



Virginia's Stream Mitigation Monitoring & Success Criteria: A Practitioner's Perspective

Stream Restoration in the Southeast:
Advancing the Science and Practice
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Presentation Topics

- Integration of the critical components for stream mitigation projects in Virginia
 - Unified Stream Methodology
 - Success Criteria
 - Monitoring Criteria
- Preliminary results of Monitoring and Success Criteria application
- A Practitioner's Perspective



Unified Stream Methodology (USM)

- Riparian Buffer Preservation
0.07-0.14 credit / % area
- Stream Enhancement
0.09-0.3 credit / ft
- Riparian Buffer Enhancement
0.29-0.4 credit / % area
- Stream Restoration
1.0 credit / ft





Success Criteria



- Riparian Buffer Preservation
 - Invasive species (< 5%)
- Riparian Buffer Enhancement
 - Stem counts (400/acre)
 - Canopy coverage (30%)
- Stream Preservation
 - Dimension
 - W/D (0.7 - 1.3)
 - BHR (0.2)



Success Criteria (cont.)

- Stream Enhancement
 - Dimension
 - BEHI
 - Stem counts (1/10ft²)
 - Canopy coverage (50%)
 - Pattern
 - Sinuosity (0.1)
 - Rc/W ratio
 - Structures





Success Criteria (cont.)

- Stream Restoration
 - Dimension
 - Stream Reach Stability
 - Pattern
 - Structures
 - Profile
 - Slope (0.1%)
 - “Significant Changes”
 - Materials
 - D50





Monitoring Criteria

- Riparian Buffer Preservation
- Riparian Buffer Enhancement
- Stream Preservation
- Stream Enhancement
- Stream Restoration





General Success Criteria Statement

The overall goal for the stream success criteria is to ensure that the dimension, pattern, and profile of the stream enhancement and restoration areas remain within the natural range of variability present in the reference data obtained for the design.

The IRT will use best professional judgment, visual observations, and monitoring reports to evaluate attainment of success criteria, and in determining whether part or all of the site is successful, or whether corrective actions are warranted.



Dimension Criteria

- The analysis of representative riffle cross-section shall indicate that it has neither aggraded, degraded, widened, nor narrowed to the point where it has become unstable or will cause instability.
 - The Width / Depth Ratio Stability Rating shall not be greater than 1.3. If the channel is incising, then the Width / Depth Ratio Stability Rating shall not be less than 0.7.
 - The Bank Height Ratio shall not increase or decrease by an amount greater than 0.2 of the baseline Bank Height Ratio.

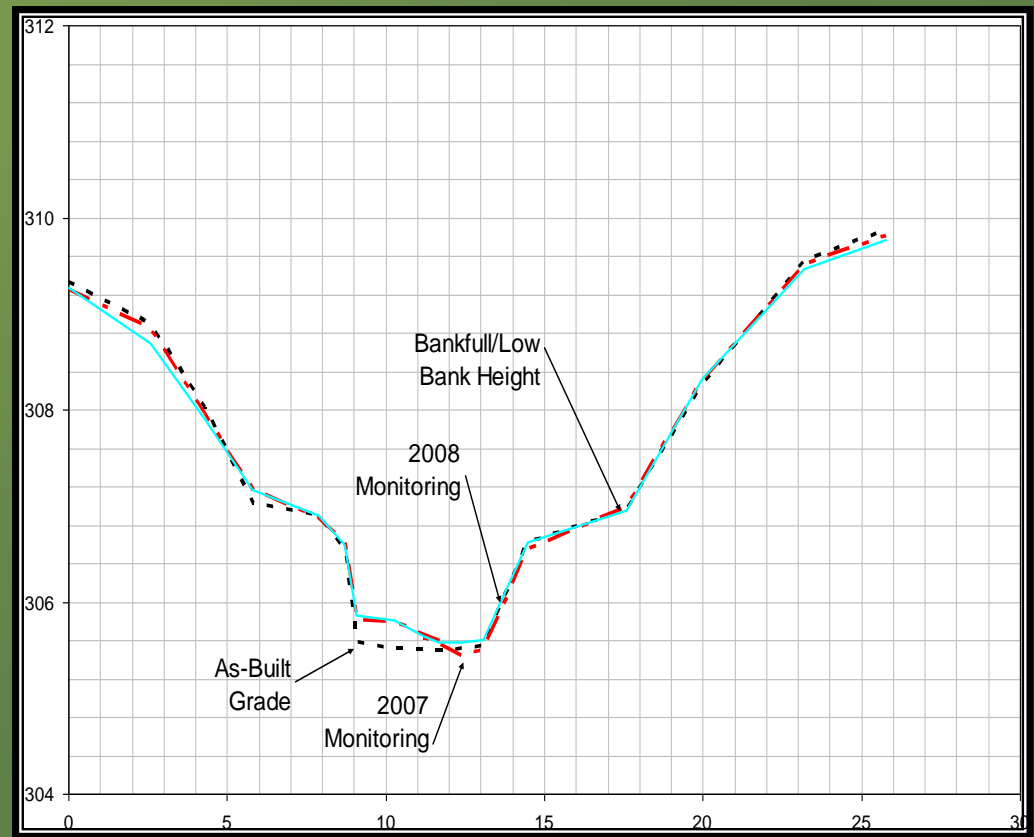


Profile Criteria

- The analysis of the longitudinal profile shall indicate that the bed elevation has neither aggraded nor degraded to the point where it will cause instability.
 - The analysis of the Longitudinal Profile shall not indicate significant alterations in the locations, depths, and slopes of stream features (riffle, run, pool, glide).
 - The slope of the longitudinal profile shall not increase or decrease by an amount greater than 0.1% of the approved as-built slope.



Example 1: Dimension





Dimension Criteria Comparisons

Table 1. Comparison of Stability Rating for Consecutive Monitoring Years

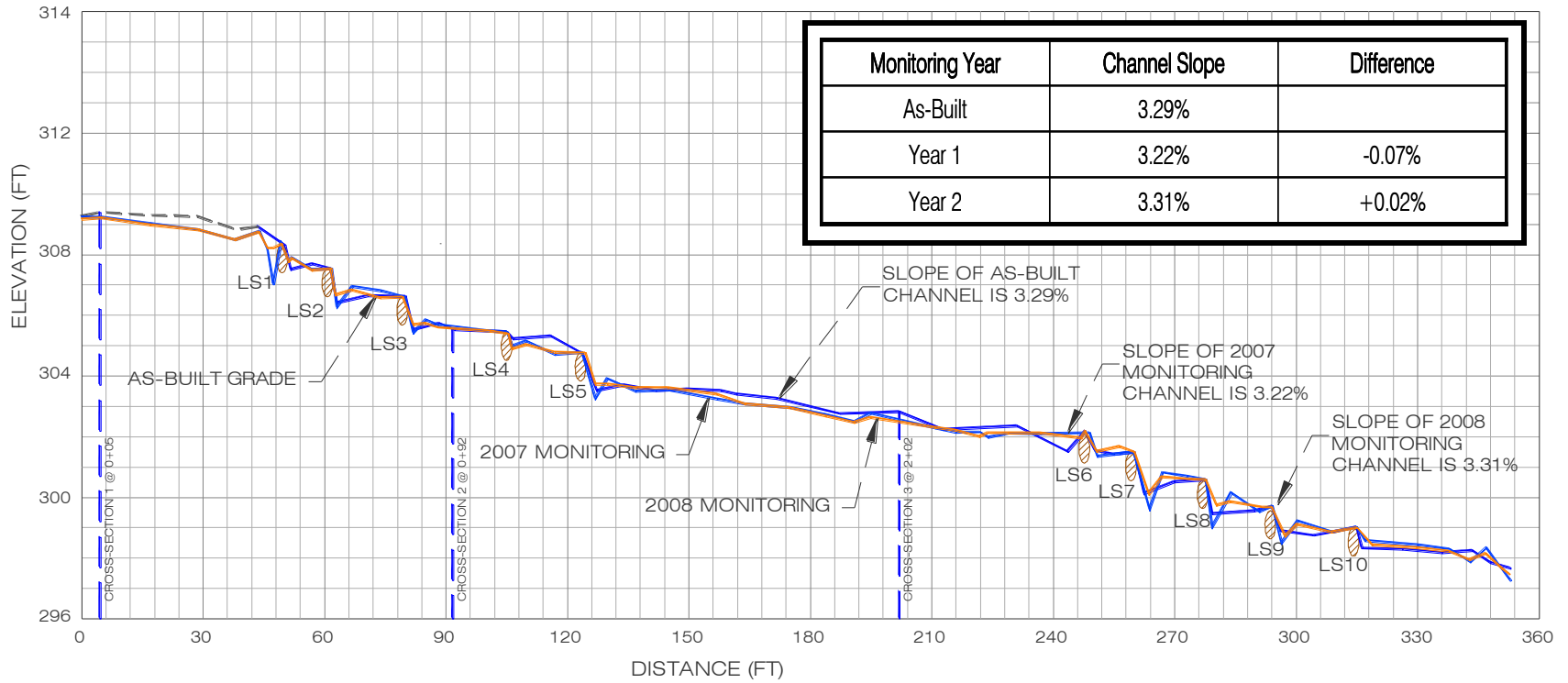
Monitoring Year	W/D	Stability Rating
As-Built (2006)	16.74	
Year 1 (2007)	17.24	1.03
Year 2 (2008)	17.44	1.04

Table 2. Comparison of Bank Height Ratio for Consecutive Monitoring Years

Monitoring Year	Bank Height Ratio	Difference
As-Built (2006)	1.00	
Year 1 (2007)	1.00	0.00
Year 2 (2008)	1.00	0.00



Example 1: Profile

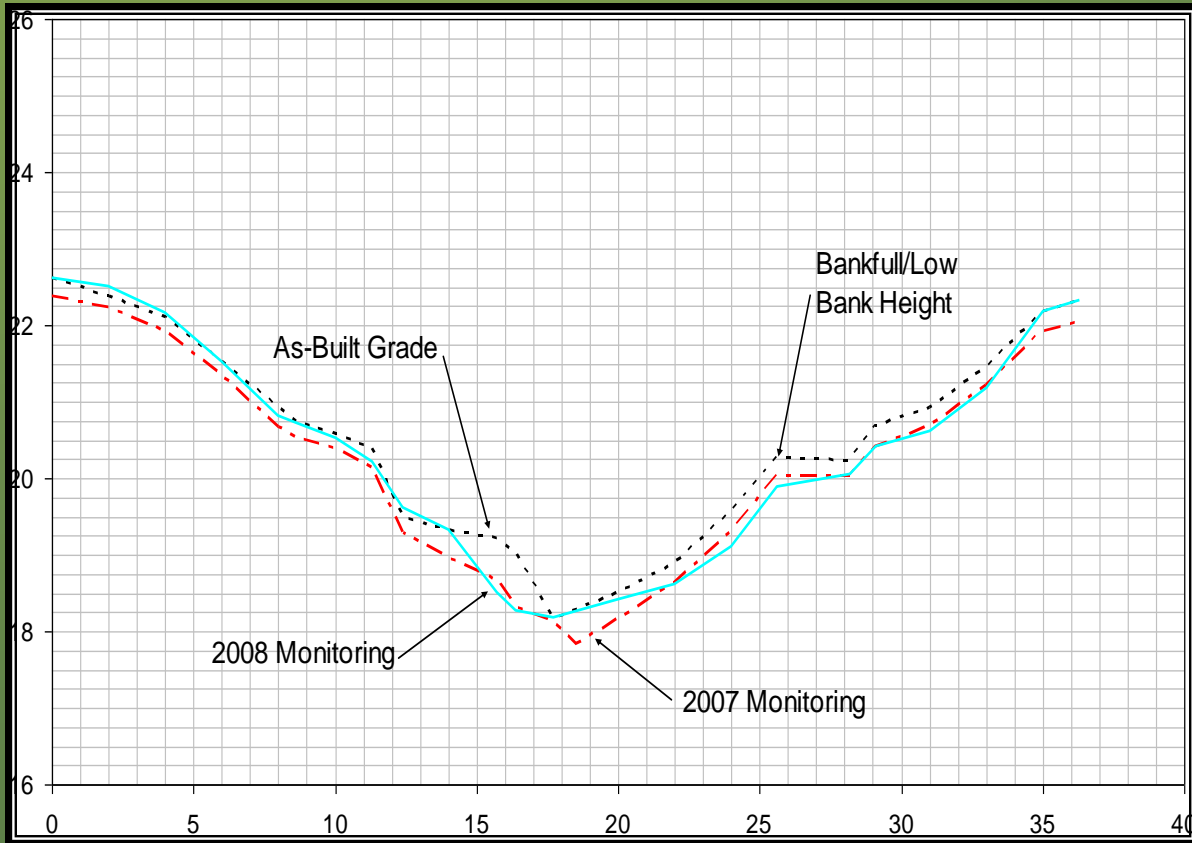


LONGITUDINAL PROFILE 0+00 - 3+53

VERTICAL SCALE: 1"=4' HORIZONTAL SCALE: 1"=30'



Example 2: Dimension





Dimension Criteria Comparisons

Table 1. Comparison of Stability Rating for Consecutive Monitoring Years

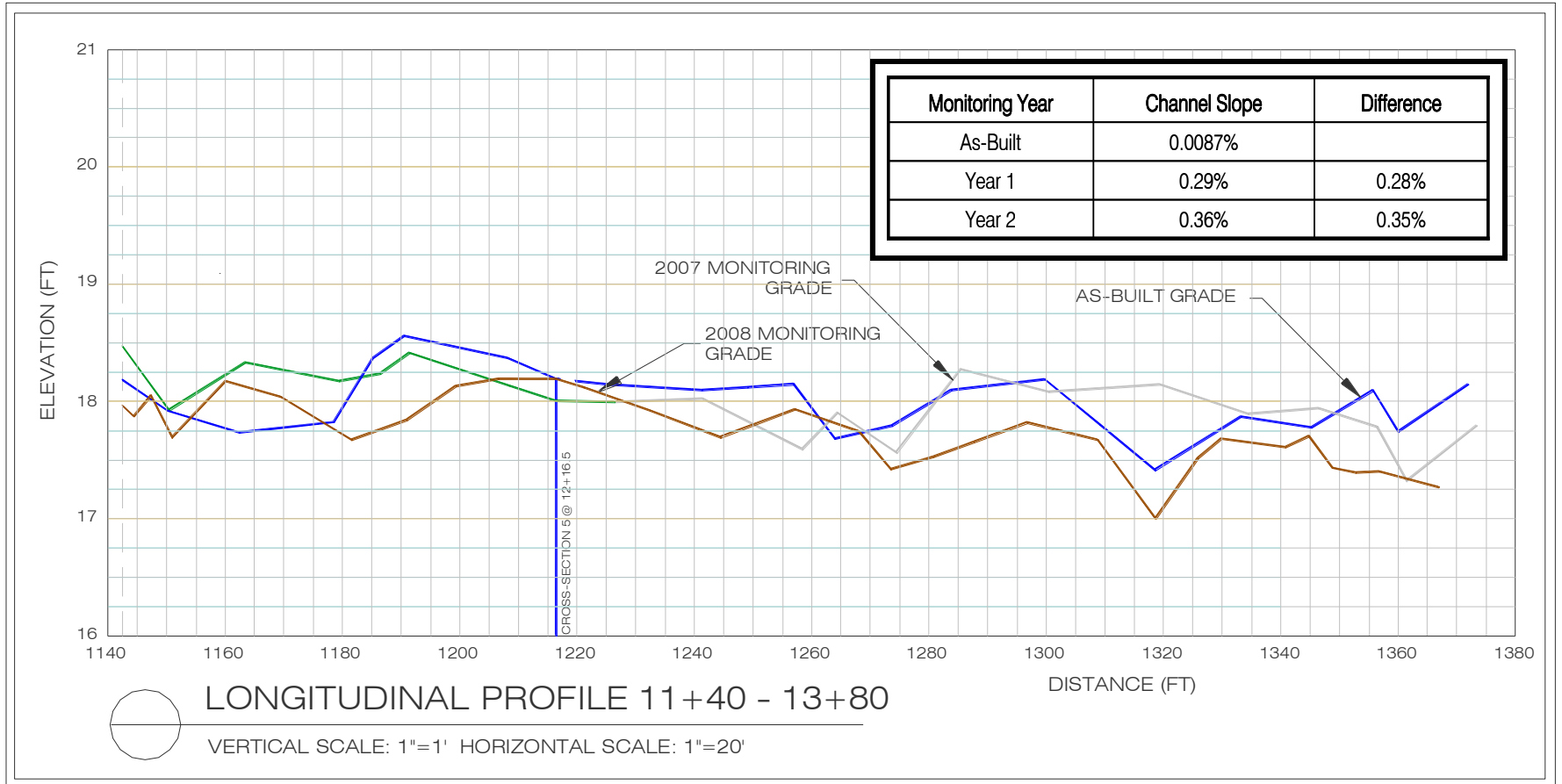
Monitoring Year	W/D	Stability Rating
As-Built (2006)	8.4	
Year 1 (2007)	8.4	1.00
Year 2 (2008)	8.3	0.99

Table 2. Comparison of Bank Height Ratio for Consecutive Monitoring Years

Monitoring Year	Bank Height Ratio	Difference
As-Built (2006)	1.0	
Year 1 (2007)	1.1	0.1
Year 2 (2008)	1.0	0.0



Example 2: Profile





A Practitioner's Perspective

Are Virginia's Success Criteria...

- Comprehensive enough to analyze the departure from the as-built condition?
- Repeatable and reproducible to allow year-to-year comparisons to show departure and problems, and enable analysis of data?
- Appropriate for determining success?



Questions?

Thank you

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