

## MARYLAND WETLAND ECOLOGICAL INTEGRITY ASSESSMENT: Piedmont Region

Project/Site Name: _____	City/County: _____	Sampling Date: _____
Assessment Area Name (if >1 AA): _____	Observer(s): _____	
Delineation performed: <input type="checkbox"/> previously <input type="checkbox"/> concurrently Lat/Long: _____ AA size: _____ units _____		
<b>Site Description:</b> (general landscape setting, overview of riparian corridor, presence of braided/multithread system, topography including karst, vegetation patterns, complexity and habitat richness; human and natural disturbance as indicated by spoil piles, beaver activity, dumping, vegetation removal, pest impacts, excessive flow; description of adjacent stream and sources/evidence of water input or alterations such as culverts, roads/trails, sediment). Representative site photographs of soil, nearest stream channel and banks, and vegetation are useful to show the features present.		

### LANDSCAPE ASSESSMENT FOR PROJECT AREA (Section 3; office and field assessment)

Field observations to assist with scoring of buffers, aquatic context, or size of AA:	
<b>METRIC</b>	<b>SCORE</b> (use Section 3 tables to assign scores)
Buffer Perimeter: %Natural: <input type="checkbox"/> >95% <input type="checkbox"/> 85-95% <input type="checkbox"/> 75-84% <input type="checkbox"/> <75%	
Buffer Condition: %Natural: <input type="checkbox"/> >90% <input type="checkbox"/> 75-90% <input type="checkbox"/> 50-74% <input type="checkbox"/> <50%	
Aquatic Context: <input type="checkbox"/> 4 or more aquatic resources <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 0-1	
Comparative Size: <input type="checkbox"/> Very large <input type="checkbox"/> Large <input type="checkbox"/> Medium to small <input type="checkbox"/> Small to very small	
Source(s) of size reduction, if any: <input type="checkbox"/> Beaver dam or lodge <input type="checkbox"/> Trail <input type="checkbox"/> Road <input type="checkbox"/> Railroad <input type="checkbox"/> Development <input type="checkbox"/> Agriculture <input type="checkbox"/> Impoundment <input type="checkbox"/> Human-constructed drainage (into or out of wetland) <input type="checkbox"/> Excavation <input type="checkbox"/> Fill <input type="checkbox"/> Groundwater extraction <input type="checkbox"/> Other _____	
From StreamStats: Impervious Surface in project area basin: _____ Forest Cover in project area basin: _____ %limestone geology: _____	
Additional channels in project area visible on LiDAR Hillshade image: _____	

### WETLAND ASSESSMENT AREA ONLY:

#### ENVIRONMENTAL INFORMATION (Section 4.2)

Slope (deg/%): \_\_\_\_\_ Aspect (if applicable): \_\_\_\_\_

**Landscape Position:** Indicate all features present.

<input type="checkbox"/> Active floodplain (depression or terrace)	<input type="checkbox"/> Beaver pond/Natural impoundment	<input type="checkbox"/> Riparian-Depression (in floodplain)	<input type="checkbox"/> Riparian terrace (outside seasonal flooding; historic floodplain or current terrace)
<input type="checkbox"/> Headwater stream/spring	<input type="checkbox"/> Seep/groundwater discharge site	<input type="checkbox"/> Swale	<input type="checkbox"/> Isolated Depression
<input type="checkbox"/> Oxbow	<input type="checkbox"/> Wetland charged by groundwater seeps	<input type="checkbox"/> Streambank	<input type="checkbox"/> Point bar
<input type="checkbox"/> Flats	<input type="checkbox"/> Braided Channels	<input type="checkbox"/> Other- describe	

**Water Source:** If more than one source is present, label as P (primary), S (Secondary), T (tertiary)

<input type="checkbox"/> Direct precipitation	<input type="checkbox"/> Groundwater discharge	<input type="checkbox"/> Natural surface flow	<input type="checkbox"/> Urban run-off/culverts
<input type="checkbox"/> Overbank flooding	<input type="checkbox"/> High groundwater	<input type="checkbox"/> Irrigation	<input type="checkbox"/> Pipes/outfall (directly feeding wetland)

**Hydrological Regime:** Circle the regime that best matches the conditions in the AA (see Manual for definitions)

H Permanently Flooded	G Intermittently Exposed	F Semipermanently Flooded	C Seasonally Flooded	E Seasonally Flooded-Saturated
B Seasonally Saturated	D Continuously Saturated	A Temporarily Flooded	I Intermittently Flooded	K Artificially Flooded

**Observations/Comments:**

**CLASSIFICATION OF AA TO KEY WILDLIFE HABITAT AND HGM CLASS** (Section 4.3)

Key Wildlife Habitat: \_\_\_\_\_ HGM Class: \_\_\_\_\_

Optional: NVC Community Type/Plant Association: \_\_\_\_\_

Stream Key Wildlife Habitat Type:  Piedmont Stream  Coldwater Stream  Limestone Stream  Piedmont River**SOIL/SUBSTRATE** (Section 4.4)Note: if the floodplain does not naturally have hydric soils and/or does not have functional hydric soils under current conditions, only score Microtopography, Organic Matter Accumulation, and Soil Disturbance.

<b>Mapped Soil Type:</b> _____ <b>Depth to water table</b> _____ <b>Hydric soil?</b> _____ <b>Hydric Soil Indicators:</b> _____ <b>Depth of O horizon</b> _____ <b>Depth of A horizon</b> _____ <b>Extensive roots in soil?</b> _____ <b>Soil Matrix Hue Value/Chroma</b> _____ Note any deviations from the characteristics described for the mapped soil type for this AA and potential causes. Describe any impacts to the soil surface such as trampling/compaction from animals or machinery, ruts or other disturbances from ATV or other vehicular activity, or sedimentation. <b>Observations/Comments (including for metrics below):</b>   
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**Soil Biogeochemical Processing:**

**Redox concentrations:** >10% surface area and  start 0-6" from soil surface  start >6-12"  start >12-18"  
 <10% surface area and  start 0-6" from soil surface  start >6-12"  None within 18" **Score:** \_\_\_\_\_

**Soil Organic Matter:**  Horizon present (any thickness)  Mineral surface layer(s)  $\geq 4"$  thick with matrix value  $\leq 3$  and chroma  $\leq 2$   
 Mineral surface layer <4" thick and  Matrix value  $\leq 3$  and chroma  $\leq 2$   Matrix value >3 and  $\leq 4$  or chroma >2 and  $\leq 3$  **Score:** \_\_\_\_\_

**Microtopography:**   $\geq 50\%$  of Assessment Area  30-49% of AA  10-29% of AA  <10% of AA **Score:** \_\_\_\_\_

**Organic Matter Accumulation:** Estimated ground cover of herbaceous/woody plants (living and dead residue): \_\_\_\_\_%  
 Estimated cover of leaf litter (loose leaves must be at least 1" thick or decaying leaves must have at least 5 stacked layers): \_\_\_\_\_%  
 % herbaceous/woody + % leaf litter:  >75%  >50-74%  >25-50%   $\leq 25\%$  **Score:** \_\_\_\_\_

**Soil Disturbance:** Presence of bare soil due to human activities:  None/minimal  Minor/small patches  Moderate  Substantial  
 Extent of impact of disturbance:  None  Minimal  Moderate  Extensive

Depth of disturbance and ponding/channeling:  None  <2"  2-4", some ponding/channeling  >4", ponding/channeling **Score:** \_\_\_\_\_

**HYDROLOGY** (Section 4.5)**Water Source**— Identify dominant water source and natural/unnatural influence for the AA by KWH type.

**Natural:**  Sheet flow present  Natural narrow channel present  Mimics natural hydrology  Coldwater spring flow  Groundwater input  Expected overbank flooding  Expected plant community  Other \_\_\_\_\_

**Unnatural/Manipulated:**  Impoundment  Inflow from anthropogenic sources  Fill  Ditching  Channelization  Confined to small outlet  Lost water sources due to alterations  Multiple sources and some degraded  Incised and no longer floods  Other \_\_\_\_\_

**Point Source Discharge** (into or adjacent to site):  Lacking  Minor  Moderate  Major

**Unnatural Obstructions** (to ground or surface water):  None  Minor (<25%)  Moderate (25-75%)  Major (>75%)

**Alteration to:**  Overland Flow  Groundwater  Overbank Flooding  Plant Community  Wetland Extent input

Timing:  Recent (within 5 years)  Historic  Permanent hydrologic change

Negative effect:  AA Flow and circulation  Redirects or confines flows into/through AA  Reduced water table  Reduced inundation  None

**Score:** \_\_\_\_\_**Observations/Comments:****Stream Bank and Channel** – Describe the stream channel in the project area, including evidence of alteration and signs of recovery/stabilization.

**Evidence of bank/channel equilibrium:**  Recovering to meander  Low energy stream with bare banks  Variety of pool depths  Variety of stream velocities  Visual flow of water from channel banks or wetlands (groundwater flow)  Embedded woody debris of size and amount consistent with what is available in riparian area  Well-defined usual high water line with obvious floodplain  Little or no active undercutting or burial of riparian vegetation  Other \_\_\_\_\_

**Evidence of channel instability/migration:**  Riparian vegetation buried  Recent sediment or gravel deposited  Active incision/downcutting  Buried hydric soil and/or gravel layer and depth \_\_\_\_\_  Other \_\_\_\_\_

**Overall channel instability:**  None/minimal  Minor  Moderate  Substantial

**Sources of channel instability/migration:**  Lacks vertical controls (vegetation, wood, rock, etc.)  Excessive channel deposition/bar development  Historic channel alteration  Proximity and landscape position presents potential impact to AA hydrology  Other \_\_\_\_\_

**Evidence of bank instability:**  Banks undercut, slides, and/or slumps  Riparian vegetation declining  Shrub/trees falling into channel  Bank uniformly scoured and unvegetated  Other \_\_\_\_\_

**Overall bank instability:**  None  Minimal  Minor  Moderate  Substantial

**Sources of bank instability:**  Vertical banks  Highly erodible materials  Raw unvegetated banks  Excessive bedload  Other \_\_\_\_\_

If available: Bank Erosion Hazard Index \_\_\_\_\_ Near Bank Stress \_\_\_\_\_ **Score:** \_\_\_\_\_

**Aquatic Life:** (if available for site or use nearest, most recent Biological Stream Survey point in stream):

Benthic IBI- Value \_\_\_\_\_ Rating:  Good ( $\geq 4$ )  Fair (3-3.99)  Poor  $<3$  Fish IBI- Value \_\_\_\_\_ Rating:  Good ( $\geq 4$ )  Fair (3-3.99)  Poor  $<3$

**Observations/Comments:**

**Hydroperiod and Hydrologic Connectivity** – Determine the natural variability and/or recent alteration of the duration, frequency, and magnitude of inundation/saturation in the AA by KWH type.

**Natural variation of hydroperiod:**  Low  High

Information Sources:  Visual indicators  Monitoring Wells  Hydrology/Hydraulic analysis  Bank Height Ratio \_\_\_\_\_ Entrenchment Ratio \_\_\_\_\_

**Overbank flooding** (if available):  2-year storm  10-year  100-year

**Degree of connection to floodplain:**  Complete **Disconnection/entrenchment:**  Minimal  Moderate  Disconnected and/or severely entrenched

**Evidence of overbank flooding:**  Recent  Evidence of overbank flooding  Some evidence, likely during large storm events  Generally no longer occurs

**Change/Alteration of hydroperiod:**  None  Due to natural events  Due to human influences:  Minor  Moderate  Substantial

Backwater flooding or lateral movement affected by restrictions: List restrictions: \_\_\_\_\_

**Score:** \_\_\_\_\_

**Observations/Comments:**

### KEY WILDLIFE HABITAT (Section 4.6)

**Interspersion/Patch Richness** – interspersion of vegetation patches **and** number of different obvious types of physical surfaces or features that may provide habitat for aquatic, wetland, or riparian animal species.

**Interspersion of habitats/physical features** (see examples):  High  Moderate  Low or Minimal  None or Few

**Features present:**  Spring or upwelling groundwater  Depression  Vegetated pool  Unvegetated pool  Unvegetated flat  Island  Animal mound or burrow  Beaver dam or lodge  Beaver-chewed vegetation  Oxbow, swale, secondary channel  Wind-thrown tree hole  Mound  Bank overhang with tree roots  Tip-up tree root mound  Brush piles  Abundant deciduous leaf litter  Partially buried natural debris  Debris jam  Plant hummock/tussocks

Other wildlife habitat Wildlife species observed: \_\_\_\_\_

**Score:** \_\_\_\_\_

**Observations/Comments:**

**Vertical Structure** – Refer to metrics for selected Key Wildlife Habitat Type for scoring.

**Forested systems: Canopy:** Heterogeneous patches of different ages or sizes:  Yes  Mostly  Somewhat  No

Gaps of varying sizes  Impacted by beaver activity  Impacted by forest pests/pathogens

**Woody vertical layers:**  Multiple layers present  One layer missing or homogeneous   $>1$  layer missing, little variation  Only 1-2 layers present

**Large trees** (DBH  $> 60$  cm or 24") present:   $\geq 10\%$    $< 10\%$

**Trees present** with DBH  $> 30$  cm or 12":   $\geq 20\%$    $< 20\%$

**Degradation** due to cutting, browsing, pests/pathogens:  Minimal  Moderate  Extensive Source(s) of degradation: \_\_\_\_\_

**Seepage wetland: Woody layer mortality (if layer present):**  Due to natural factors  Minor human-caused  Moderate human-caused

Extensive human-caused  Impacted by forest pests/pathogens  Impacted by browsing/grazing

**Expected structure:**  Present  Minor alteration  Moderate Alteration  Extensive Alteration

**Score :** \_\_\_\_\_

**Observations/Comments:**

**Standing and Downed Coarse Woody Debris** – Refer to metrics for selected Key Wildlife Habitat type for scoring.

**Forested systems: Standing snags and downed logs: Size diversity:**  High  Moderate  Moderate-low  Low

**Stage of downed log decay:**  Variable including advanced stage  Variable with few advanced  Variable with no advanced  Low variability

Source(s) of woody debris if not natural (cutting, pest/pathogens, etc.): \_\_\_\_\_

**Seepage wetland: Woody and/or litter:**  Typical  Human-caused alteration Minor  Moderate  Substantial  Impacted by forest pests/pathogens

**Ground cover alterations:**  None  Minor  Moderate  Substantial

**Score:** \_\_\_\_\_

**Observations/Comments:**

**VEGETATION** (Section 4.6) Additional species may be listed on a separate sheet. See Scoring Sheet for %cover examples.

**NOTE: Include native diagnostic, disturbance indicator, and state rare, threatened, and endangered species regardless of %cover.**

Species:	Absolute % Cover	Species:	Absolute % Cover
<b>Tree Stratum: woody plants, excluding woody vines, 3 in. (7.6 cm) or larger DBH (any height)</b>			
1.		5.	
2.		6.	
3.		7.	
4.		8.	
<b>Sapling/Shrub Stratum: woody plants, excluding woody vines, less than 3 in. (7.6cm) DBH and greater than 3.28 ft (1 m) tall</b>			
1.		7.	
2.		8.	
3.		9.	
4.		10.	
5.		11.	
6.		12.	
<b>Herb Stratum: all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and all other plants less than 3.28 ft (1 m) in height</b>			
1.		11.	
2.		12.	
3.		13.	
4.		14.	
5.		15.	
6.		16.	
7.		17.	
8.		18.	
9.		19.	
10.		20.	
<b>Woody Vine Stratum: all woody vines, regardless of height</b>			
1.		4.	
2.		5.	
3.		6.	

**KWH VEGETATION COMPOSITION** (Use tables in Section 4.6 to assign scores).

**Invasive Species:**  
**Maximum invasive species cover in any one woody layer (if present):**  <1%  1- 5%  >5-10%  >10%  
**Absolute cover of invasive/disturbance species in herbaceous layer:**  <1%  1-5%  >5-30%  >30% **Score:** \_\_\_\_\_  
 Observations/Comments:

**Native Species:** *Refer to metrics for selected Key Wildlife Habitat Type for scoring.*  
**Woody layer (if present):**  Dominated by diagnostic native species  Some diagnostic species absent/reduced  Few diagnostic species  Few/no diagnostic species present  
**Herbaceous layer:**  Dominated by diagnostic native species  Some diagnostic species absent/reduced  Few diagnostic species  Few/no diagnostic species present  
**Cover of native species indicative of disturbance:**  0-1%  2-10%  >10-30%  >30%  
**Seepage Swamp/Springs: Sphagnum cover -**  Continuous/abundant  Absent from small areas  Reduced  Very low **Score:** \_\_\_\_\_  
 Observations/Comments:

**Alterations/Stressors:** *Indicate stressors and alterations affecting the observed vegetation composition of the AA.*  
 Recent timber harvest (clearcut or selective cut)  Tree plantation  Mowing or shrub cutting  Herbicide use  Trampling/ORV  Excessive animal herbivory  Pest damage  Unnatural fire regime  Trash/dumping  
 Other \_\_\_\_\_  
**Suggestions for improving native species cover and natural vegetation composition** \_\_\_\_\_  
 \_\_\_\_\_  
**Observations/Comments:** \_\_\_\_\_

**Floristic Quality Assessment:** *(see Excel data sheet or manual for calculation):*  
**Native mean C-value** \_\_\_\_\_ :  >4  3-4  <3-2  <2  
**Adjusted FQI** \_\_\_\_\_ **Score:** \_\_\_\_\_

## MARYLAND WETLAND ECOLOGICAL INTEGRITY ASSESSMENT: Piedmont Region SCORING FORM

Project/Site Name: \_\_\_\_\_ City/County: \_\_\_\_\_ Sampling Date: \_\_\_\_\_

Assessment Area Name (if >1 AA): \_\_\_\_\_ Observer(s): \_\_\_\_\_

**Scoring Scale: 3.5- 4 = Excellent 2.5-3.49 = Good 1.5-2.49 = Fair 1-1.49 = Poor**

Core Factor	Metric	Metric Score	Mean Core Factor Score	Weighting Factor	Overall Core Factor Score (Mean Core Factor Score X Weighting Factor)
Landscape (Assessment for project area)	Buffer Perimeter		(Sum of metric scores: _____) / 4 = _____	0.3	
	Buffer Condition				
	Aquatic Context				
	Comparative Size				
Soil/Substrate* <small>* If only Microtopography, Organic Matter Accumulation, and Soil Disturbance were scored, divide by 3 rather than 5</small>	Redox Concentrations		(Sum of metric scores: _____) / 5 or /3* = _____	0.1	
	Microtopography				
	Soil Organic Matter				
	Soil Disturbance				
Hydrology	Water source		(Sum of metric scores: _____) / 3 = _____	0.2	
	Channel				
	Hydroperiod and Hydrologic Connectivity				
Key Wildlife Habitat and Vegetation Composition	Interspersion/Patch Richness		(Sum of metric scores: _____) / 6 = _____	0.4	
	Vertical Structure				
	Coarse Woody Debris				
	Invasive Species				
	Native Species Composition				
	Floristic Quality Assessment				
<b>Sum of Overall Core Factor Scores = Overall KWH Ecological Integrity Assessment (EIA) Score:</b>					
<p><b>Note the presence of these unique features in the project area using the check boxes.</b>  <b>Add additional Points IF the Overall EIA score is not "Excellent" for each of the following:</b>  <u>From WRR layers (see Manual Section 3.5): Mark all categories present in WRR layers. Assign the single highest score for a maximum of +0.2 for WRR layers:</u>  <input type="checkbox"/> Nontidal Wetlands of Special State Concern (+ 0.2)  <input type="checkbox"/> Biodiversity Conservation Network Tier 1, 2, or 3 (+ 0.2)  <input type="checkbox"/> Forest Interior Dwelling Species (FIDS) area: Class 1 (+ 0.1)  <input type="checkbox"/> Targeted Ecological Area (+ 0.1)  <input type="checkbox"/> Sensitive Species Project Review Area (+ 0.1)  <u>From MDE Tier II High Quality Waters (Section 3.5):</u>  <input type="checkbox"/> Upstream of, within, or adjacent to Tier II High Quality stream segment (+ 0.2)  <u>From StreamStats (see Manual Section 3.5):</u>  <input type="checkbox"/> Impervious surface area for project area basin is low (&lt; 5%) (+ 0.2)  <input type="checkbox"/> Forest cover in project area basin is &gt;90% (+ 0.2)  <u>From field observations (see Manual Section 5.1):</u>  <input type="checkbox"/> Maryland nontidal wetland(s) with significant plant or wildlife value (as defined by COMAR 26.23.01.01B80) but not designated as a Nontidal Wetland of Special State Concern (add + 0.2 for each wetland to the Overall EIA score)  <input type="checkbox"/> State rare, threatened, or endangered plants or state rare natural community noted during field data collection but not mapped in Biodiversity Conservation Network Tier 1, 2, or 3 (+ 0.2)  <input type="checkbox"/> Sensitive species (colonial waterbird nesting colony, native mussel bed, anadromous fish) (+ 0.1)  <input type="checkbox"/> Dominated by native trees greater than 30cm or 12" diameter at breast height (+ 0.1)  <input type="checkbox"/> Dominated by hard mast (i.e., acorns and nuts) producing native species in the tree stratum (+ 0.1)</p>					
<b>FINAL Key Wildlife Habitat Ecological Integrity Assessment SCORE and RATING:</b> _____					

Comments: