Draft Stream Buffer Quality Assessment Instructions

For Maryland Stream Mitigation Framework Version 1

February 2022

I. Summary

Through the Maryland Stream Mitigation Framework Version 1 (MSMF V.1.), stream mitigation credits (functional feet) may be awarded for improvements to stream buffer areas within 200 feet of perennial stream channels and 100 feet of intermittent and ephemeral channels measured from the edge of water during baseflow conditions. The process of identifying assessment areas and performing the Stream Buffer Quality Assessment are described below. Note that existing score values apply to initial conditions before mitigation work is performed, and proposed conditions should apply estimated conditions at the end of the monitoring period (10 years) after work is completed. Monitoring will occur throughout the monitoring period to ensure a site is tracking towards proposed values at year 10, and adjustments will be made to final values and crediting regarding deviations from the proposed values.

Note: Throughout this document, the phrase "conservation easement boundaries" as this is the preferred site protection approach. For the purpose of this instructional document, the phrase is used broadly referring to the project boundaries, areas in a (proposed)deed restriction or conservation easement, or areas on public lands that are within the project work area. The phrase refers to areas that must be protected after work is performed.

II. Materials

To perform the stream buffer quality assessment, the following materials are needed: Known area of work or proposed conservation easement boundary, mapped utility easements and infrastructure, Wetland delineation manual and appropriate regional supplements, wetland data forms, wetland plant lists, vegetation identification books, soil auger or shovel, alpha alpha dipyridyl strips, transect tape and laser level with stakes (or total station), notebooks, a copy of the MSMF V.1. Stream Buffer Quality Assessment Instructions (this document), and copies of the MSMF V.1. Stream Buffer Assessment Form. An detailed map of site terrain may also be helpful.

Useful links (See References):

Maryland Watershed Resources Registry

Maryland State List of Invasive Plants

III. Process

1) Top Section of MSMF V.1. Stream Buffer Quality Assessment

a. Fill out prior to steps 2-4:
   i. Project Name
   ii. Credited Stream Buffer Area (CSBA) Name: CSBA name (*Example: "Reach 1 buffer", See Step 3 for CSBA definition*)
   iii. Assessors: Name of those who completed the Assessment
   iv. Date: Date assessment was performed
   v. Lat/Long: Coordinates in decimal degrees
   vi. Corps application/permit number: *if known*

b. Fill out during steps 2-4:
   i. Stream Buffer Assessment Area (SBAA) (Acres): *See Step 2 below to determine the SBAA.*
   ii. Infrastructure Area (Acres): All utilities, surface and subsurface utility easements, buildings, pavilions, or other constructed items in the SBAA. *See Step 2 below and Metric 2 in Section IV.*
   iii. Wetland Area (Acres): Wetland acreage in the SBAA following delineation.
   iv. Area Credited by other programs (Acres): Any areas credited as forest conservation, etc., within the SBAA).
   v. CSBA (Acres): After identifying the Credited Stream Buffer Area (CSBA) boundaries (*see Step 3*), list the acreage of the CSBA.

c. Fill out upon assessment completion:
   i. Existing Buffer Quality (%): Tally all Existing Condition scores for Metrics 1-9 to determine the Existing Condition Score.
   Existing Buffer Quality (%) =Existing Condition Score/35 X 100.
   ii. Proposed Buffer Quality (%): Tally all Proposed Condition scores for Metrics 1-9 to determine the Proposed Condition Score.
   Proposed Buffer Quality (%) = Proposed Condition Score/35 X 100

d. Include in Submittal with Stream Buffer Quality Form
   i. Mapping: Maps of the project area including all utilities, delineated wetlands, proposed easement boundary, locations of CSBA's, and existing and proposed locations of streams.
   ii. Representative photographs of each CSBA and additional photos for each vegetation sample location.

2) Identifying the Stream Buffer Assessment Area (SBAA)

When a stream mitigation site is identified, the proposed protected area must be identified as the Stream Buffer Assessment Area (SBAA). A SBAA includes the proposed stream buffer area and its inholdings (wetlands and infrastructure, etc.) for an entire mitigation site. Two of the Stream Buffer Quality Metrics apply directly to the SBAA

(Metric 1: % of SBAA as wetlands, Metric 2: % of SBAA as Utilities/Infrastructure). *See figure one demonstrating SBAA's and CBSA's.* SBAA's must be delineated using the 1986 wetland delineation manual and appropriate regional supplements. For both wetlands and uplands, the vegetative portions of the delineation form will be needed to complete Metrics 3-6 in for the Credited Stream Buffer Areas described below.

3) Identifying Credited Stream Buffer Areas (CBSA's)

CBSA's are those areas within the SBAA where the remaining seven metrics (Metrics 3-9) vegetative and topographic based metrics) will be performed. CBSA's include portions of the SBAA, after subtracting out inholdings such as: infrastructure easements, credited wetlands, or features credited by other programs (e.g., Forest conservation, etc.). CBSA's should be measured in acres and inholding areas subtracted from the SBAA acreage. This CBSA acreage should be listed in the top portion of the assessment form, and a new stream buffer quality assessment form should be completed for each CBSA. There may be a single or multiple Credited Stream Buffer Areas. CSBA's may span an entire site, when relatively consistent existing conditions or consistent proposed conditions are present. However, in most cases, it may be more appropriate to identify new CBSA's for particular stream reaches, at topographic breaks, and/or vegetative breaks. CBSA's may shift between existing vs proposed sites that experience major changes through restoration and relocation of resources. MSMF V.1. Stream Mitigation Tab will tally the total value for existing and proposed conditions. In the Stream Mitigation Tab, if CBSA's shift, the user will need to zero out the proposed buffer value and make a new entry for a proposed condition in a new row (with existing values zeroed out). Note that substantial vegetation clearing in the CSBA within five years of the existing stream buffer quality assessment may result in assumption of an excellent existing score or may result in dismissal of the mitigation site.

4) Wetlands and infrastructure within the SBAA, CSBA, and Credit Overlap:

a. *Existing Conditions*: Wetlands may contribute to the quality of Metric 1 in the SBAA. For the CSBA (Metrics 3-9), the stream buffer quality assessment for existing conditions should include existing wetlands in the CSBA. The metrics should not be applied to infrastructure easement areas and/or (in rare circumstances) should not apply to existing credited wetlands or other credited features on the mitigation site.

b. *Proposed conditions*: Wetlands may contribute to the quality of Metric 1 in the Stream Buffer Assessment Area (SBAA). Regarding the CSBA (metrics 3-9) the wetland acres may be counted/assessed as part of the CBSA only if it is not being credited for wetland mitigation credits or another credited program. Further, metrics 3-9 of the CBSA should not include infrastructure areas or easements which are not subordinate to the conservation easement.

Figure 1. Example of SBAA and CBSA's for proposed conditions

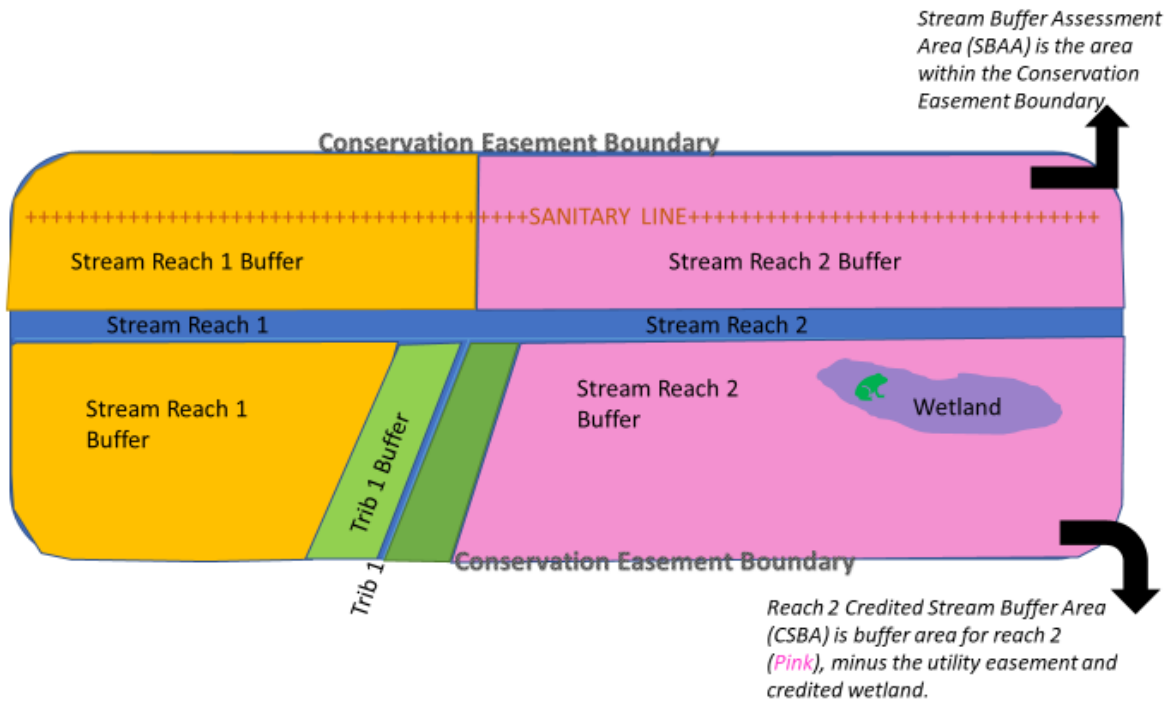

Figure1. Proposed conditions, example showing the Stream Buffer Assessment Area and Credited Stream Buffer Area. Note that credited wetlands and infrastructure areas are not included in the CSBA acreage for metrics 3-9.

IV. Stream Buffer Quality Assessment Metric Narratives

METRICS APPLYING TO STREAM BUFFER ASSESSSMENT AREA (SBAA)

Metric 1: Percentage of SBAA as wetlands

Metric 1: % SBAA as wetlands					
Ranges	50%+	30-49%	15-30%	5-15%	0%
Existing	4	3	2	1	0
Proposed	4	3	2	1	0

Wetlands within the Stream Buffer Assessment Area (SBAA) may improve the quality of the Stream Buffer Assessment Area through habitat interspersion. A site wetland delineation will be required for this metric using the 1986 Wetland Delineation Manual and the appropriate Regional Supplements. After delineation, have the Corps verify the flagged wetland line in the field and capture the wetland boundaries with an accurate GPS instrument. Load into mapping software and determine the area in acres. For both existing and proposed conditions, calculate the % of SBAA as wetlands by dividing the wetland acreage within the SBAA boundary divided by the total acreage of the SBAA (including wetlands and infrastructure inholdings). Wetlands

credited for CWA 404 mitigation may be included in the calculation. *Note: Regarding metrics 3-9 below, credited wetland areas may not be included in calculations, as they are not part of the Credited Stream Buffer Area.*

Stream mitigation projects which increase the relative wetland acreage (existing vs proposed) on a site will improve scoring for this metric as a result of the work.

Metric 2: Percentage of SBAA as Infrastructure

Metric 2: % of SBAA as Utilities/Infrastructure					
Ranges	0	1-5%	5-10%	10-15%	>15%
Existing	4	3	2	1	0
Proposed	4	3	2	1	0

Determine the area (in acres) of all Infrastructure easements, utility lines without easements (surface or subsurface), buildings, or other structures within the work area or conservation easement boundaries. Determine the total area of the infrastructure items listed above in acres. Divide by the whole SBAA.

Stream mitigation project which includes relocating infrastructure components encroaching on the stream and stream buffer may result in improved ratings in this metric.

METRICS APPLYING TO CREDITED STREAM BUFFER AREA (CSBA)

Metric 3: Plant Species Richness in the CSBA (derived from MDWAM 2022)

Metric 3: Plant Species Richness in CSBA[1]					
Ranges	11+	9-10	6-8	2-5	2 or less
Existing	4	3	2	1	0
Proposed	4	3	2	1	0

Using the vegetation sheets on the wetland data form(s), determine all native plant species in the CSBA and circle the appropriate value.

Stream mitigation projects which result in an increase in native species richness appropriate for the location will produce higher increases comparing existing vs. proposed values.

Metric 4: Percent Canopy Cover in the CSBA (Derived from Unified Stream Methodology 2008)

Metric 4: % Canopy Cover in the CSBA[3]					
Ranges	>60%	30-60%	10%-29%	1-9%	0%
Existing	4	3	2	1	0
Proposed	4	3	2	1	0

Using the vegetation sections of the wetland data form(s) apply the percent canopy cover to the table above. If more than one data sheet was used, apply the sheet most representative of the CBSA.

Metric 5: Number of Strata in the CSBA (derived from MDWAM 2022)

Metric 5: # of Strata in CSBA[1]					
Ranges	4+	3	2	1	0
Existing	4	3	2	1	0
Proposed	4	3	2	1	0

Using the vegetation sheets from the wetland data form(s), determine the number of strata in the assessed area. Note: if more that one form is used, use the form that most accurately describes the CSBA.

Metric 6: Total Cover of herbaceous, emergent, and submergent plants in CSBA (MDWAM 2022)

Metric 6: Total Cover of herbaceous, emergent, and submergent plants in CSBA[1]					
Ranges	>75%	51-74%	26-50%	<25%	NA
Existing	4	3	2	1	0
Proposed	4	3	2	1	0

Using the vegetation portions of the wetland data sheet(s) tally the % cover of herbaceous, emergent, and submergent plants. If more than one sheet was used, apply the form that most accurately represents the CSBA.

Metric 7: Invasive Plant Species (Relative % Cover) in the CSBA (MDWAM 2022)

Metric 7: Invasive Plant Species (Total Relative % Cover) in CSBA[1]					
Ranges	<1%	1-10%	11-25%	26-50%	51-100%
Existing	4	3	2	1	0
Proposed	4	3	2	1	0

Using the vegetation portions of the wetland data sheet(s) to determine the relative % cover of invasive plant species in the CSBA. The Maryland Invasive Plant List should be used to determine which plants classify as invasive and a link is provided in the reference section of this document.

Metric 8: Microtopography and Woody Debris in the CSBA

Metric 8: Mircotopgraphy and Woody Debris in CSBA [1,2]					
Description	Woody debris and topographic deviations widespread, covering >15% of the CSBA. Multiple types of woody debris (Snags, downed wood, etc)	Woody debris and topographic deviations common, covering 10-15% of CSBA. Woody debris may lack diversity.	Occasional woody debris and topographic deviations present (Covering 5-9% CSBA) and/or woody debris lacking diversity.	Woody debris and topographic deviations very limited (<5% CSBA coverage) and/or Either woody debris or topographic deviations absent or scarce.	Woody debris and deviations in topography very scarce or not present
Existing	4	3	2	1	0
Proposed	4	3	2	1	0

Estimate the % cover of woody debris larger than 3" in diameter in the floodplain. Estimate the % cover of topographic deviations in the floodplain (>3 inches). Estimate the % cover of snags in the CSBA. Add these percentages. Circle the value reflecting the total percentage of woody debris, snags, and topographic deviations in the CSBA. Concepts regarding woody debris are derived from MDE 2021 (*See References*).

Note: While snags are unlikely to cover a large portion of the CSBA area, their presence will improve scoring of this metric by their presence alone, improving the diversity of woody debris on the site.

Metric 9: Height Above Nearest Drainage in CSBA (Derived from Nobre et al. 2011)

Metric 9: Height Above Nearest Drainage in CSBA[1]					
Ranges	0-2 ft	2.1-3 ft	3.1-4 ft	4.1-6 ft	>6 ft
Existing	4	3	2	1	0
Proposed	4	3	2	1	0

Height above nearest drainage measures the difference in elevation between the stream channel and land surrounding it. For the purpose of metric 9, this is the elevation difference between the riffle crest thalweg of the nearest stream and the elevation of the CSBA.

Beginning at the subject CSBA, identify the nearest stream. If two streams are near a CSBA, select the stream most likely to inundate the area during a flood event. Perform a valley-wide cross section capturing the subject CSBA. Run a transect tape across the stream valley, transectiong the stream channel (riffle crest) and the CSBA. Then use a laser lever or microstation to create a stream valley cross section. Subtract the CSBA elevation from the riffle thalweg elevation of the stream cross-section. Use the value to determine the appropriate value for metric 9. If using a laser level, a notebook with graph paper or tablet will be helpful for this metric. It may be helpful to determine terrain elevations of an entire site prior to performing this metric to assist in identification of individual CSBA's based on elevation.

Note 1: This metric may require breaking up a CSBA into multiple parts along topography on some projects. Multiple CSBA's may use data from a single cross-section occurring along the section, however elevations must be determined for each individual CSBA for Metric 9.

Note 2: Tools to estimate Height Above Nearest Drainage for project planning may be found by researching the USGS FACET Tool (USGS 2019) and (USGS 2020). Links are provided in the references section of this document. Note that Height Above Nearest Drainage would need to

Note 3: While a lower CSBA results in an increased scoring in Metric 9, the Corps will determine whether certain valley grading options are appropriate for the site during review of the mitigation proposal. Floodplain geometry may substantially affect sediment transport, and an understanding of sediment transport for a reach is crucial for successful stream restoration design including floodplain grading.

REFERENCES

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