orangethroat darter	
*Muskellunge	(404-00000	*Silver redhorse		Johnny darter	2
Cyprinidae (Minnows and Carp)		*River redhorse	****	Blackside darter	
Central Stoneroller		*Black redhorse		Logperch	
Lake chub		*Golden redhörse		*Yellow perch	
*Gdläfish		*Shorthead redhorse		*Walleye	
*Caro		*Greater redhorse		Percopsidae (Trout-perch)	
Blueye chub		ictaluridae (Büllhead/Catrish)		Trout-perch	
*Horneyhead chub		*Black bullhead		Anguillidae (Eels)	-
*River chub	-	*Brown builhead		*Ametican eel	
*Creek chub	35	*Yellow bullhead	-	Gadidae (Cod)	
*Golden stilher		Stonecat		*Burbot	
Pugnose shiner	***************************************	Tadpole madtom		Sciaenidae (Drums)	-
Emerald shiner	-	Brindled madtom		*Freshwater drum	
					-
Bigeye shiner	made a manda of many of many	*Channel catrish		Cobitidae (Loaches)	
Ironcolor shiner	-	*Flathead catfish	minutes and	Oriental weatherfish	
*Common shiner		Aphredodaridae (Firate perch)		Other family/species:	
Central bigmouth shiner		Pirate perch			. 10000
Blackchin shiner		Atherinidae (Silversides)		14-14-14-14-14-14-14-14-14-14-14-14-14-1	-
Blacknose shiner	Alexandra de la compansión de la compans	Brook silverside			-
Spottail shiner		Cyprinodontidae (Topminnows)			:
Silver shiner	4	Banded killifish			
Rosyface shiner		Blackstripe topminnow			
Spotfin shiner				* = Measure length	

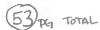
TONQUESH CREEK

Appendix J (continued)

1/20 UF ST1-561

HABITAT ASSESSMENT FIELD DATA SHEET - RIFFLE/RUN STREAMS

Habitat			on Category	
Parameter	Excellent	Good	Marginal	Poor
Epifaunal Substratel 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	f5 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, tast-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 habital regimes present (if fast- shallow or slow-shallow are missing, score low)	Dominated by 1 velocity/depth regime (usually slow-deep).
SCORE [[20 19 18 17 16	15 14 12 (11)	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little of no enlingement 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 finan 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCOTE 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 IIIs 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
56. Chamiel Flow Status – Flashiness	Vagetation along the stream bank is complete nearly to the waters edge. Liftle or no evidence of frequent changes in discharge and/or frequent high water events that soour 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 relention devices (if present) mostly stable and extending partially into the active stream channel	thank 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
	10 9	8 7 6	5 4 3	2 (1) 0



Habitat	Europe (n Category	
Parameter	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.	Charnelization 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 38	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of rifles 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 rifles 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 15	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 hank sloughing; 60-100% of bank has erosional scars
SCORE 2 (LB) SCORE 2 (RB)	Left Bank 10 9 Right Bank 10 9	8 7 6 8 7 6	5 4 3 5 4 3	(2) (0) (1)
9. Vägetative Prokeution (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.	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 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		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 / (UB)	Left Bank 10 9	8 7 6	5 4 3	2 0
SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 (1) 0
10. Riberian Vegetative Zohe Width (score each bank riparian zone)	Width of riparian zone >150 feet and dominated by native vegetation including trees, shrubs, or non-woody inacrophytes 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 limpacted	Width of riparian zone 75- 150 feet, human activities have impacted zone only minimally	man activities 75 feet; human activities <10 feet; little	
SCORE 9 (LB)	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0

(1) PG 2 TOTAL

Total Score

95 TOTAL 2 PGS

Shaded fields are entered into datab	ase	The state of the s	and the second s			
STREAM, NAME STHIN STE	#2 WILLOW CREEK	LOCATION (road crossing) Haggerty RD N of Ford RD				
COUNTY/TOWNSHIP / CAN		1 25 R 8E	\$ 12			
LAT(dd) DM5	1 (dd) 1 (23° 26' 5 . 2039	TRIVER BASIN				
42 19 33.19	93 26 5 1, 2037	HUC CODE	#38528.W.I			
STORET#		040900040202	ECOREGION MAUMER LAKE PLANE			
INVESTIGATOR(S)	DATE 7/31/12	REASON FOR SURVEY				
T. ESTREM S. KOGGE		Targeted: comment				
M. BERMINHEN	TIME AM PM	VSEC description (eg. cold small				
WEATHER CONDITIONS	and the second s	WATERSHED FEATURES				
Current	Has there been a significant	Predominant Surrounding	Local Watershed NPS Pollution			
Sunny	rain in the last 7 days?	Land Use	☐ No evidence			
Partly Cloudy	¥ Yes □ No	Forest	Some potential sources			
Cloudy	☐ Don't Know	Commercial	Obvious Sources			
Rainy	Air Temperature 85 °F	☐ Field/Pasture Industrial	Local Watershed Erosion			
DESERVICE CONTROL		Agricultural	□ None			
RIPARIAN VEGETATION	ecord the dominant species Species: SALEX, CORNES, ACENES	Residential	Moderate			
Trains Shruhs	Strecies: SALSX CORNS, ACENEG	Other	☐ Heavy			
Grasses Herbaceous		- Standard Control of the Control of	to the second of			
Estimate buffer width (left) 100	ft (right) 35 ft		(2.5.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.			
STREAM CHARACTERIZATION	1	INSTREAM FEATURES				
Stream Subsystem	Stream Modifications	Avg. Stream Width 15 ft	Avg. Stream Depthft			
Perennial	☐ None	00				
Intermittent	☐ Dredged	Surface Velocity O. ft/sec	Est. Flow 6,00 cfs			
Lake Outlet Influenced	Canopy Removal	(at thalweg)				
☐ Dam influenced	☐ Snagging	150	7 4			
	☐ Impounded	Est. Survey Reach Length				
Stream Origin	☐ Relocated ☐ Bank Stabilization	150x 13	High Water Mark 2.5 ft			
Spring Fed Lake/Pond	Habitat Improvement	Survey Reach Alea	riigit vacci weak			
Swamp, Marsh, Bog	L1 Habitat improvement	Canopy Cover: 50 % Shade	he			
Mixture of origins	Stream Type	100 100 100 100 100 100 100 100 100 100				
Other	☐ Coldwater	1				
	☑ Warmwater					
AQUATIC VEGETATION						
☐ Rooted emergent	Free Floating	Portion of the reach with aquatic				
☐ Rooted submergent	☐ Floating algae	Nuisance aquatic plants or slime	s present? Yes No			
Rooted floating	Attached algae	Dominant species present	etiene rewood an extractive constructive con			
WATER QUALITY	Solids, Turbidity					
Temperature 75 °F	Clear	Color	Surface Oils Water Odors			
	Slightly turbid	☐ Clear	☐ None ☐ Normal/None			
Water Samples Taken	Turbid	Stained	Sheen Sewage			
X None ☐ Other	Floating solids	☑ Opaque	Globs Petroleum Flecks Chemical			
□GA □ GN	Settleable solids	Colored	☐ Flecks ☐ Chemical ☐ Stick ☐ Fishy			
□MA □ MN □VOA □ ON	Foams	La Otter	Other Other			
SEDIMENT Sediment Samples Taken	Oils	Sediment Odors	Deposits			
None Other	☐ Absent	Normal/None	X None			
☐MS ☐ GS	☐ Slight	Sewage	Sludge			
□VOA □ OS/BNA	☐ Moderate	Petroleum	☐ Sawdust			
	☐ Profuse	Chemical	Paper fiber			
Looking at stones that are not		Anaerobic	☐ Sand			
deeply embedded, are the		Other	Rélict shells			
undersides black in color?	es TNo		Other			

1.00					
Willow	Creek STREAM	A o	2	SITE	2

APPENDIX J (Continued)

Substrate Diameter % Composition in Sampling Reach Type Type Sticks, wood, coarse plant material (CPOM) Sampling Reach Type Sticks, wood, coarse plant material (CPOM) Type			JBSTRATE COMPONENTS d add up to 100%)	DIX 3 (CORUM	ORGANIC SUBSTR	ATE COMPONENTS rily add up to 100%)	
Proportion of Reach Represented by Stream Muck-Muck Structure Available for Macroinvertebrate Colonization	Substrate Type	market and a Trib and the same and all the same and		1	A STATE OF THE STA		mpling Read
Muck-Mud Diack, very fine Organic (FPOM) Organic	Bedrock			Detritus		5	
Gravel 0.1"-2.5" Sand Gritty (course) 5 % Silt Gritty (fine) 45 % Clay slick Meck 50% Proportion of Reach Represented by Stream Morphology Types Riffle % Proof % Run % Depositional 100 % STEATH Additional Structure Available for Macroinvertebrate Colonization Extensive Moderate Sparse Absent Undercut banks		and the state of t		Music Music		0.4	
Sand Gritty (course) 5 % Silt Gritty (fine) 75 % Clay slick Meck 50% Proportion of Reach Represented by Stream Morphology Types Riffle % Run % Peool % Depositional 100 % STEELOCATION MAP Draw a map of the site and indicate the areas sampled (or attach a photograph) Further investigation necessary (explain) Obvious pollution source/expression PHOTOS 2165 - 2183 MB PENTEX (AMERA) STREAM 1185 1-015 OF GARBAGE & PETROLEUM SMELL (SHERN WAS OBSERUED AT LOWER END OF REACH			<u> </u>	- INIUCK-MIUU		70	
Silt Gritty (fine) 45°8 Clay Slick Meck 50°2. Proportion of Reach Represented by Stream Worphology Types Riffle % Run % Pool % Depositional 100 % Stream Worphology Types Run %		And the second s	5%	Other	organic (r r oni)		
Proportion of Reach Represented by Stream Morphology Types Riffle % Run % Pool % Depositional 100 % 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 MEB PENTIX (AMERA - STREAM HBS LOTS OF GARBAGE & PETROLEUM SMELL SHEEN WAS OBSERUED AT LOWER END OF REACH	Control of the Contro					5 TRASH	
Morphology Types Riffle	Clay		The state of the s				
Protection MAP Draw a map of the site and indicate the areas sampled (or attach a photograph) Further investigation necessary (explain) Obvious pollution source/expression PHOTOS 2165-2183 MB PENTEX (AMERA - STREAM HAS 1015 OF GARBAGE & RETROLEUM SMELL / SHEEN WAS OBSERUED AT LOWER END OF REACH	Morpholog □ Riffle □ Run □ Pool	y Types		Undercut b Overhangir Large wood	Extensive anks g vegetation dy debris	e Moderate Sparse	Absent
Further investigation necessary (explain) Obvious pollution source/expression PHOTOS 2165-2183 MB PENTEX (AMERA - STREAM HAS 1-015 OF GARBAGE & PETROLEUM SMELL / SHEEN WAS OBSERVED AT LOWER END OF REACH	□ Deposit	ional /00	6		1000		47
	- STRE	EAM HAS LOTS	OF GARBAGE & PETROLEUM SME	LL / SHEEN	ONES PROCEDED IN		

ST#2 SITE #2

Date 7/3//12

Length sai	mpled /50	Time sampled 30A	Gear type (cir	cle): ops sear	ni shocker b	oat shocker of	her	WORKER COMMITTEE TO SERVICE AND SERVICE AN	Samuel and the state of the sta
Species				The state of the s	-	7		Y-1	T
length (in)(11/2005)	COMSHANER	BLUNT NSE MINNON	LM BASS	JHNY DARTEL	CRK	CARA SUNFISH			in
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Number of	Anomalies	
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FISH

Station Number: STREAM # 2 STIE # 2

Length Sampled (ft): 150 4+

Area Sampled (sq ft):

Sampling Time: 45 mins

Probes: /

#Passes: 2

Gear; boat / ss / bps

Number of Anomalies: 0

Comments: Lots of trash AND SHEEN IN CREEK

- William Control of the Control of					
Petromyzontidae (Lampreys)	711	Sand shiner	15. The last of th	Gasterosteidae (Sticklebacks)	
Sea lamprey (a/l)		Redfin shiner	H-5-3X5-/	Brook stickleback	
Silver lamprey (a/l)		Mimic shiner	ACM CITE	Threespine stickleback	-
Northern brook lamprey (a/l)		Brassy minnow	**********	Perchicthyidae (Temp. bass)	
Chestnut lamprey (a/l)	-	Fathead minnow	A10 promote 100 miles	*White bass	15071
American brook lamprey (a/l)		Bluntnose minnow	3	*White perch	
Lepisosteidae (Gars)		Suckermouth minnow		Centrarchidae (Sunfishes)	
*Spotted gar	Toronto annone.	Silverjaw minnow		*Rock bass	-1
*Longnose gar	-	Northern redbelly dace		*Green sunfish	2
Amiidae (Bowfins)		Southern redbelly dace	land been	*Pumpkinseed	*******
*Bowlin		Finescalé dace		*Warmouth	
Clupeidae (Herrings)		Віасклове дасе		*Orangespotted sunfish	
*Alewife		Longnose dace		*Bluegill	
*Gizzard shad		Redside dace		*Longear sunfish	
Salmonidae (Salmon/Trout)		*Pearl dace	TOTAL CONTRACTOR OF THE PARTY O	*White crappie	
*Rainbow trout		Cottidae (Sculpins)		*Black crappie	12000
*Brown treut		Mottled sculpin		*Largemouth bass	-
*Brook frout		Slimy sculpin		*Smallmouth bass	
*Goho	10-00-00-00-0	Catostomidae (Suckers)		Percidae (Perch)	,
*Chidook	Jahrensen der Geberte	*Longrosie sucker		N. sand darter	
Umbridae (Müdminnow)		*White sucker		Rainbow darter	(bearing in
Central mudminnow		*Creek chubsucker	Mark 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	lowa darter	30440000
Esocides (Pike)	CALL STATE OF THE	*Lake chubsucker		Greenside darter	3-4
*Grass pike		*Northern hog sucker		Fantail darter	-
*Northern pike	-	*Spotled sucker	Designation of	Orangelhroat darter	(
*Musikellunge	-	*Silver redhorse	*******	Johnny darter	[[
Cyprinidae (Minnows and Carp)		*River redhorse		Blackside darter	
Central stoneroller		*Black redhorse	4111	Logperch	
Lake chub		*Golden redhorse		*Yellow perch	-
*Goldlish		*Shorthead redhorse		*Walleye	
		*Greater redhorse		Percopsidae (Trout-perch)	
*Carp		Ictaluridae (Builhead/Catfish)	770700	Troul-perch	
Bigeye chub		*Black bullhead		Anguillidae (Eels)	7
*Homeyhead chub	1	*Brown bullhead		*American eel	
*River chillb	5	*Yellow bullhead		Gadidae (Cod)	
*Creek chub	3			*Burbot	
*Golden shifter		Stonecat	2414-4-1211	Sciaenidae (Drúms)	-
Pugnose shiner	-	Tadpole madtom		*Freshwater drum	
Emerald shiner		Brindled madtom	unu u		1727
Bigaye shiner	(*Channel catfish	**************************************	Cobitidae (Loaches)	
Ironcolor shiner	7	*Flathead catfish		Oriental weatherfish	
*Common shiner		Aphredoderidae (Pirate perch)		Other family/species:	
Central bigmouth shiner	10000000	Pirate perch	X		
Błackchin shiner		Atherinidae (Silversides)		**************************************	
Blacknose shiner	Sales mari	Brook silverside			
Spottail shiner	-	Cyprinodontidae (Topminnows)		10(79)	
Silver shiner	-	Banded killifish			
Rosyface shiner		Blackstripe topminnow			
Contin chinor				* = Measure length	

Time Sampled: /:/5 Station: Area Sampled: 150x/5 PORIFERA Hemiotera Diptera PLATYHELMINTHES Belostomatidae Athericidae Turbellaria ' (1) Corixidae Ceratopogonidae _____ NEMATOMORPHA___ Gelastocoridae Chaoboridae Chironomidae 🛛 🖾 🗸 🛣 ; (52) Gerridae _____ BRYOZOA Culicidae _____ ANNELIDA Mesoveliidae Hirudinea 🎎 Naucoridae _____ Dixidae _____ Dolichopodidae _____ Oligochaeta . -Nepidae ARTHROPODA Notonectidae Empididae _____ Ephydridae _____ Crustacea Pleidae Amphipoda . Saldidae Muscidae _____ Psychodidae _____ Decapoda 4 Veliidae Ptychopteridae _____ Isopoda Megaloptera Sciomyzidae Arachnoidea Corydalidae Hydracarina Sialidae _____ Simuliidae _____ Neuroptera Stratiomyidae Insecta Sisyridae Syrphidae _____ Ephemeroptera Ametropodidae _____ Trichoptera Tabanidae Thaumaleidae _____ Brachycentridae Baetiscidae Glossosomatidae Tipulidae _____ Baetidae _____ MOLLUSCA Helicopsychidae _____ Caenidae _____ Ephemerellidae _____ Hydropsychidae _____ Gastropoda Hydroptilidae Ancylidae _____ Ephemeridae _____ Heptageniidae _____ Lepidostomatidae Bithynlidae Hydrobiidae Isonychiidae _____ Leptoceridae _____ Leptophleblidae _____ Limnephilidae _____ Lymnaeidae Physidae MMMBB AN (A) Metretopodidae Molannidae Polymitarcyldae _____ Odontoceridae _____ Planorbidae Philopotamidae _____ Pleuroceridae Potamanthidae _____ Phryganeldae _____ SiphloHuridae Pomatiopsidae _____ Polycertropodidae_____ Tricorylhidae Valvatidae Viviparidae * Odonata Psychomyildae Rhyacophilidae _____ Pelecypoda Anisoptera Sericostornatidae Dreissenidae Aeshridae Pisidiidae Corduledastridae Uenoidae (Neophylax) Sphaeriidae Ø Ø 11 Cordullidae Lepidoptera Gomphidae N (9) Unionidae Noctuidae Pyralidae Libellulidae 4 : (3) Coleoptera* Macomiidae Other taxa or comments: Dryopidae ___ Zygoptera (ORBSCULOUS Dytiscidae : (2) Calopterygidae ___ Coeriagrionidae 5: (12) Elmidae Gyrinidae (a) (l) Lestidae Haliplidae (a) (l) Plecoptera - SAMPLED ENTERE FESHERIES REACH Capniidae Heteroceridae Chloroperlidae _____ Hydraenidae Leuctridae Hydrophilidae _____ Nemouridae _____ Lampyridae (a) (l) Noteridae (a) (l) Peltoperlidae Psephenidae(a) (l) Perlidae _____ Ptilodactylidae (a) (l) Perlodidae Pteronarcyidae Scirtidae (a)_____(l)__ Taeniopterygidae _____ * record # of adults (a) or larvae (l) as indicated

MACROINVERTEBRATES

HABITAT ASSESSMENT FIELD DATA SHEET - GLIDE/POOL STREAMS

Habitat		Condition	Category	
Parameter	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 /	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 pdols prevalent.	Heavy decosits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition
SCORE O	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	Walter 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 rifle 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
55. CháHhei FioW 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 debits (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.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0



Habitat	Condition Category									
Parameter	Excellent	Excellent Good		Marginal		ı		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).	increas length 2 than if i line.	nds in the sea the streate to 3 times was in a s	m longer	increas length than if i line (No sinuosil	nds in the e the strea 1 to 2 time t was in a ote: lack o ty may be dization)	am s longer straight f		traight; wat ed for a long	erway has bee g distance
SCORE O	20 19 18 17 16	15 1	4 13	12 11	10	9 8	7 6	5 4	3	2 1 (
8. Bank Stability (score each bank)	Banks stable; evidence or erosion or bank failure absent or minimal; little potential for future problems <5% of bank affected	infreque erosion over. 5	tely stable ent, small a mostly he -30% of ba as areas o	reas of aled nk in	60% of areas o	tely unsta bank in re f erosion; potential	ach has high	areas freq sections a	uent along nd bends; o 60-100% o	ed areas; raw straight obvious bank of bank has
SCORE 6 (LB)	Left Bank 10 9	8	7	6	5	4	3	2	1	0
SCORE 7 (RB)	Right Bank 10 9	- 8	0	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.	covered vegetat plants is represe evident full plan to any g than on potentia	iank surfact by native on, but 1 con, but 1 con, but 1 con on, but 1 con on, but not affect disrubut not affect extended half of the liplant stulermaining	ption ption ecting otential t; more e	covered disruption patches closely vegetation than on potentia	boank surfa d by veget, on obvious s of bare s crepped ion comme e-haif of that al plant stu	ation; s; oi! or on; less ne	surfaces c disruption has been i	overed by v	ank vegetation 2 inchès or
SCORE 6 (LB)	Left Bank 10 9	8	7	(6)	5	4	3	2	1	0
SCORE 6 (RB)	Right Bank 10 9	8	7	(6)	5	4	3	2	1	0
10. Ripariah Vegetalive Zone Width (score each bank riparian zone)	Width of riparian zone >150 feet and dominated by native vegetation including frees, shrubs, or non-woody macrophytes or wetlands; vegetative disruption through grazing of 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.	150 fee have im minimal	f riparian z ;; human a pacted zoi ly.	ctivities	75 feet;	f riparian human ad pacted zo eal	ctivities		ian vegetati	e <10 feet; little on due to
	The second secon	1	~		-		0	2	4	
SCORE 9 (LB)	Left Bank 10 (9)	8	7	6	5	- 4	3		1	0

38 25) total From LS PAGE

total Score 63

APPENDIX J. STREAM CARD

STREAM NAME		LOCATION (road crossing)	
STREAM 3 SITE 3	Fellows Creek	Canterbury Dr. and H	Maggerty Rd.
COUNTY/TOWNSHIP WAYNE COUNTY /	CANTON TOWNSHOP	1 2s R 8E	S
LAT(dd) 42' 18'47, 5852	LONG (dd) 45, 5682	RIVER BASIN ROUGE ZEVER	
STORET#		HUC CODE 640900040202	ECOREGION MAUMEE LAKE PLANE
INVESTIGATOR(S) M. BERNANGER S. KOGGE	DATE 7/3//12 TIME 7:50 AM PM	REASON FOR SURVEY Targeted: comment Randomized: VSEC #	
T ESTROM	3.00	VSEC description (eg. cold small)
WEATHER CONDITIONS Current Sunny Partly Cloudy Cloudy Rainy RIPARIAN VEGETATION Indicate the dominant type and recomplete the summer of the s	Species: SALTX, ACENEG, ACCORT	WATERSHED FEATURES Predominant Surrounding Land Use I Forest C Commercial I Field/Pasture I Industrial Agricultural Residential Other	Local Watershed NPS Pollution No evidence Some potential sources Obvious Sources Local Watershed Erosion None Moderate Heavy
STREAM CHARACTERIZATION Stream Subsystem Perennial Intermittent Lake Outlet Influenced Dam Influenced Stream Origin Spring Fed Lake/Pond Swamp, Marsh, Bog Mixture of origins Other	Stream Modifications None Dredged Cahopy Removal Snagging Impounded Relocated Bank Stabilization Habitat Improvement Stream Type Coldwater Warmwater	INSTREAM FEATURES Avg. Stream Width	ft High Water Mark 1.5 ft
AQUATIC VEGETATION Rooted emergent Rooted submergent Rooted floating	☐ Free Floating ☐ Floating algae ☐ Attached algae	Portion of the reach with aquatic Nuisance aquatic plants or slimes Dominant species present	
WATER QUALITY Temperature 12 °F Water Samples Taken None □ Other □ GA □ GN □ MA □ MN □ VOA □ ON	Solids, Turbidily Clear Slightly turbid Turbid Sloating solids Suspended solids Settleable solids Foams	Color Clear Stained Copaque Colored Cother	Surface Oils Water Odors None Normal/Nor Sheen Sewage Globs Petroleum Flecks Chemical Slick Fishy Other Other
SEDIMENT Sediment Samples Taken None Other SS GS VOA OS/BNA Looking at stones that are not deeply embedded, are the undersides black in color?	Oils Absent Slight Moderate Profuse	Sediment Odors Normat/None Sewage Petroleum Chemical Anaerobic Other	Deposits None Sludge Sawdust Paper fiber Sand Relict shells

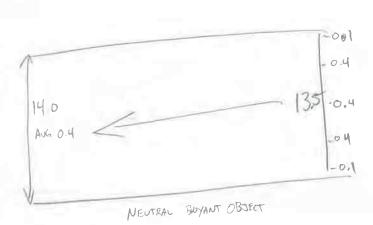
STREAM 3 SITE 43

Fellow's Creek

4)11)	PICAL	APPEN	DIX J (Contin		
INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)					ATE COMPONENTS rily add up to 100%)
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Reach
Bedrock			Detritus	Sticks, wood, coarse	52
Boulder	>10"	270		plant material (CPOM)	
Cobble	2 5 -10	5	Muck-Mud	black, very fine	5%
Gravel	0.1"-2.5"	3		organic (FPOM)	J *0
Sand	Gritty (course)	90	Other		
Silt	Gritty (fine)			1 MANS	
Clay	slick				

Proportion of Reach Represented by Stream	Additional Structure Avail	able for Mac	roinvertebra	ate Coloni	zation
Morphology Types ☐ Riffle	Undercut banks Overhanging vegetation Large woody debris Aquatic macrophytes Rootwads		Moderate		

SITE LOCATION MAP	Draw a map of the site and indicate the areas sampled (or attach a photograph)	
Further investigation nec	essary (explain)	
Obvious pollution source		



TIME # 1 40 SEC #2 42 #3 41

Location Sampled_

STREAM #3

SITE 3

Date 7/31/12

ength sa	impled	Time sampled	Gear type (c	ircle): bps strear	AND DESCRIPTION OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED I	at snocker other			
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Number of	Anomalies	
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FISH

Station Number: STREAM 3 STE#3
Length Sampled (ft): 160ft

Area Sampled (sq ft):

Sampling Time: 45 mens

Probes: /

#Passes: 2

Gear: boat / ss bps

Number of Anomalies:

Comments:

Petromyzontidae (Lampreys)		Sand shiner	34	Gasterosteidae (Sticklebacks)	
Sea lamprey (all)	-	Redfin shiner	-	Brook stickleback	
Silver lamprey (a/l)		Mimic shiner		Threespine stickleback	
Northern brook lamprey (a/l)		Brassy minnow	-	Perchicthyidae (Temp. bass)	
Chestnut lamprey (a/l)		Fathead minnow		*White bass	
American brook lamprey (a/l)		Bluntnose minnow		*White perch	
Lepisosteidae (Gars)		Suckermouth minnow		Centrarchidae (Sunfishes)	
*Spotled gar		Silverjaw minnow		*Rock bass	
*Longribse gar		Northern redbelly dace		*Green sunfish	1
Amiidae (Bowfins)	announced to	Southern redbelly dace		*Pumpkinseed	
*Bowfin		Finesballe blace		*Warmouth	-
Clupeidae (Herrings)	************	Blacknose dace		*Orangespotted sunfish	
*Alewife		Longnose dace		*Bluegill	
*Gizzard shad		Redside dace		*Longear sunfish	20072
Salmohidae (Salmon/Trout)	The second second	*Pedirl dace		*White crappie	
*Rainbow trout		Cottidae (Sculpins)		*Black crappie	
*Brown trout	-	Mottled sculpin		*Largemouth bass	1
*Brook trout		Slimy sculpin		*Smallmoulh bass	
*Coho	A 10 / C	Catostorlidae (Suckers)		Percidae (Perch)	
*Chinook		*Longhose sucker	-	N _i sand darter	
Umbridae (Mudminiow)		*White sucker		Rainbow darter	
Central mudminnow		*Creek chubsucker		lowa darler	-
Esocidae (Pike)		*Lake chubsucker		Greenside darter	
*Grass pike		*Northern hog sucker		Fantail darter	
*Northern pike		*Spotted sucker		Orangethroat darter	
*Muskellunge		*Silvet radhorse		Johnny darter	74
Cyprihidae (Minnows and Carp)		*River redhorse	01-04-011	Blackside darter	- 1-1
Central stoneroller		*Black redhorse		Logperch	and has been be
Lake chub		*Golden redhorse		*Yellow perch	
*Goldfish		*Shortflead redhorse		*Walleye	
*Carp		*Greatër redhorse		Percopsidae (Trout-perch)	
Bigeye chub		Ictaluridae (Bullhead/Catfish)	DEID FOR	Trout-perch	
*Horneyhead chub		*Black bullhead		Anguillidae (Eels)	
*River chub		*Brown builhead		*American eel	
*Creek chub		*Yellow buffhead		Gadidae (Cod)	-
*Golden shifter		Stonecat		*Burbot	
Pugnose shiner	**********	Tadpole madtom	3000 00 00 00 00 00 00 00 00 00 00 00 00	Sciaenidae (Drums)	
Emerald shiner	***	Brindled madlom		*Freshwater drum	
Bigeye shiner		*Channel catfish		Cobitidae (Loaches)	
Ironcolor shiner		*Flathead catfish		Oriental weatherfish	
*Common shiner	3	Aphredoderidae (Pirate perch)		Other family/species:	***************************************
	- Comment	Pirate perch		Other ranny/species.	
Central bigmouth shiner		·		and the section of th	
Blackchin shiner		Atherinidae (Silversides)		2004 (1/1/2004 (
Blacknose shiner		Brook silverside		2-110	
Spottail shiner		Cyprinodontidae (Topminnows)		No. of the second second second	
Silver shiner		Banded killifish			
Rosyface shiner		Blackstripe topminnow			
Spotfin shiner				* = Measure length	

MACROINVERTEBRATES

45 mins Time Sampled: Station: STRFAM #3 SITE 3 Area Sampled: PORIFERA Hemiptera Diptera **PLATYHELMINTHES** Belostomatidae Athericidae Corixidae 2 (9) Ceratopogonidae _____ Turbellaria :: Chaoboridae Gelastocoridae _____ NEMATOMORPHA Chironomidae 8 8 8 8 2 (42) BRYOZOA Gerridae Culicidae _____ ANNELIDA Mesoveliidae Hirudinea _____ Dixidae _____ Naucoridae _____ Nepidae _____ Dolichopodidae _____ Oligochaeta 📩 Notonectidae :: (4) Empididae _____ ARTHROPODA Crustacea Pleidae Ephydridae _____ Muscidae _____ Amphipoda Saldidae _____ (10) Psychodidae Decapoda 🔀 Veliidae Ptvchopteridae _____ Isopoda 😃 Megaloptera Corydalidae Sciomyzidae _____ Arachnoidea Simuliidae _____ Sialidae _____ Hydracarina Stratiomyidae Neuroptera insecta Syrphidae _____ Ephemeroptera Sisyridae _____ Tabanidae _____ Ametropodidae Trichoptera Brachycentridae Thaumaleidae Baetiscidae _____ Tipulidae Glossosomatidae Baetidae Caenidae MOLLUSCA Helicopsychidae _____ Ephemerellidae _____ Hydropsychidae Gastropoda Ancylidae : 9 Hydroptilidae Ephemeridae _____ Lepidostomatidae Bithyniidae Heptageniidae _____ Leptoceridae _____ Hydrobiidae Isonychiidae _____ Leptophlebildae _____ Limnephilidae Lymnaeidae Physidae 🛛 : (12) Metretopodidae _____ Molannidae Planorbidae ______ Polymitarcyldae _____ Odontoceridae Pleuroceridae _____ Philopotamidae _____ Potamanthidae _____ Siphlontiridae _____ Phryganeidae _____ Pomatiopsidae _____ Valvatidae _____ Polycentropodidae _____ Tricorythidae Vivibaridae Odonata Psychomylidae _____ Peletypoda Anisoptera Rhyacophilidae Aeshnidae • (D) Sericostomatidae _____ Dreissenidae _____ Uenoidae (Neophylax) Pisidifdae Cordillegastridae Sphaeriidae 1810 Cordülildäe Lepidoptera Gomphidae Noctuidae _____ Urllonidae Libellüllääe Pyralidae Coleoptera* Other taxa or comments: Macontiidae _____ Zygoptera Dryopidae _____ Calopterygidae Dytiscidae _____ Coenagrionidae _____ Elmidae Gyrinidae (a) (l) Lestidae Haliplidae (a) (i) Piecoptera Heteroceridae _____ Capniidae ___ Chloroperlidae _____ Hydraenidae Leuctridae _____ Hydrophilidae _____ Lampyridae (a) (I) Nemouridae _____ Noteridae (a) (l) Peltoperlidae _____ Psephenidae(a) (i) 19 10 (48) Perlidae _____ Ptilodactylidae (a) (l) Perlodidae __ Pteronarcyidae _____ Scirtidae (a) (l) Taeniopterygidae _____ * record # of adults (a) or larvae (I) as indicated

Appendix J (continued) Appendix J (continued) HABITAT ASSESSMENT FIELD DATA SHEET - RIFFLE/RUN STREAMS

Habitat		Condition	on Category	
Parameter	Excellent	Good	Marginal	Poor
1. Epifaunal Substratel 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 I velocity/depth regimes present (slow-deep, slow- stigllow, 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 then 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/depti regime (usually slow-deep)
scoke 2	20 9 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 0 1 0
Sa. Channel Flow Status - Maintained Flow Volume	Water reaches base of bold 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 neërly 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 relähtion devices (if present) stable and extending laterally across	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
	the stream channel		5 4 3	



Habitat			Col	ndition	Catego					
Parameter	Excellent	G	lood		A	/largina	ił.		Poor	-
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern	Some char- present, us of bridge al evidence o channeliza- dredging (g past 20 yr) present, bu channeliza- present	ually in a outments f past tion, i.e., preater th may be it recent	reas S	Channel continuo (>5 years Embanki mature to dominate and shru	us but no s). ments wit rees and ed by gra	thout	years) shored v cement Instream altered o	channel OR Bai vith gabi or bare e habitat or remov Bank ve	ized (<5 nks on, rock, earth greatly ed egetation
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 infrequent; between rif the width o between 7	distance fles divid f the stre	led by		ontours point on tour on the control of the state of the	provide tance vided by tream is	shallow habitat; riffles di	riffles; po distance vided by	betwee
SCORE O	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 infrequent, erosion mo over 5-30 reach has a erosion	small an stly heal % of ban	ed	areas of	ely unsta pank in re erosion; potential	ach has high	frequent sections obvious	raw" area along stand ber bank slo of bank	ds traight nds; oughing;
SCORE 4 (LB) SCORE 4 (RB)	Left Bank 10 9 Right Bank 10 9	8 8	7	6	5 5	4	3	2 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 bank surfar native vege class of pla represente evident but full plant gr to any greathan one-hipotential plant in height remarks.	ces cove station, b ints is no d; disrup not affer owth pot at extent; alf of the ant stubl	red by ut 1 t well- tion cting ential more	bank sur vegetation obvious; soil or clause vegetation than one	of the strates core, disrupt patches osely croom commercial plant studentials of the plant stude	vered by otion of bare pped on; less ne	covered disruption vegetati vegetati	bank sur by vege on of stre on is ver on has b I to 2 inc	faces tation; am bant y high; een thes or
SCORE 8 (LB)	Left Bank 10 9	(8)	7	6	5	4	3	2	1	0
SCORE 8 (RB)	Right Bänk 10 9	(8)	7	6	- 5	4	3	2	1	0
10. Riparian Veriëtative Zorie Width (score each bank riparian zone)	Width of riparian zone >150 feet and dominated by native vegetablion 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	Width of rig 150 feet; hi have impac minimally	uman ac	tivities	75 feet; I	riparian human ac pacted zo al	ctivities	<10 feet	riparian ; little or vegetati activities	no on due t
SCORE 3 (LB)	zone Left Bank 10 9	8	7	6	5	4	3	2	1	0

23 TOTAL FROM PAGE 1

3



Shaded fields are entered into data	base		The second secon
	Fellows Creek		south of Cherry Hill Rd
COUNTY/TOWNSHIP /CANTY /CAN	NTON TOWNSHEP	7 Zs R 81	E
LAT(dd)	LONG (dd)	RIVER BASIN LOGE REVEL	
STORET#		HUC CODE 046900040202	ECOREGION MANNEE LAKE PLANE
INVESTIGATOR(S) M BERNTUGER S. KOGGE M, ESTROM	DATE 8-01-2012 TIME 8:36 AM PM		
WEATHER CONDITIONS Current Sunny Partly Cloudy Cloudy Rainy RIPARIAN VEGETATION Indicate the dominant type and Trees Shrubs Grasses Herbaceous Estimate buffer width (left) 12	Has there been a significant rain in the last 7 days? Yes No or No o	WATERSHED FEATURES Predominant Surrounding Land Use Forest Commercial Field/Pasture Industrial Agricultural Residential Other	Local Watershed NPS Pollution No evidence Some potential sources Obvious Sources Local Watershed Erosion None Moderate Heavy
STREAM CHARACTERIZATION Stream Subsystem Perennia! Intermittent Lake Outlet Influenced Dam Influenced Stream Origin Spring Fed Lake/Pond Swamp, Märsh, Bog Mixture of origins		INSTREAM FEATURES Avg. Stream Widthft Surface Velocityft/se (at thalweg) Est. Survey Reach Length	10_ft 2 High Water Mark 35_ft
AQUATIC VEGETATION ☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating	☐ Free Floating Pous ☐ Floating algae ☐ Attached algae	Portion of the reach with aqua Nuisance aquatic plants or slir Dominant species present	
WATER QUALITY Temperature 70 °F Water Samples Taken None Other GA GN MA MN VOA ON	Solids, Turbidity Clear Slightly turbid Turbid (Vey) Floating solids Suspended solids Settleable solids	Color Clear Stained Opaque Colored Other	Surface Oils Water Odors None Normal/None Sewage Sevage Petroleum Flecks Chemical Slick Fishy Other Other
SEDIMENT Sediment Samples Taken Other Other SS	Oils Absent Slight Moderate Profuse	Sediment Odors Normal/None Sewage Petroleum Chemical Anaerobic Other	Deposits None Sludge Sawdust Paper fiber Sand Relict shells

APPENDIX J (Continued)

	/ a h a s	CARACTER AND ALL LAND LETT.	113	(dose not no		1000/
0.1.1.1.	A RESIDENCE OF THE PARTY OF THE	ild add up to 100%)	unline Cleach Cubatrata	the print the same of the same	cessarily add up to	sition in Sampling Reach
Substrate	Diameter	% Composition in San		Characteristic	% Compos	sition in Sampling Reach
Туре			Туре			
Bedrock	11000000		Detritus	Sticks, wood, coars		
Boulder	>10"	5		plant material (CPC	OM) AO	
Cobble	2.5"-10"	10	Muck-Muck		200	
Grave!	0.1"-2.5"	10		organic (FPOM)	20	
Sand	Gritty (course)	25	Other			
Silt	Gritty (fine)	25			1	
				1		
Proportion Morpholog Riffle Riffle Rin / Pool Deposit SITE LOCA Further i Obvious STREA	of Reach Representation of Rea	% Draw a map of the sicessary (explain)	Undercut Overhang Large wo	banks ing vegetation ody debris acrophytes	ensive Moderate	

9:48 smt me Date 8-1-2012

Species	ORK CHUB	COM. SHEWER	GRAV SUNFEST	CATAL	DARTER	Whik Sucker	MUT SCULPIN	MUDHINON	l la
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Species	- Aller Mallian recognition and the second	A STATE OF THE PARTY OF THE PAR			1.7	The state of the same of the state of the st			
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Number	of Anomalies	 ш

FISH

Station Number: STREAM #3 STATTON 4

Length Sampled (ft): 140

Area Sampled (sq ft):

Sampling Time: 45 MEN

Probes: / # Passes: Z Gear: boat / ss bps

Number of Anomalies:

Comments:

Comments.					
Petromyzontidae (Lampreys)		Sand shiner		Gasterosteidae (Sticklebacks)	
Sea lamprey (a/l)		Redfin shiner		Brook stickleback	
Silver lamprey (a/l)		Mirnic shiner		Threespine stickleback	
Northern brook lamprey (a/l)		Brassy minnow		Perchicthyidae (Temp. bass)	
Chestnut lamprey (a/l)		Fathead minnow		*White bass	
American brook lamprey (a/l)		Bluntnose minnow		*White perch	
Lepisosteidae (Gars)		Suckermouth minnow		Centrarchidae (Sunfishes)	
*Spotted gar II.		Silverjaw minnow		*Rock bass	
*Longnose gar	***********	Northern redbelly dace		*Green sunfish	(31)
Amiidae (Bowfins)		Southern redbelly dace		*Pumpkinseed	
*Bowfin		Finescale dace		*Warmouth	
Clupeidae (Herrings)		Blacknose dace		*Orangespotted sunfish	
*Alewife		Longnose dace		*Bluegill	
*Gizzard shad		Redside dace		*Longear sunfish	
Salmonidae (Salmon/Trout)	***	*Pearl dace		*White crappie	
*Rainhow trout		Cottidae (Sculpins)		*Black crappie	**********
*Brown trout		Mottled sculpin	0	*Largemouth bass	
*Brook trout		Slimy sculpin		*Smallmouth bass	
*Coho		Catostomidåe (Suckers)	******	Percidae (Perch)	
*Chindok		*Longnose sucker		N. sand darter	
Umbridge (Mutiminnow)		*White sucker	(12)	Rainbow darter	-
Central mudminnow	(1)	*Creek chubsucker		lowa darler	
Esocidae (Pike)		*Lake chubsucker		Greenside darter	
· · · · · ·		*Northern hog sucker		Fantail darter	
*Grass pike				Orangethroat darter	
*Northern pike		*Spotted sucker *Silver_redhorse		**	(117)
*Muskeliunge		*River redhorse		Johnny darter Blackside darter	(II)
Cyprinidae (Minnows and Carp)	2				
Central stoneroller	(3)	*Black redhorse		Logperch *Vallau naveh	-
Lake chub		*Golden redhorse		*Yellow perch	F0071
*Goldfish		*Shorthead redhorse		*Walleye	7
*Carp		*Greater redhorse	*********	Percopsidae (Trout-perch)	
Bigeye chub		Ictaluridae (Büllhead/Catfish)		Trout-perch	
*Horneyhead chub		*Black bullhead		Anguilldae (Eels)	
*River chub		*Brown bullhead		*American eet	
*Creek chub	(D)	*Yellow bullhead		Gadidae (Cod)	
*Golden shiner	+	Stonecat		*Burbot	
Pugnose shiner		Tadpole madfom		Sciaenitiae (Drums)	
Emerald shiner		Brindled madtom		*Freshwater drum	
Bigeye shiner	-	*Channel catfish		Cobitidae (Lauches)	
Ironcolor shiner	6	*Flathead catfish	19-11-1	Oriental weatherfish	
*Common shiner	(6)	Aphredoderidae (Pirate perch)		Other family/species:	
Central bigmouth shiner		Pirate perch		100000000000000000000000000000000000000	
Blackchin shiner		Atherinidae (Silversides)		The same of the same of the same	***********
Blacknose shiner		Brook silverside	****	-10-00-10-00-00-00-00-00-00-00-00-00-00-	-0-1
Spottali shiner		Cyprinodontidae (Topminnows)		IIIIwi-lia Kiyasa arasa	
Silver shiner		Banded killifish			
Rosyface shiner		Blackstripe topminnow	1000-100		
Spotfin shiner	100000000			* = Measure length	

MACROINVERTEBRATES

Station: STREAM 13 STE#4 Area Sampled: Time Sampled: PORIFERA Hemiptera Diptera Belostomatidae _____ **PLATYHELMINTHES** Athericidae Turbellaria : 3 Corixidae _____ Ceratopogonidae Chaoboridae ___ NEMATOMORPHA _____ Gelastocoridae Chironomidae ABABBB (70) BRYOZOA _____ Gerridae _____ Culicidae ANNELIDA Mesoveliidae Hirudinea ___ Naucoridae _____ Dixidae _____ Oligochaeta :: (4) Dolichopodidae _____ Nepidae _____ ARTHROPODA Notonectidae _____ Empididae _____ Pleidae * O Crustacea Ephydridae ______ Amphipoda :: Saldidae ___ Muscidae _____ (13) Decapoda M! Veliidae * Psychodidae _____ Isopoda 🚜 Ptychopteridae _____ Megaloptera Corydalidae Arachnoidea Sciomyzidae _____ Hydracarina Sialidae _____ Simuliidae _____ Neuroptera Stratiomyidae _____ Insecta Sisyridae Syrphidae ____ Ephemeroptera Tabanidae _____ Ametropodidae _____ Trichoptera Brachycentridae _____ Thaumaleidae _____ Baetiscidae Baetidae Glossosomatidae Tipulidae _____ Caenidae _____ Helicopsychidae MOLLUSCA Hydropsychidae 🛛 🕽 . Ephemerellidae _____ Gastropoda Hydroptilidae _____ Ancylidae & ØØ (29) Ephemeridae _____ Lepidostomatidae _____ Bithyniidae Heptageniidae _____ Isonychildae Hydrobiidae Leptoceridae _____ Limnephilidae 3. 3 Lymnaeidae ___ Leptophieblidae Metretopodidae _____ Physidae :: (9) Molannidae Odontoceridae _____ Polymitarcyidae _____ Planorbidae • O Potamanthidae _____ Philopotamidae _____ Pleuroceridae Siphlohuridae_____ Phryganeidae ____ Pomatiopsidae Polycentropodidae ____ Tricorythidae _____ Valvatidae Viviparidae (8) Odonata Psychomyiidae _____ Rhyacophilidae _____ Anisoptera Pelecypoda Aeshhldae _____ Sericostomatidae _____ Dreissenidae _____ CordUlegastridae _____ Pisidiidae _____ Uendidae (Neophylax) Cordillidae _____ Lepidoptera Sphaeriidae _____ Noctuidae____ Gompfildae_____ Unionidae Libellulidae Pyralidae Coleoptera* Macomlidae _____ Other taxa or comments: Zygoptera Dryopidde _____ UN KAWN (ASES :: Dytiscidae _____ Calopterygidae Coenagrionidae 🎁 🙆 Elmidae SPRINKTAIL Lestidae _____ Gyrinidae (a) (l) Colverbilia Plecoptera Haliplidae (a) (l) Dukalow Ephon - :: Heteroceridae _____ Capniidae (Collectual) Hydraenidae _____ Chloroperlidae Hydrophilidae _____ Leuctridae _____ UNKNOWN BEETLE Nemouridae _____ Lampyridae (a) (i) Peltoperlidae _____ Noteridae (a) (I) Perlidae _____ Psephenidae(a) (I) Ptilodactylidae (a) (l) Perlodidae Pteronarcyidae _____ Scirtidae (a) (l) Taeniopterygidae _____ * record # of adults (a) or larvae (l) as indicated

HABITAT ASSESSMENT FIELD DATA SHEET - GLIDE/POOL STREAMS

Habitat		Condition	Category		
Parameter	Excellent	Good	Marginal	Poor	
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking	
SCORE 5	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	6 4 3 2 1 0	
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation	
SCORE 7	20 19 18 17 16	15 14 13 12 11	10 9 8 (7) 6	5 4 3 2 1 0	
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present	Majority of pools large- deep; very few shallow.	Shallow pools much more prevalent than deep pools	Majority of pools small- shallow or pools absent.	
SCORE 5	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0	
4. Sediment Deposition	Little or no enlargement of island or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 20-50% of the bottom affected; slight deposition in pools	Moderate deposition of new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of bools prevalent	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
SCORE 3	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 (3) 2 1 0	
5a. Channel Flow Status - Maintained Flow Volume	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed	Water fills >75% of the available channel; or <25% of channel substrate is exposed	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed	Very little water in channel and mostly present as standing pools	
SCORE 8	10 9	8 7 6	5 4 3	2 1 0	
5b. Channel Flow Status – Flashiness	Vegetation along the stream bank is complete nearly to the waters edge Little or no evidence of frequent changes in discharge and/or frequent high water events that scours stream bank vegetation Large woody debris (if present) stable and extending laterally across the stream channel	Some evidence of bank scour approximately 4-8 inches above the waters surface. Large woody debris (if present) mostly stable and extending partially into the active stream channel	Bank scour evidence 9-18 inches above the waters surface. Large woody débris (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 woodly debris are generally absent from the active channel and/or may exist as woodly debris jams along the stream bank above the active channel	
SCORE	10 9	8 7 6	5 4 3	2 (1) 0	
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization is continuous but not recent (>5 years). Embankments without mature trees and dominated by grasses and shrubs	Stream reach has been recently channelized (<5 years) OR Banks shored with gabion, rock, cement or bare earth Instream habitat greatly altered or removed entirely Bank vegetation moderately dense to absent.	
SCORE 16	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	





Habitat	Condition Category							
Parameter	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 bee channelized for a long distance.				
SCORE 6	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0				
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected	Moderately stable; infrequent, small areas of erosion mostly healed over 5-30% of bank in reach has areas of erosion	Moderately unstable; 30- 60% of bank in reach has areas of erosion; high erosion potential during floods	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars				
SCORE 3 (LB)	Left Bahk 10 9	8 7 6	5 4 3	0 1 0				
SCORE ((RB)	Right Bank 10 9	8 7 6	5 4 3	2 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 miritmal 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					
SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 ①				
SCORE (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 crobs) have not impacted zone	Width of riparian zone 75- 150 feet; human activities have impacted zone only minimally	Width of riparian zone 10- 75 feet; human activities have impacted zone a great deal	Width of riparian zone <10 feet, little or no riparian vegetation due to human activities				
SCORE 8 (LB)	Left Bank 10 9	(8) 7 6 (8) 7 6	5 4 3	2 1 0				

TOTAL FROM PAGE 1

Total Score 70

Shaded itelds are entered into datab	lase			
STREAM NAME	ITE # 5 WILLOW (REEK	LOCATION (road crossing) Ford Road and I-275 k	oike path (e	east of HWY)
COUNTY/TOWNSHIP	2/2 9 When with		S	
WAYNE COUNTY / CA	ACTON TOWNSHIP	T 25 R 8E		
LAT(dd)	LONG (dd)	RIVER BASIN		
LAT(du)	2.0110 (00)	ROLLE RIVER		
STORET#		HUC CODE	ECOREGION	
		0409 0004 0202	MAUMEE L	AKE RANE
INVESTIGATOR(S)	DATE 8/1/12	REASON FOR SURVEY		
M. BERNINGER		☐ Targeted: comment		
S. KOGGE	TIME /1:39 AM PM	Randomized: VSEC #		
T- FSTROM	11.51	VSEC description (eg. cold small)	AND ADDRESS OF A STATE
WEATHER CONDITIONS		WATERSHED FEATURES		
Current	Has there been a significant	Predominant Surrounding	Local Watershe	ed NPS Pollution
Sunny	rain in the last 7 days?	Land Use	No evidence	
Partly Cloudy	☐ Yes ☐ No	□ Forest	Some poten	tial sources
Cloudy	Don't Know	Commercial	Obvious Sou	irces
Rainy	Air Temperature 85 °F	☐ Field/Pasture		
Company of the second s	The second secon	industrial industrial	Local Watershe	ed Erosion
RIPARIAN VEGETATION		Agricultural	☐ None	
Indicate the dominant type and	record the dominant species	Residential .	Moderate	
Trees Shrubs	Species:	Other May Row	[] Heavy	
Grasses Herbaceous				
Estimate buffer width (left)	ft (right)ft			CHARLES OF THE PARTY OF THE PAR
STREAM CHARACTERIZATION	XI	UNSTREAM FEATURES		
Stream Subsystem	Stream Modifications	Avg Stream Width _ / 3 _ ft	Avg. Stream De	epth -5 ft
Perennial	☐ None:		,,	
Intermittent	☐ Dredded	Surface Velocity ft/sec	Est. Flow 45	cfs
Lake Outlet Influenced	Cantroy Removal	(at thalweg)		
☐ Dam Influenced	☐ Snagging			
E Barr middisod	☐ Impounded	Est, Survey Reach-Length 130 1301 Bit Survey Reach Area ft ²	ft	
Stream Origin	Relocated	1301 84	and the state of t	0 /
☐ Spring Fed	Bank Stabilization	Survey Reach Area ft ²	High Water Ma	rk 2-5 ft
☐ Lake/Pond	☐ Habitat Improvement			
Swamp, Marsh, Bog	,	Canopy Cover: 55 % Shade	ed	
Mixture of origins	Stream Type			
Other	☐ Coldwater			
	⊠ Warmwater			
AQUATIC VEGETATION				
☐ Rooted emergent	☐ Free Floating	Portion of the reach with aquatic	vegetation ()	%
☐ Rooted submergent	☐ Floating algae	Nuisance aquatic plants or slime:		s No No
Rooted floating	Attached algae	Dominant species present	and the second second	
C2				
WATER QUALITY	Solids, Turbidity Clear	Color	Surface Oils	Water Odors
Temperature 75 °F			None None	Normal/None
Makes Country Teles	Slightly turbid Turbid	☐ Clear ☐ Stained	Sheen	Sewage
Water Samples Taken		Opaque	Globs	☐ Petroleum
None Other	☐ Floating solids ☐ Suspended solids	☐ Colored	CJ Flecks	☐ Chemical
☐ GA ☐ GN ☐ MN	Settleable solids	☐ Charea	Slick	[] Fishy
VOA ON	Foams		Other	Other
SEDIMENT	0.1	On the case Ode	Clausaite	
Sediment Samples Taken	Oils	Sediment Odors	Deposits	
None Other	☐ Absent	Normal/None	None	
☐ MS ☐ GS	Slight	Sewage	Sludge	
□ VOA □ OS/BNA	☐ Moderate	Petroleum	Sawdust	
15	☐ Profuse	Chemical	Paper fiber	
Looking at stones that are not	F	Anaerobic	Sand	
deeply embedded, are the		Other	Relict shells	
Trip do value a la calcia a ala co	Vec I INIo		1 1 1771 Q.T	

INORGANIC SUBSTRATE COMPONENTS

APPENDIX J (Continued)

ORGANIC SUBSTRATE COMPONENTS

	(shoul	d add up to 100%)	(does not necessarily add up to 100%)			
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in	Sampling Reach
Bedrock	160		Detritus	Sticks, wood, coarse	5	
Boulder	>10"		Muck-Mud	plant material (CPOM) black, very fine	10	
Cobble Gravel	0.1"-2.5"		- INIGCK-INIGG	organic (FPOM)	50	
Sand	Gritty (course)	15	Other	organio (11 om)	-	-10-10-11-0-
Silt	Gritty (fine)	15				
Clay	slick	A CONTRACTOR OF THE PARTY OF TH		1000		
Morpholog Riffie Run Pool	%		Undercut b	oanks ng vegetation dy debris	croinvertebrate Color e Moderate Sparse	
Further	ATION MAP investigation necrosers pollution sourcer					
,				DNS CS	1" 4,5" 3	1,5" 2" 01
/-		15 fs		UPS CS 3	11 , 11 , 11	4.5' 1.5
				UPS CS 3	6 6	4,3
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	4					
	#Z					
	#3					
-	ヤン					
		STREAM # 2 SETE	5 8/1	12		- 4

12:29 STATE

Date 8/1/12

Length sa	mpled /30/4	Time sampled 35%	Gear type (ci	rcle): hps strear	n shocker bo	at shocker of	her	- Partition of the Control of the Co
Species length (in)	BLUNTNOSE MENNON	CREEK	Soham! DAKTER	Great Soutist	COMMEN	White SuckER	BLUERALL	In
1								1
2		0 0	四夏口	2			6	2
3	2 2 LL (29)	MADMAR	; (31)	: (14)	1: (5)			3
4		风味:.		1: (14)			1	4,
5		· (83)				1. (1)	2	5
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11			A SINGER BUILDING CONTRACTOR CONT		V-V-C-STREET, S-P-C-STREET,	NAME OF TAXABLE PARTY.		11
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14						1		14
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>20					POY LUCION	-		
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length (in)					the statement			
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17								18
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19								
20	The state of the s	many lysphonomens young because and positions (estername			and the second section in the			20
>20								

Number	of	Anomalies	

Station Number: STREAM # 2 (willow (REEK) STITE #5
Length Sampled (ft): BOGS

FISH

Area Sampled (sq ft):

Sampling Time:

Probes: /

Passes: 2_

Gear: boat / ss / b

Number of Anomalies: (**) Comments:

Petromyzontidae (Lampreys)		Sand shiner	and the second s	Gasterosteidae (Sticklebacks)
Sea lamprey (a/l)		Redfin shiner	W. Harv	Brook stickleback
Silver lamprey (a/l)		Mimic shiner		Threespine stickleback
Northern brook lamprey (a/l)		Brassy minnow		Perchicthyidae (Temp. bass)
Chestnut lamprey (a/l)	 	Fathead minnow		*White bass
American brook lamprey (a/l)		Bluntnose minnow	(29)	*White perch
Lepisosteidae (Gars)		Suckermouth minnow		Centrarchidae (Sunfishes)
*Spotted gar		Silverjaw minnow		*Rock bass
*Longnose gar	11111	Northern redbelly dace		*Green sunfish
Amiidae (Bowfins)		Southern redbelly dace	1-1-1-1 - 1-1-1-1	*Pumpkinseed
*Bowfin	20000000000	Finescale dace	10.000	*Warmouth
Clupeidae (Herrings)		Blacknose dace		*Orangespotted sunfish
*Alewife		Longnose dace		*Bluegill
*Gizzard shad	5 990 1990 1990	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		Stimy sculpin		*Smallmouth bass
*Coho		Catostomidae (Stickers)		Percidae (Perch)
*Chinook		*Longnose sucket		N ₋ sand darter
Umbridee (Mudminnow)	(4)	*White sucker	1	Ralnbow darter
Central mudminnow		*Creek chubsucker	No. of Concession and	lowa darter
Esocidae (Pike)		*Lake chubsucker		Greenside darter
*Grass pike		*Northern hog sucker		Fantail darter
*Northern pike		*Spotled sucker	1000000000	Orangethroat darter
*Muskellunge	-	*Silver redhorse		Jöhnny darter
Cyprinidae (Minnows and Carp)		'River redhorse		Blackside darter
Central stoneroller		*Black redhorse	(212)	Logperch
Lake chub		*Golden redhorse		*Yellow perch
	-	*Shorthead redhorse		*Walleye
*Goldfish				9
*Carp		*Greater redhorse		Percopsidae (Trout-perch)
Bigeye chub		ictaluildae (Bullhead/Catfish)		Trout-perch
*Homeyhead chub		*Black bullhead		Anguillidae (Eels)
*River chub	83	*Brown bullhead		*American eel
*Creek chub	83	*Yellow builhead		Gadidae (Cod)
*Golden shiner	,	Stonecal		*Burbot
Pugnose shiner		Tadpole madtom		Sciachidae (Drums)
Emerald shiner		Brindled madtom		*Freshwater drum
Bigeye shiner	41.000	*Channel catfish	1	Cobifidae (Loaches)
Ironcolo: shiner		*Flathead catfish	H	Oriental weatherfish
*Common shiner	5	Aphredoderidae (Pirate perch)		Other family/species:
Central bigmouth shiner		Pirate perch		
Blackchin shiner		Atherinidae (Silversides)		3111-12-12-13-13-13-13-13-13-13-13-13-13-13-13-13-
Blacknose shiner		Brook silverside		
Spottail shiner		Cyprinodontidae (Topminnows)		
Silver shiner	-	Banded killifish		
Rosyface shiner		Blackstripe topminnow		
Spotfin shiner			Campbell Control	* = Measure length

Station: STREAM # 2 STTES	MACROINVERTEBRATES Area Sampled: 1300 4184	Time Sampled: 45 mins
PORIFERA	Hemiptera	Diptera
PLATYHELMINTHES	Belostomatidae	Athericidae
Turbellaria		
NEMATOMORPHA	Gelastocoridae	Chaoboridae
BRYOZOA		Chironomidae 🛛 🗷 🗸 🗸 (72)
ANNELIDA	Mesoveliidae	Culicidae
Hirudinea		Dixidae
Oligochaeta		
ARTHROPODA	Notonectidae	Empididae
Crustacea	Pleidae	Ephydridae
Amphipoda (2	Saldidae	
Decapoda 🗷 🕒 (16)	Veliidae	Psychodidae
Isopoda 🔩 (4)	Megaloptera	Ptychopteridae
Arachnoidea	Corydalidae	Sciomyzidae
Hydracarina		
Insectà	Neuroptera	Stratiomyidae
Ephemeroptera	Sisyridae	
Ametropodidae		Tabanidae
Baetiscidae		Thaumaleidae
Baetidae		
Caenidae		
Ephemerellidae	Hydropsychidae	Gastropoda
Ephemeridae		
Heptagenildae		
Isonychiidae		
Leptophlebiidae		Lymnaeidae
Metretopodidae		
Polymitarcyldae		Planorbidae
Potamanthidae	Philopotamidae	Pleuroceridae
Siphloritiridae	Phryganeidae	Pomatiopsidae
Tricorythidde		
Odonata	Psychoniylidae	
Anisoptera	Rhyacophilidae	
Aeshnidae	Sericosiomatidae	Dreissenidae
Cordulegastridae		Pisidiidae
Corduliidae		Sphaeriidae
Gomphidae	Noctuidale	Unionidae
Libellulidae	Pyralidae	
Macomiidae	Colsoptera*	Other taxa or comments:
Zygoptera	Dryopidae	
Calopterygidae		CORBICULIDAE: (4)
Coenagrionidae		7
Lestidae		VCHANGE ON STIF #4
Placoptera	Haliplidae (a) (l)	
Capniidae		
Chloroperlidae		
Leuctridae		
Nemouridae		
Peltopertidae	Noteridae (a) (I)	

Psephenidae(a) (l)

Ptilodactylidae (a) (l)

Scirtidae (a) (l)

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

Perlidae _____

Taeniopterygidae _____

Perlodidae _

Pteronarcyidae ____



HABITAT ASSESSMENT FIELD DATA SHEET - GLIDE/POOL STREAMS

Habitat	Condition Category							
Parameter	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	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 yagetation				
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. Clumnel 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/br rifle 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 soour evidence 9-18 inches above the waters surface. Large woody debnis (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.	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 o bare earth Instream habita greatly altered or removed entirely Bank vegetation moderately dense to absent				
SCORE 3	20 19 18 17 16	present. 15 14 13 12 11	10 9 8 7 6					

Habitat	Condition Category							
Parameter	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 long than if it was in a straig line.	increa er length ht than if line (1 sinuos	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 be 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 erosion mostly healed over. 5-30% of bank in reach has areas of erosion	of 60% o areas	ately unsta f bank in re of erosion; n potential	ach has high	areas frequ	ent along s d bends; o 30-100% o	bvious bank
SCORE 2 (LB)	Left Bank 10 9	8 7	6 5	4	3	(2)	1	0
SCORE 2 (RB)	Right Bank 10 9	8 7	6 5	4	3	(2)	1	0
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally	70-90% of the streambank surfaces covered by native vegetation, but 1 class plants is not well-represented; disruption evident but not affectin full plant growth potent to any great extent; mothan one-half of the potential plant stubble height remaining.	stream covere of disrup patche closely yegete al than o potent	% of the hoank surfa and by veget; tion obvious as of bare s a cropped ation commene-half of the plant sturemaining.	ation; s; oil or on; less ne	surfaces co	vered by vered by vered by vered by the streambar of the	nk vegetation 2 inches or
SCORE / (LB)	Left Bank 10 9	8 7	6 5	4	3	2	[1]	0
SCORE ((RB)	Right Bank 10 9	8 7	6 5	4	3	2	(T)	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 150 feet; human activit have impacted zone or minimally	es 75 fee ly have in	Width of riparian zone 10- 75 feet; human activities have impacted zone a great deal		Width of rip or no riparie human activ	an vegetati	<10 feet; little on due to
SCORE 9 (LB)	Left Bank 10 (9)	8 7	6 5	4	3	2	1	0

(3) TOTAL FROM PAGE !

Total Score 52

APPENDIX J STREAM CARD

STREAM NAME		[LOCATION (road crossing)	
STREAM # 1 S	ITE #6 TOWGUTH CREEK		section of I-275 bike path
COUNTY/TOWNSHIP		7 75 R 8E	S
LAT(dd) 42 20'. 04 8159	LONG (dd) 83 26 31 6090	RIVER BASIN	
STORET#		HUC CODE 040900040202	ECOREGION MANNEE LAKE PLANE
INVESTIGATOR(S) T. ESTROM	TIME 15:30 AM EM	REASON FOR SURVEY Targeted: comment	
S. KOGGE M. BERNINGER	TIME 15:30 AM (1)	Randomized: VSEC # VSEC description (eg. cold small	
WEATHER CONDITIONS		MWATERSHED FEATURES	
Current Sunny Partly Cloudy Cloudy Rainy	Has there been a significant rain in the last 7 days? Yes No Non't Know	Predominant Surrounding Land Use Forest Commercial Field/Pasture Industrial	Local Watershed NPS Pollution No evidence Some potential sources Obvious Sources Local Watershed Erosion
RIPARIAN VEGETATION Indicate the dominant type and reconstrues Shrubs Grasses Herbaceous Estimate buffer width (left)	cord the dominant species Species: **RESE ; **RENEG** ft (nght) ft	Agricultural Residential Other Robb Row	☐ None ☐ Moderate ☐ Heavy
	7 (17 m)	100000000000000000000000000000000000000	
STREAM CHARACTERIZATION Stream Subsystem Perennial	Stream Modifications None	INSTREAM FEATURES Avg. Stream Width 16 ft	
☐ Intermittent ☐ Lake Outlet Influenced	☐ Dredged ☐ Canopy Removal	Surface Velocityft/sec (at thalweg)	Est. Flow 65 cfs
☐ Dam Influenced Stream Origin	☐ Snagging☐ Impounded☐ Relocated	Est. Survey Réach Length 170	
Spring Fed Lake/Pond	☐ Bank Stabilization ☐ Habitat Improvement	Survey Reach Area 11 Canopy Cover: 65 % Shade	
Swamp, Marsh, Bog Mixture of origins Other	Stream Type Coldwater	Cartopy Cover. 20 79 Strade	5u
L	Warmwater	JL	
AQUATIC VEGETATION Rooted emergent Rooted submergent Rooted floating	☐ Free Floating ☐ Floating algae ☐ Attached algae	Portion of the reach with aquatic Nuisance aquatic plants or slimes Dominant species present	
WATER QUALITY	Solids, Turbidity		
Temporature 72 °F Water Samples Taken	Clear Slightly turbid Turbid	Color Clear Stained	Surface Oils Water Odors None Normal/None Sheen Sewage
None Other GA GN	☐ Floating solids ☐ Suspended solids	Opaque Colored	☐ Globs ☐ Petroleum ☐ Flecks ☐ Chemical
□MA □ MN □VOA □ ON	☐ Settleable solids ☐ Foams	Other	Slick Fishy Other Other
SEDIMENT			
Sediment Samples Taken	Oils	Sediment Odors	Deposits
None Other OS	Absent	Normal/None Sewage	None Sludge
□ VOA □ OS/BNA	☐ Moderate	☐ Petroleum	☐ Sawdust
	☐ Profuse	☐ Chemical	Paper fiber
Looking at stones that are not		☐ Anaerobic	Sand
deeply embedded, are the undersides black in color?	s 🗆 No	Other	☐ Relict shells ☐ Other

APPENDIX J (Continued)

		JBSTRATE COMPONENTS		ORGANIC SUBSTR	ATE COMPONENTS rily add up to 100%)
Cubateato	Diameter	d add up to 100%) % Composition in Sampling Reach	Substrate	Characteristic	% Composition in Sampling Reach
Substrate Type	Diameter	% Composition in Sampling Reacti	Туре		W Composition in Camping Reach
Bedrock			Delritus	Sticks, wood, coarse	15
Boulder	>10"		1,	blant material (CPOM)	
Cobble	2.5"-10"		Muck-Mud	black, very fine	15
Gravel	0.1"-2.5"			organic (FPOM)	
Sand	Gritty (course)	90	Other		
Silt	Gritty (fine)		-		
Clay	slick	10			
			Denies	2)	
	of Reach Repres	ented by Stream	Additional		croinvertebrate Colonization
Morpholog	y Types		the done of S		e Moderate Sparse Absent
Riffle			Undercut b	4471745	
Run	%			4,4	CAY AND THE STATE OF THE STATE
Pool_		,	Large wood		
☐ Deposit	ional9	/n	Aquatic ma		
			Rootwads		
	17' UPS - 2.5" ROB	, and the second	5*'	19" 19"	
生	14" 20B city runs 55 sec 57 sec 555	11" 10" 3"	/" RDB		

FISH

Station Number: Length Sampled (R): Area Shripled (sq ft):

Sampling Time:

Probes: # Passes:

Gear: boat / ss / bps

Number of Anomalies:

De AFFECTEVE) eceleorr	ESKENT WAS NOT COMPLETED	may come	Contrapolarida Italiana	LIE / F
Petroniyzontidae (Lampreys)		Sand shiner	-	Gasterosteidae (Sticklebacks)	
Sea lamprey (a/l)	-	Redfin shiner	-	Brook stickleback	
Silver lamprey (a/l)		Mimic shiner		Threespine stickleback	-
Northern brook lamprey (a/l)	-	Brassy minnow		Perchicthyidae (Temp. bass)	
Chestnut lamprey (a/l)		Fathead minnow		*White bass	_
American brook lamprey (a/l)		Bluntnose minnow		*White perch	_
Lepisosteidae (Gars)		Suckermouth minnow		Centrarchidae (Sunfishes)	
*Spotted gar	-	Silverjaw minnow		*Rock bass	
*Longnose gar	-	Northern redbelly dace		*Green sunfish	
Amiidae (Bowfins)		Southern redbelly dace		*Pumpkinseed	
*Bowfin		Finescale dace		*Warmouth	
Clupeidae (Herrings)		Blacknose dace		*Orangespolted sunfish	
*Alewife	-	Longnose dace	-	*Bluegii!	
*Gizzard shad		Redside dace		*Longear sunfish	
Salmonidae (Salmon/Trout)		*Pearl dace		*White crapple	
*Rainbow trout		Cottidae (Sculpins)		*Black crappie	
*Brown frout		Mettled sculpin		*Largemouth bass	1 11 11 11
*Brook trout		Slimy sculpin		*Smallmouth bass	
*Coho		Catostomidae (Suckers)		Percidae (Perch)	
*Chinook		*Longnose sucker		N_sand darter	
Umbridae (Mudmindow)		*White sucker	177	Rainbow darter	
Central mudminnow		*Creek chubsucker		lowa darter	
Esocidae (Pike)		*Lake chubsucker		Greenside darter	
*Grass pike		*Northern hog sucker		Fantail darter $-\partial_{t} r^{0}_{AB} = 0$	The same of
*Northern pike		*Spotted sucker		Orangethroat darter	
*Muskellunge		*Silver_redhorse		Johnny darter	
Cyprinidae (Minnows and Carp)		*River redhorse		Blackside darter	
Central stoneroller		*Black redborse		Logperch	
Lake chub		*Golden redhorse		*Yellow perch	
*Goldfish		*Shorthead redhorse		*Walleye	
*Carp		*Greater redhorse	-	Percopsidae (Trout-perch)	
Bigeye chub		Ictaluridae (Bullhead/Cattish)		Trout-perch	
*Homeyhead chub	-	*Black bullhead		Anguillidae (Eels)	
*River ch(lb		*Brown bullhead	4)	*American eel	
*Creek chub		*Yellow butthead		Gadidae (Cod)	
*Golden shiner		Stonecat		*Burbot	
Pugnose shiner		Tadpole madtom		Sciaenidae (Drume)	-
Emerald shiner		Brindled madtom	-	*Freshwater drum	
Bigeye shiner		*Channel catfish		Cobitidae (Loaches)	
Ironcolor shiner	-	*Flathead catfish	-	Oriental weatherfish	
	-				-
*Common shiner		Aphredoderidae (Pirate gerch)		Other family/species:	
Central bigmouth shiner		Pirate perch "	-	***	-
Blackchin shiner		Atherinidae (Silversides)			-
Blacknose shiner	and the second	Brook silveraide			
Spottail shiner		Cyprinodoniidae (Topminnows)			-
Silver shiner		Banded killifish			
Rosyface shiner		Blackstripe topminnow			
Spatfin shiner		N.,		* = Measure length	

MACROINVERTEBRATES

Station. The 6, Stream I	Area Sampleo.	Time Sampled. 50mm
PORIFERA		Diptera
PLATYHELMINTHES	Belostomatidae	
Turbellaria		Ceratopogonidae
NEMATOMORPHA	Gelastocoridae	Chaoboridae
BRYOZOA	Gerastocoridae Gerridae 1 : Gerridae 1 : Gerr	
ANNELIDA	Mesovellidae	Culicidae
Hirudinea		Dixidae
Oligochaeta		Dolichopodidae
ARTHROPODA	Notonectidae	Empididae
Crustacea	Pleidae	
Amphipoda	Saldidae	Muscidae
Decapoda 🛛 🗀 (17)	Veliidae	Psychodidae
Isopoda	Megaloptera	Ptychopteridae
Arachnoidea	Corydalidae	
Hydracarina	Sialidae	Simuliidae
Insecta	Neuroptera	Stratiomyidae
Ephemeroptera	Sisyridae	Syrphidae
Ametropodidae		Tabanidae
Baetiscidae		Thaumaleidae
Baetidae		Tipulidae
Caenidae	Helicopsychidae	MOLLUSCA
Ephemerellidae		Gastropoda
Ephemeridae		
Heptageniidae		
// Isonychiidae		
Leptophlebiidae		Lymnaeidae
Metretopodidae	Molannidae	Physidae O
Polymitarcyidae		
Potamanthidae	Philopotamidae	Pleuroceridae
Siphlonuridae	Phryganeidae	Pomatiopsidae
Tricorythidae		Valvatidae
Odonata	Psychomylidae	Viviparidae
Anisoptera	Rhyacophilidae	Pelecypoda
Aeshnidae <u>U</u>		Dreissenidae
Cordulegastridae	Uenoidae (Neophylax)	
Corduliidae	Lepidoptera	Sphaeriidae
Gomphidae		Unionidae
Libellulidae		
Macomiidae		Other taxa or comments:
Zygoptera	Dryopidae	
Calopterygidae		
- Coenagrionidae * 0	Elmidae	
Lestidae		
Plecoptera	Haliplidae (a) (l)	
Capniidae		
Chloroperlidae		
Leuctridae		
Nemouridae	Lampyridae (a) (l)	
Peltoperlidae		
Perlidae		
Perlodidae		
Pteronarcyidae		
Taeniopterygidae		
7.0		

Site 6, Stream 1- HABITAT ASSESSMENT FIELD DATA SHEET - GLIDE/POOL STREAMS

Habitat	Condition Category						
Parameter	Excellent	Good	Marginal	Poor			
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 Illian 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	ation, mostly from el, sand, or fine sediment on old and new bars; 50-80% of the bottom affected; slight new gravel, sand, or fine sediment on old and new bars; 50-80% of the bottom affected; sediment material, increa				
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			
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 detris (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	Eark scour is 20 inches) along the stirram 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 I	10 9	8 7 6	5 4 3	2 (1) 0			
5. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern	Some charmelization present, usually in areas of bridge abutments; evidence of past channelization. i.e., dredging (greater than past 20 yr) may be present, but recent charmelization 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 (7) 17 16	15 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0			

Due to pridue crossing and rad crossing

TONOUSH CREEK STREAM # 1 SITE #6

Appendix J (continued)

Habitat	Condition Category						
Parameter	Excellent	Good	Marginal	Poer Channel straight, waterway has been channelized for a long distance			
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 Manuel Zahou et up stream end				
SCORE %	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 (
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 / (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0			
SCORE (RB)	Right Bank 10 9	8 7 G	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 innimediate 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 reight 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 slubble 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			
SCOPL 6 (LB)	Left Bank 10 9	8 7 6 8 7	5 4 3	2 1 0			
SCORE 6 (RB) Right Bank 10 9 10. Riparian Vegetative Zohe 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		Width cl 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 npanan vegetation due to human activities.			
	zone						
SCORE 9 (LB)	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0			

Total Score

Notes: -wire fencing and concrete at upstream end of site. - discharge enters stran on LDB near pedestrian bridge