

**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](http://www.michigan.gov/wetlands)

# Background Information

## Wetland

Proposed Project Site Name or DNRE File #:
Date of Evaluation:
County:
Township:
Town:
Range:
Section:
Decimal Lat/Long:

## Evaluator

Name:		
Address:		
City:	State:	Zip:
Phone:		
Email:		

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

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

- MiRAM Boundary.** See *MiRAM User's Manual* for more information  
**Size of the Wetland Evaluation Area:** \_\_\_\_\_ acres
- Location Map.** A county road map showing the location of the Wetland Evaluation Area, north arrow, map scale information, roads, landmarks, etc. *Attach* a map to the end of this document.
- Color Photographs.** Photos should show the wetland vegetation components, habitat/community types, hydrologic features, and any other pertinent site features. *Attach* to the end of this document.
- Landscape Sketch or Aerial Photograph.**
  1. Clearly label the Proposed Project Site and Wetland Evaluation Area. Indicate the location of the MiRAM Boundary.
  2. Label and indicate the extent of all general wetland community types identified within the Wetland Evaluation Area. Examples include: marsh, wet meadow, hardwood swamp, conifer swamp, shrub swamp, etc. Some wetland communities may be further classified as natural communities. Natural communities are predominantly structured by natural processes rather than modern anthropogenic disturbances. Examples include: bog, prairie fen, muskeg, wet prairie, southern wet meadow, etc.
  3. Identify and label all hydrologic features, such as: streams, 100-year floodplains, ponds, vernal pools, and small patches of open water within a marsh or swamp.
  4. Identify and label surrounding upland features.
  5. Include north arrow and map scale information.
  6. *Attach* the landscape sketch or aerial photo to the end of this document.

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

# Field Datasheet

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

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


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


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


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

- |  |  |
|--|--|
| <input type="checkbox"/> Hydrologic Condition and Interactions<br><input type="checkbox"/> Hydrologic Alterations<br><input type="checkbox"/> Substrate/Soil Disturbances<br><input type="checkbox"/> Habitat Structure Development<br><input type="checkbox"/> Habitat Alterations<br><input type="checkbox"/> Habitat/Wetland Condition<br><input type="checkbox"/> Amphibian Breeding Pools | <input type="checkbox"/> Vegetation Diversity<br><input type="checkbox"/> Vegetation Condition<br><input type="checkbox"/> Amount of Open Water<br><input type="checkbox"/> Percent of Invasive/Non-native Species<br><input type="checkbox"/> Community Interspersion<br><input type="checkbox"/> Vertical/Horizontal Structure<br><input type="checkbox"/> S1, S2, or S3 Natural Community |
|--|--|

**Approximately how much of the Wetland Evaluation Area was reviewed during the field inspection? \_\_\_\_\_%**


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

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

# Narrative Rating

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

Answer all of the following metrics.

<p><b>1. U.S. Fish and Wildlife Service (USFWS) Critical Habitat.</b> Is any part of the Wetland located within an area designated as Critical Habitat <u>and</u> does the Wetland <i>actually</i> contain habitat suitable for either species listed below?</p> <p><b>Piping Plover</b> (<i>Charadrius melodus</i>) Critical Habitat Units are designated only within the following counties: Alger, Benzie, Charlevoix, Cheboygan, Chippewa, Emmet, Iosco, Leelanau, Luce, Mackinac, Mason, Muskegon, Presque Isle, and Schoolcraft. See URL below for Unit locations. (The link provided was broken and has been removed)</p> <p><b>Hines's Emerald Dragonfly</b> (<i>Somatochlora Hineana</i>) Critical Habitat Units are designated only within the following counties: Alpena, Mackinac, and Presque Isle. See URL below for Unit locations. (The link provided was broken and has been removed)</p>	<p><input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>If "yes", the Wetland has <b>high functional value</b>.</p>
<p><b>2. Threatened or Endangered (T/E) Species.</b> Do federal/state-listed T/E plant or animal species occur within the Wetland? Complete the following questions to answer this metric.</p> <p>a. <input type="checkbox"/> YES <input type="checkbox"/> NO Has an approved T/E survey been completed? If "Yes," go to question b. If "No," go to question c.</p> <p>b. <input type="checkbox"/> YES <input type="checkbox"/> NO Does the T/E survey indicate T/E species present within the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric.</p> <p>c. <input type="checkbox"/> YES <input type="checkbox"/> NO Has the Evaluator (or others known to the Evaluator) observed any T/E species within the Wetland? If "Yes," answer "Yes" to this metric. If "No," go to question d.</p> <p>d. <input type="checkbox"/> YES <input type="checkbox"/> NO Does the DNRE Endangered Species Assessment (ESA) web site interactive map, <a href="http://mcgi.state.mi.us/esa">mcgi.state.mi.us/esa</a>, indicate that there is a potential for unique natural features at or near your site of interest?" If "No," answer "No" to this metric. If "Yes," request a DNRE formal review by submitting the online form. Type "MiRAM" within the "Project Information" field on the form. Go to question e.</p> <p>e. <input type="checkbox"/> YES <input type="checkbox"/> NO Did the DNRE review confirm potential T/E occurrence in the Wetland? If "Yes," answer "Yes" to this metric. If "No," answer "No" to this metric.</p> <p><b>The Evaluator may proceed with the Narrative Rating and Quantitative Rating while waiting for a formal response from DNRE.</b></p>	<p><input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>If "yes", the Wetland has <b>high functional value</b>.</p>
<p><b>3. Rare Wetland Natural Community Type.</b> Are more than 5 acres or more than 25% of the Wetland comprised of a Rare Wetland Natural Community Type*? Check (√) all Rare Wetland Natural Community Types</p> <p><input type="checkbox"/> <b>S1 or S2 Natural Community Type.</b> Has the Wetland been identified by the Evaluator — or other persons — as being an S1 or S2 natural community type as defined by the Michigan Natural Features Inventory (MNFI)? See the <i>MiRAM User's Manual</i> for more information.</p> <p><input type="checkbox"/> <b>Southern Bog</b>, defined as any bog occurring <u>below the northern limit</u> of Michigan's Floristic Tension Zone (see figure for approximate location).</p> <p><input type="checkbox"/> <b>Old-Growth/Mature Forested Wetland.</b> Lacks evidence of any significant harvesting. Dominated by large, overstory trees (mean overstory DBH ≥20 inches, including at least two trees/acre having DBH ≥28 inches) and the canopy is multi-aged and multi-layered. Aggregations of canopy trees are interspersed with canopy gaps and large snags. Large nursery logs and tip-up mounds litter the forest floor. Does the forested Wetland have all/most of these characteristics?</p> <p><small>*If the Rare Wetland Community Type is less than 5 acres and less than 25% of the Wetland, the rare community should be split off and evaluated separately.</small></p>	<p><input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>If "yes", the Wetland has <b>high functional value</b>.</p>  <p>Floristic Tension Zone</p>
<p><b>4. Great Lakes Coastal Wetland.</b> Is any part of the Wetland within 1,000 feet of the ordinary high water mark of any of the Great Lakes, including Lake St. Clair?</p>	<p><input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>If "yes", the Wetland has <b>high functional value</b>.</p>

# Quantitative Rating

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

## Metric 1. Wetland Size and Distribution

Maximum 9 points.

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

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



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

## Metric 2. Upland Buffers and Intensity of Surrounding Land Use

Maximum 12 points.

2a. Average Buffer Width around the Wetland's Perimeter			Score
<p><b>Step 1:</b> Using the most recent aerial photograph available, sketch a 150-foot wide "buffer zone" around the Wetland.</p> <p><b>Step 2:</b> Estimate the buffer widths from the Wetland's edge to any non-buffer areas (up to 150 feet).</p> <p><b>Step 3:</b> Average the buffer widths along the Wetland's perimeter.</p> <p><b>Step 4:</b> Select the buffer width that is most appropriate. <b>Maximum 6 points.</b></p> <p><b>Buffers Include:</b></p> <ul style="list-style-type: none"> <li>shrubland, young forest, natural grassland, prairie</li> <li>abandoned row crop field (vegetated &amp; naturalizing)</li> <li>hay field (non-row crop), lightly grazed pasture</li> <li>lightly managed forest (selectively logged)</li> <li>designated wildlife area, lightly managed parkland</li> <li>other wetland, lake, river</li> </ul> <p><b>Non-Buffers Include:</b></p> <ul style="list-style-type: none"> <li>lawns, golf courses, manicured parkland</li> <li>residential, commercial, industrial</li> <li>roadways (including shoulders), parking lots</li> <li>row crop field</li> <li>conservation tillage, heavily grazed pasture</li> <li>clear-cutting, mining, construction activity</li> </ul>			
Wide Buffer Width:	≥150 feet around the perimeter	6 pts	
Medium Buffer Width:	75 to <150 feet around the perimeter	4 pts	
Narrow Buffer Width:	25 to <75 feet around the perimeter	2 pt	
Very Narrow Buffer Width:	0 (no buffer) to <25 feet around the perimeter	0 pt	

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

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

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

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

Type of Land Use	Examples within each Type of Land Use		Score
<b>Very Low Intensity:</b>	<ul style="list-style-type: none"> <li>maturing forest</li> <li>natural grassland, prairie</li> </ul>	<ul style="list-style-type: none"> <li>designated wildlife area</li> <li>other wetland, lake, river</li> </ul>	6 pts
<b>Low Intensity:</b>	<ul style="list-style-type: none"> <li>shrubland/young forest</li> <li>recent selective logging</li> <li>hay field (non-row crop)</li> </ul>	<ul style="list-style-type: none"> <li>lightly managed parkland</li> <li>old field, lightly grazed pasture</li> <li>one-lane road/two track</li> </ul>	4 pts
<b>Moderately High Intensity:</b>	<ul style="list-style-type: none"> <li>residential &amp; lawns</li> <li>manicured parkland</li> <li>golf course</li> </ul>	<ul style="list-style-type: none"> <li>conservation tillage</li> <li>recent clear-cut (&lt;10 years)</li> <li>two-lane road</li> </ul>	2 pts
<b>High Intensity:</b>	<ul style="list-style-type: none"> <li>commercial, industrial</li> <li>high-density residential</li> <li>heavily grazed pasture</li> <li>row crop field</li> </ul>	<ul style="list-style-type: none"> <li>multi-lane paved roadway</li> <li>construction activity</li> <li>parking lot</li> <li>mining</li> </ul>	1 pt



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

**Metric 3. Hydrology**

Limited to 26 points.

<b>3a. Sources of Water: Select <u>all that apply</u>. Maximum 8 points.</b>		Score
<b>Precipitation:</b> Directly and/or as runoff from upland areas.	1 pt	
<b>Groundwater:</b> Seeps or evidence, such as significant amounts of skunk cabbage ( <i>Symplocarpus foetidus</i> ) or other fen-adapted species.	2 pts	
<b>Seasonal/Intermittent Surface Water:</b> 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	
<b>Perennial Surface Water:</b> Perennial inundation from a lake, stream or pond.	5 pts	

<b>3b. Connectivity: Select <u>all that apply</u>. Maximum 8 points.</b>		Score
<b>100-Year Floodplain.</b> As defined in the Floodplain Authority under Part 31 of the NREPA.	2 pts	
<b>Between a Stream/Lake/Pond and Human Land Use.</b> 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	
<b>Wetland/Upland Complex.</b> 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	
<b>Riparian Corridor.</b> 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	

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

<b>3d. Alterations to Natural Hydrologic Regime</b>		Score											
This submetric evaluates the intactness of the natural hydrologic regime of the Wetland. Check (✓) all forms of past or ongoing hydrologic alteration(s) that are potentially influencing the Wetland. <table border="0" style="width: 100%;"> <tr> <td><input type="checkbox"/> ditch(es) in or near the wetland</td> <td><input type="checkbox"/> point source discharge(s) (non-stormwater)</td> </tr> <tr> <td><input type="checkbox"/> tile(s) in or near the wetland</td> <td><input type="checkbox"/> filling/grading activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/> dike(s) in or near the wetland</td> <td><input type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/> weir(s) in or near the wetland</td> <td><input type="checkbox"/> dredging activities in or near the wetland</td> </tr> <tr> <td><input type="checkbox"/> stormwater inputs (addition of water)</td> <td><input type="checkbox"/> other (specify)</td> </tr> <tr> <td><input type="checkbox"/> stream channelization</td> <td><input type="checkbox"/> other (specify)</td> </tr> </table> <p>Evaluate whether an alteration is significant or minor in relation to the Wetland's overall area and hydrologic regime. For this submetric, "significant" is defined as affecting approximately 10% or greater of the Wetland. "Minor" is defined as affecting less than approximately 10% of the Wetland. A hydrologic alteration may also impact the Substrate/Soil (submetric 4a) and/or Habitat (submetric 4b).</p> <p>Select an option below that best describes the extent of (or lack of) alteration(s) to the Wetland's natural hydrologic regime. If uncertain, select adjoining options and average the available points. Round to the nearest 0.5 increment. If the Wetland's natural hydrologic regime has been significantly altered, it shall receive no more than 6 points for this submetric. <b>Maximum 8 points.</b></p>			<input type="checkbox"/> ditch(es) in or near the wetland	<input type="checkbox"/> point source discharge(s) (non-stormwater)	<input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> filling/grading activities in or near the wetland	<input type="checkbox"/> dike(s) in or near the wetland	<input type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland	<input type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland	<input type="checkbox"/> stormwater inputs (addition of water)	<input type="checkbox"/> other (specify)	<input type="checkbox"/> stream channelization
<input type="checkbox"/> ditch(es) in or near the wetland	<input type="checkbox"/> point source discharge(s) (non-stormwater)												
<input type="checkbox"/> tile(s) in or near the wetland	<input type="checkbox"/> filling/grading activities in or near the wetland												
<input type="checkbox"/> dike(s) in or near the wetland	<input type="checkbox"/> road bed(s)/RR grades(s) in or near the wetland												
<input type="checkbox"/> weir(s) in or near the wetland	<input type="checkbox"/> dredging activities in or near the wetland												
<input type="checkbox"/> stormwater inputs (addition of water)	<input type="checkbox"/> other (specify)												
<input type="checkbox"/> stream channelization	<input type="checkbox"/> other (specify)												
<b>No Hydrologic Alterations Apparent:</b>	There has been no significant alteration(s) to the Wetland's natural hydrologic regime, and/or ongoing minor alteration(s) is/are rare.	8 pts											
<b>Recovered:</b>	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											
<b>Recovering:</b>	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											
<b>Recent or No Recovery:</b>	Multiple significant hydrologic alterations have occurred in the 20 years prior to the assessment, and/or significant alteration(s) is/are ongoing.	1 pt											

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

## Metric 4. Habitat Alteration and Habitat Structure Development

Maximum 20 Points.

### 4a. Substrate/Soil Disturbance

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

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

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

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

		Score
<b>No Substrate Disturbance Apparent:</b>	There has been no significant disturbance to the Wetland's substrate and/or ongoing minor disturbance events are rare.	4 pts
<b>Recovered:</b>	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
<b>Recovering:</b>	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
<b>Recent or No Recovery:</b>	Multiple significant substrate disturbance events have occurred in the 20 years prior to the assessment, and/or significant disturbance is ongoing.	1 pt

### 4b. Habitat Alteration

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

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

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

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

		Score
<b>No Habitat Alterations Apparent:</b>	There has been no significant alteration to the Wetland's natural habitat, and/or ongoing minor alteration(s) is/are rare.	9 pts
<b>Recovered:</b>	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
<b>Recovering:</b>	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
<b>Recent or No Recovery:</b>	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
<b>Excellent:</b>	Wetland appears to represent the best of its type.	7 pts
<b>Good:</b>	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
<b>Fair:</b>	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
<b>Poor:</b>	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**

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

<b>5b. Forested Wetland. 5 points.</b>	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.	

<b>5c. Urban/Suburban Wetland. 5 points.</b>	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.	

<b>5d. Low-Quality Wetland. Negative 10 points.</b>	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.	

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

## Metric 6. Vegetation, Interspersion, and Habitat Features

Maximum 20 points.

### 6a. Wetland Vegetation Components

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

**Qualitative Cover Scoring Table**

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

**Forest Overstory Component**, qualitative cover score derived from table **maximum 3 points**.

Forested wetland areas are characterized by a group of trees at least 3 inches in DBH, regardless of height. The Wetland does not have a forested component if the trees are widely scattered (e.g., a savanna), located only thinly along the Wetland's margin, or if it is clear that most of the trees are actually located on upland around the perimeter of the Wetland.

**Score**

**Shrub/Sapling Component**, qualitative cover score derived from table **maximum 3 points**.

Shrub/Sapling wetland areas are dominated by clusters of woody plants less than 3 inches in DBH and greater than 3.28 feet in height. Species include true shrubs, young trees, and stunted trees. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.

**Score**

**Herbaceous Component**, qualitative cover score derived from table **maximum 3 points**.

Herbaceous wetlands are areas dominated by dense patches of erect, non-woody plants, regardless of size, and woody plants less than 3.28 feet in height. The MiRAM includes the robust-stemmed yellow pond lily (*Nuphar advena*) and American lotus (*Nelumbo lutea*) within the herbaceous component because of their tendency to hold their stems and leaves well above the water. All floating-leaf species (including *Nymphaea* spp.) are excluded from the herbaceous component, and are instead included within the open water component (see Submetric 6b).

**Score**

### 6b. Open Water Component

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

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

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

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

### 6c. Coverage of Highly-Invasive Plant Species

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

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

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

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

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

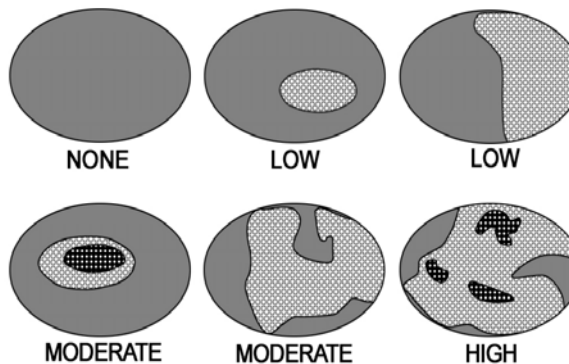
**Non-native, Invasive:** Hybridization may have occurred if most plants within the same local stand do not cleanly fit the characteristics of either pure species described above. The gap between the male and female portions of the flower spikes is highly variable, with many plants within the same local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

Estimate the total coverage. <b>Maximum 1 point.</b>			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	
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 <u>moderate</u> degree of interspersion	3 pts	
Wetland has a <u>low</u> degree of interspersion	1 pt	
Wetland has <u>no</u> interspersion	0 pt	

**6e. Habitat Features**

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

<b>1. Hummocks/Tussocks/Tree Mounds</b> , 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	

<b>2. Coarse Woody Debris (CWD)</b> . 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	

<b>3. Large Standing Trees, Living or Dead (≥12 inches DBH).</b>				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	

<b>4. Amphibian Breeding/Nursery Habitat</b> , 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	

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

## Metric 7. Scenic, Recreational, and Cultural Value

Maximum 3 points.

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

	<b>Metric 7 Total</b> (3 points max.)
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## MiRAM Summary

### Narrative Rating

- |   |  |
|---|--|
| Question 1: U.S. Fish and Wildlife Service (USFWS) Critical Habitat | <input type="checkbox"/> YES <input type="checkbox"/> NO |
| Question 2: Threatened or Endangered (T/E) Species Habitat          | <input type="checkbox"/> YES <input type="checkbox"/> NO |
| Question 3: Rare Wetland Natural Community Type                     | <input type="checkbox"/> YES <input type="checkbox"/> NO |
| Question 4: Great Lakes Coastal Wetland                             | <input type="checkbox"/> YES <input type="checkbox"/> NO |

### Quantitative Rating

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

**Grand Total**  
*Add totals from  
all seven metrics*

	<b>100 Max.</b>
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Scoring comments: