



U.S. Fish & Wildlife Service

CHESAPEAKE BAY FIELD OFFICE

COASTAL PROGRAM

RAPID STREAM RESTORATION MONITORING PROTOCOL

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U.S. Fish and Wildlife Service

Chesapeake Bay Field Office



U.S. Fish & Wildlife Service

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Why Monitor?

- **Evaluate Success**
 - **Stability**
 - **Function**
- **Evaluate Cost-Benefit**
- **Improve Restoration Science**





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Intense is awesome!!!!

What kind of monitoring?





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Why Not?



Funds



Time



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Rapid Stream Restoration Monitoring Protocol

- Developed by the U.S. Fish and Wildlife Service
- First tier of a three tiered approach
- Visually evaluate the stability and functional success of stream restoration projects
- A standardized Rapid Stream Restoration Monitoring Form is used for efficiency, comparability and consistency
- Results of the first tier steer future activities
 - Second Tier: Detailed monitoring
 - Third Tier: Repair
- Requires a skilled evaluator with knowledge of fluvial geomorphic and watershed processes



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Protocol Objectives

- Develop a rapid and standardized method to evaluate the stability and functional success of a restored stream
- Establish a minimum standard necessary to evaluate the stability and functional success of a restored stream
- Promote consistent and reproducible results
- Identify situations that require additional monitoring
- Identify potential causes for impairment
- Identify potential corrective actions



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Protocol Components

- Bankfull Determination
- Limits of Investigation Determination
- Rapid Stream Restoration Monitoring Form
- Evaluation Parameter Definitions
- Stream Measurements
- Monitoring/Restoration Thresholds



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Bankfull Determination

- Review designer's bankfull determination
- Review hydrology and hydraulics analysis
- Critical to evaluate stability and function
- Experience counts





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Investigation Limits

- Monitoring reach starts and ends where restoration has no visible influence
- Project limits may not matter



Rapid Stream Restoration Monitoring Form

Project Description

Stream Name:	Crew:	Project Description:	Comments:
Project Name:	Date:		
Project Location:			

Station	Identification Number	Problem Description						Corrective Actions		Measurement(s)
		Type	Indicator(s)	Severity	Implication(s)	Cause(s)	Description	Type	Description	
		Bed Bank Structure	1 2 3 4 5 6 7 8 9 10	1 2 3	1 2 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15		1 2 3 4 5 6 7 8 9 10 11 12		
	Photograph(s):	Other:	Other:	Other:	Other:	Other:		Other:		
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Station Identification

Problem Description

Corrective Actions

Measurements



Rapid Stream Restoration Monitoring Form

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Rapid Stream Restoration Monitoring Form

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Project Location:		Type/Indicators								
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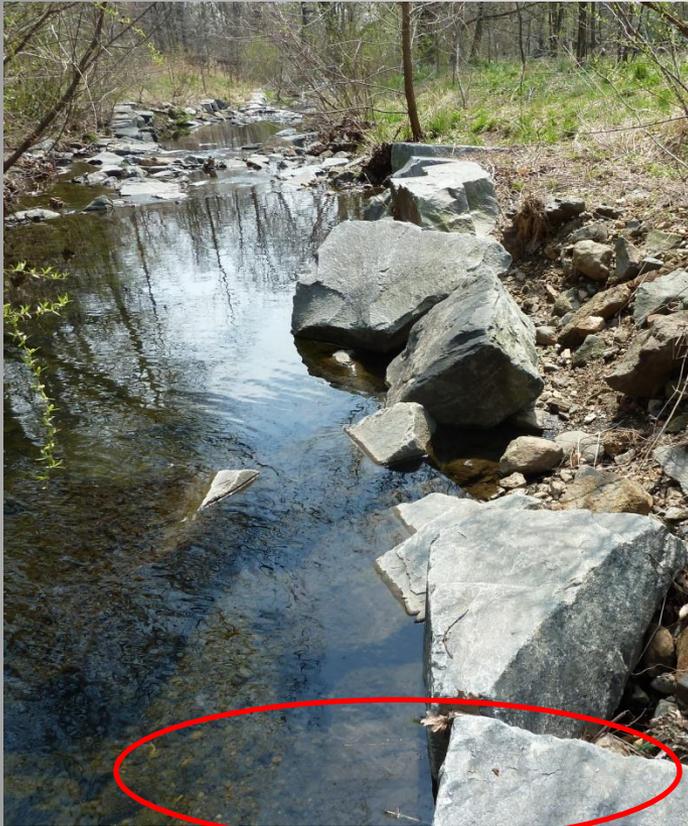


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Evaluation Attributes



9	Decrease incision	9	Decrease in en
10	Aggradation	10	Decrease in co





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Severity/Implications

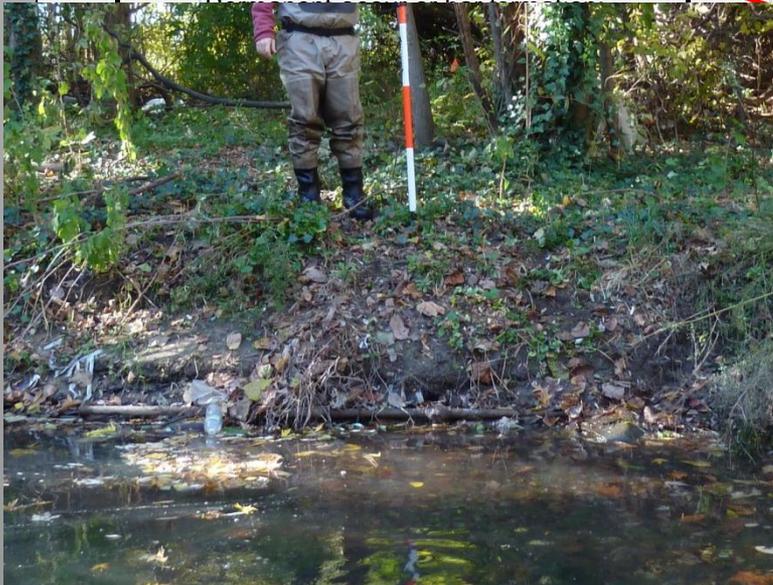
Problem Description

Problem Description



Evaluation Attributes, continued

	Bed		Banks		Structure	
Severity	1	Temporary scour or deposition formation	1	Localized bank erosion; minor loss of bank material; BEHI and/or NBS have a rating of low or less	1	Minor stress on the structure; still functioning as intended
	2	Limited scour or bar formation; minor changes to bed characteristic	2	Moderate bank erosion; moderate loss of bank material; BEHI and NBS have a rating of moderate	2	Partial failure of structure; minimally functioning as intended
		Permanent scour or deposition formation	3	Failure of entire bank; bank actively eroding and substantial loss of bank material; BEHI and NBS have a rating of	3	Complete structural failure; no longer functioning as intended
			1	Not expected to worsen or cause further problems; may stabilize over time	1	Not expected to worsen or cause further problems; may stabilize over time
			2	Expected to worsen over time	2	Expected to worsen over time
			3	Immediated concern; will cause further damage and contribute to other problems	3	Immediated concern; will cause further damage and contribute to other problems

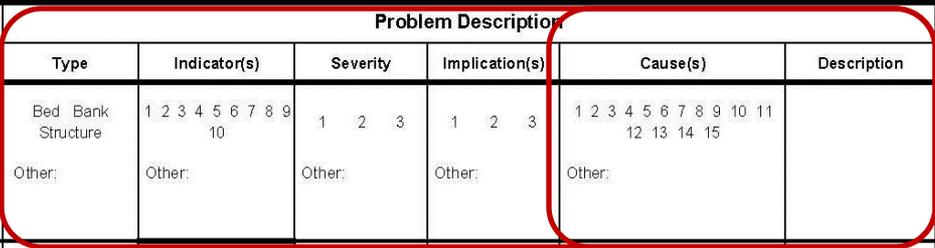




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Causes



Problem Description





Evaluation Attributes, continued

	Bed	Banks	Structure
1	Localized sediment input from an immediate source	1	Drain outfa
2	Cross section width/depth ratio is less than the design criteria	2	Over





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Corrective Actions



Evaluation Attributes, continued

	Bed	Banks	Structure
	1 No action	1 No action	1 No action
	2 Remove debris jam, other obstruction, and/or excessive sediment	2 Armor bank	2 Regrade banks, repair matting, and/or replant vegetation
			3 Stabilize structure with rock material
			4 Repair unstable portion of structure
			5 Relocate or rebuild entire structure
			6 Modify channel dimensions or characteristics (e.g., active channel bench); reconnect channel to
			7 Modify channel profile
			8 Modify channel planform
			9 Stabilize local sediment source
			10 Manage stormwater quantity
			12 Manage stormwater quantity



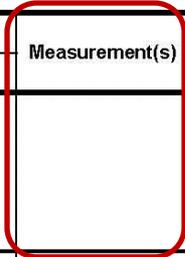
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Common Measurements

- Bankfull Width
- Bankfull Depth
- Width/Depth Ratio
- Active Channel Width
- Meander Width Ratio
- Slope
- Many More

Measurements





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Second Tier

- Used for localized impacts that may be significant threats to the restoration function
- Requires monumented monitoring to determine instability trends
- Will determine if remediation (third tier) is required

Third Tier

- Used for widespread impacts that pose a significant threat to restoration function
- Used when repair or remediation is required
- May include restoration design and implementation



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Summary

- Develop a rapid and standardized method to evaluate the stability and functional success of a restored stream
- Establish a minimum standard necessary to evaluate the stability and functional success of a restored stream
- Promote consistent and reproducible results
- Identify situations that require additional monitoring
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Future Direction

- Adjust methodology to incorporate functional description

