S-A128

Stream Photograph Page

Stream ID S-A128 Date: 06/05/2015

Photograph Direction East

Comments:

STREAM ID S-A128	**STREAM NAME** Rockcamp Run
LAT 39.355557 **LONG** -80.490037	**DATE** 06/05/2015
CLIENT MVP	**PROJECT NAME** MVP
INVESTIGATORS S. Yarbrough, K. Lew, R. Sparhawk, W. Shannonberg	
FLOW REGIME Perennial ✔ Intermittent ___ Ephemeral ___	**WATER TYPE** TNW ___ RPW ✔ NRPW ___

CHANNEL FEATURES

Estimate Measurements
Top of Bank Width: 48.0 ft
Top of Bank Height:
LB 21.0 in RB 20.0 ft
Water Depth: 12.00 in
Water Width: 4.5 ft
High Water Mark: 15.0 in
Flow Direction: East

Stream Erosion
___None ✔Moderate ___Heavy

Artificial, Modified or Channelized
___ Yes ✔ No

Dam Present ___Yes ✔ No

Sinuosity ___ Low ✔ Medium ___ High

Gradient
✔ Flat (0.5/100 ft) ___Moderate (2 ft/100 ft) ___Severe (10 ft/100 ft)

FLOW CHARACTERISTICS

Water Present
___ No water, stream bed dry
___ Stream bed moist
___ Standing water
✔ Flowing water

Velocity
___ Fast ___ Moderate
✔ Slow

Proportion of Reach Represented by Stream Morphology Types
Riffle 20 % Run 40 %
Pool 40 %

Turbidity
✔ Clear ___Slightly turbid ___Turbid
___ Opaque ___Stained
___Other_____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)

Substrate Type	Diameter	% Composition in Sampling Reach
Bedrock		
Boulder	> 256 mm (10")	15
Cobble	64-256 mm (2.5"-10")	25
Gravel	2-64 mm (0.1"-2.5")	30
Sand	0.06-2mm (gritty)	10
Silt	0.004-0.06 mm	10
Clay	< 0.004 mm (slick)	10

ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)

Substrate Type	Characteristic	% Composition in Sampling Area
Detritus	sticks, wood, coarse plant materials (CPOM)	5
Muck-Mud	black, very fine organic (FPOM)	
Marl	grey, shell fragments	

WATERSHED FEATURES

Predominant Surrounding Landuse
✔ Forest ___ Commercial
___ Field/Pasture ___Industrial
___ Agricultural ___ Residential
___ Other:

Canopy Cover
✔ Partly open ___Partly shaded
___ Shaded ___ Open

Indicate the dominant type (Check one)
✔ Trees ___ Shrubs
___ Grasses ___Herbaceous

Floodplain Width
✔ Wide > 30ft ___ Moderate 15-30ft
___ Narrow <16ft

Wetland Present ✔Yes ___No
Wetland ID W-A37 , W-A38

AQUATIC VEGETATION

Indicate the dominant type and record the dominant species present
___ Rooted emergent ___Rooted submergent ___Rooted floating ___Free floating
___ Floating algae ___Attached algae

MACROINVERTEBRATES OR OTHER WILDLIFE OBSERVED/OTHER OBSERVATIONS AND NOTES

Road and broken concrete bridge located at observation point.

West Virginia Stream and Wetland Valuation Metric (SWVM)
Version 2.1, September 2015

USACE FILE NO./ Project Name: (v2.1, Sept 2015)	Mountain Valley Pipeline Project SWVM v2.1	IMPACT COORDINATES: (in Decimal Degrees)	Lat.	39.355535°	Lon.	-80.490021°	WEATHER:		DATE:	8/10/2015
IMPACT STREAM/SITE ID AND SITE DESCRIPTION: (watershed size {acreage), unaltered or impairments)	S-A128; Rockcamp Run; 3504ac watershed Form of Mitigation: Mitigation Bank	MITIGATION STREAM CLASS./SITE ID AND SITE DESCRIPTION: (watershed size {acreage), unaltered or impairments)							Comments:	
STREAM IMPACT LENGTH:	29	FORM OF MITIGATION:	RESTORATION (Levels I-III)	MIT COORDINATES: (in Decimal Degrees)	Lat.		Lon.		PRECIPITATION PAST 48 HRS:		Mitigation Length:	

Column No. 1- Impact Existing Condition (Debit)				Column No. 2- Mitigation Existing Condition - Baseline (Credit)				Column No. 3- Mitigation Projected at Five Years Post Completion (Credit)				Column No. 4- Mitigation Projected at Ten Years Post Completion (Credit)				Column No. 5- Mitigation Projected at Maturity (Credit)			
Stream Classification:	Perennial			Stream Classification:	Perennial			Stream Classification:	Perennial			Stream Classification:	Perennial			Stream Classification:	Perennial		
Percent Stream Channel Slope	2			Percent Stream Channel Slope				Percent Stream Channel Slope	0			Percent Stream Channel Slope	0			Percent Stream Channel Slope	0		
HGM Score (attach data forms):				HGM Score (attach data forms):				HGM Score (attach data forms):				HGM Score (attach data forms):				HGM Score (attach data forms):			
		Average				Average				Average				Average				Average	
Hydrology	1			Hydrology	1			Hydrology	1			Hydrology	1			Hydrology	1		
Biogeochemical Cycling	1	0		Biogeochemical Cycling	1	0		Biogeochemical Cycling	1	0		Biogeochemical Cycling	1	0		Biogeochemical Cycling	1	0	
Habitat	1			Habitat	1			Habitat	1			Habitat	1			Habitat	1		
PART I - Physical, Chemical and Biological Indicators				PART I - Physical, Chemical and Biological Indicators				PART I - Physical, Chemical and Biological Indicators				PART I - Physical, Chemical and Biological Indicators				PART I - Physical, Chemical and Biological Indicators			
	Points Scale	Range	Site Score		Points Scale	Range	Site Score		Points Scale	Range	Site Score		Points Scale	Range	Site Score		Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all streams classifications)				PHYSICAL INDICATOR (Applies to all streams classifications)				PHYSICAL INDICATOR (Applies to all streams classifications)				PHYSICAL INDICATOR (Applies to all streams classifications)				PHYSICAL INDICATOR (Applies to all streams classifications)			
USEPA RBP (High Gradient Data Sheet)				USEPA RBP (High Gradient Data Sheet)				USEPA RBP (High Gradient Data Sheet)				USEPA RBP (High Gradient Data Sheet)				USEPA RBP (High Gradient Data Sheet)			
1. Epifaunal Substrate/Available Cover	0-20	0-1	16	1. Epifaunal Substrate/Available Cover	0-20	0-1	0	1. Epifaunal Substrate/Available Cover	0-20	0-1	0	1. Epifaunal Substrate/Available Cover	0-20	0-1	0	1. Epifaunal Substrate/Available Cover	0-20	0-1	
2. Embeddedness	0-20		13	2. Embeddedness	0-20		0	2. Embeddedness	0-20		0	2. Embeddedness	0-20		0	2. Embeddedness	0-20		
3. Velocity/ Depth Regime	0-20		16	3. Velocity/ Depth Regime	0-20		0	3. Velocity/ Depth Regime	0-20		0	3. Velocity/ Depth Regime	0-20		0	3. Velocity/ Depth Regime	0-20		
4. Sediment Deposition	0-20		15	4. Sediment Deposition	0-20		0	4. Sediment Deposition	0-20		0	4. Sediment Deposition	0-20		0	4. Sediment Deposition	0-20		
5. Channel Flow Status	0-20		13	5. Channel Flow Status	0-20		0	5. Channel Flow Status	0-20		0	5. Channel Flow Status	0-20		0	5. Channel Flow Status	0-20		
6. Channel Alteration	0-20		10	6. Channel Alteration	0-20		0	6. Channel Alteration	0-20		0	6. Channel Alteration	0-20		0	6. Channel Alteration	0-20		
7. Frequency of Riffles (or bends)	0-20		17	7. Frequency of Riffles (or bends)	0-20		0	7. Frequency of Riffles (or bends)	0-20		0	7. Frequency of Riffles (or bends)	0-20		0	7. Frequency of Riffles (or bends)	0-20		
8. Bank Stability (LB & RB)	0-20		12	8. Bank Stability (LB & RB)	0-20		0	8. Bank Stability (LB & RB)	0-20		0	8. Bank Stability (LB & RB)	0-20		0	8. Bank Stability (LB & RB)	0-20		
9. Vegetative Protection (LB & RB)	0-20		14	9. Vegetative Protection (LB & RB)	0-20		0	9. Vegetative Protection (LB & RB)	0-20		0	9. Vegetative Protection (LB & RB)	0-20		0	9. Vegetative Protection (LB & RB)	0-20		
10. Riparian Vegetative Zone Width (LB & RB)	0-20		14	10. Riparian Vegetative Zone Width (LB & RB)	0-20		0	10. Riparian Vegetative Zone Width (LB & RB)	0-20		0	10. Riparian Vegetative Zone Width (LB & RB)	0-20		0	10. Riparian Vegetative Zone Width (LB & RB)	0-20		
Total RBP Score	Suboptimal		140	Total RBP Score	Poor		0	Total RBP Score	Poor		0	Total RBP Score	Poor		0	Total RBP Score	Poor		0
Sub-Total			0.7	Sub-Total			0	Sub-Total			0	Sub-Total			0	Sub-Total			0
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)				CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)				CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)				CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)				CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)				WVDEP Water Quality Indicators (General)				WVDEP Water Quality Indicators (General)				WVDEP Water Quality Indicators (General)				WVDEP Water Quality Indicators (General)			
Specific Conductivity				Specific Conductivity				Specific Conductivity				Specific Conductivity				Specific Conductivity			
<=99 - 90 points	0-90	0-1	0.169		0-90	0-1	0		0-90	0-1	0		0-90	0-1	0		0-90	0-1	
pH				pH				pH				pH				pH			
6.0-8.0 = 80 points	0-80		7.56		5-90		0		5-90		0		5-90		0		5-90		
DO				DO				DO				DO				DO			
>5.0 = 30 points	10-30		7.06		10-30		0		10-30		0		10-30		0		10-30		
Sub-Total			1	Sub-Total			0	Sub-Total			0	Sub-Total			0	Sub-Total			0
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)				BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)				BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)				BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)				BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WV Stream Condition Index (WVSCI)				WV Stream Condition Index (WVSCI)				WV Stream Condition Index (WVSCI)				WV Stream Condition Index (WVSCI)				WV Stream Condition Index (WVSCI)			
Good	0-100	0-1	73.8		0-100	0-1	0		0-100	0-1	0		0-100	0-1	0		0-100	0-1	
Sub-Total			0.738	Sub-Total			0	Sub-Total			0	Sub-Total			0	Sub-Total			0

PART II - Index and Unit Score			PART II - Index and Unit Score			PART II - Index and Unit Score			PART II - Index and Unit Score			PART II - Index and Unit Score		
Index	Linear Feet	Unit Score	Index	Linear Feet	Unit Score	Index	Linear Feet	Unit Score	Index	Linear Feet	Unit Score	Index	Linear Feet	Unit Score
0.813	29	23.56733333	0	0	0	0	0	0	0	0	0	0	0	0

PART III - Impact Factors
(See instruction page to insert default values for MITIGATION BANKING and ILF)

Temporal Loss-Construction

**Note: Reflects duration of aquatic functional loss between the time of an impact (debit) and completion of compensatory mitigation (credit).*

Years	0
Sub-Total	0

Temporal Loss-Maturity

**Note: Period between completion of compensatory mitigation measures and the time required for maturity, as it relates to function (i.e. maturity of tree stratum to provide organic matter and detritus within riparian stream or wetland buffer corridor).*

% Add. Mitigation	Temporal Loss-Maturity (Years)
0%	0
Sub-Total	0

Long-term Protection

% Add. Mitigation and Monitoring Period	Long-Term Protection (Years)
0 + 5/10 Year Monitoring	101
Sub-Total	0

PART IV - Index to Unit Score Conversion

Final Index Score (Debit)	Linear Feet	Unit Score (Debit)	ILF Costs (Offsetting Debit Units)
0.812666667	29	23.56733333	$18,853.87

PART V- Comparison of Unit Scores and Projected Balance

Final Unit Score (Debit) [No Net Loss Value]	23.56733333	Mitigation Existing Condition - Baseline (Credit)		Mitigation Projected at Five Years Post Completion (Credit)		Mitigation Projected at Ten Years Post Completion (Credit)		Mitigation Projected At Maturity (Credit)	
FINAL PROJECTED NET BALANCE					0		0		0

Part VI - Mitigation Considerations (Incentives)

Extent of Stream Restoration

***Note1: Reference the Instructional handout to determine the correct Restoration Levels (below) for your project**
***Note2: Place an "X" in the appropriate category (only select one).**

☐ Restoration Level 1	
☐ Restoration Level 2	
☐ Restoration Level 3	

Compensatory Mitigation Plan incorporates HUC 12-based watershed approach? (Yes or No) *Note: HUC 12-based watershed approach required to obtain Stream Restoration incentive	No

Site	Impact Unit Yield (Debit)	Mitigation Unit Yield (Credit)
S-A128	23.56733333	#DIV/0!

Extended Upland Buffer Zone

***Note[1]: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below)**
***Note[2]: Enter the buffer width for each channel side (Left Bank and Right Bank)**
***Note[3]: Select the appropriate mitigation type**

Buffer Width	Left Bank	
	0-50	None
	51-150	None
Buffer Width	**Right Bank**	
	0-50	None
	51-150	None
Average Buffer Width/Side	0	

Straight Preservation Ratio (v2.1, Sept 2015)

Final Mitigation Unit Yield
#DIV/0!

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME S-A128	LOCATION Harrison County, WV	
STATION #_____ RIVERMILE_____	STREAM CLASS Perennial	
LAT 39.355569° LONG -80.490100°	RIVER BASIN Rockcamp Run, Tenmile Creek	
STORET #	AGENCY Tetra Tech	
INVESTIGATORS J. McGuirk, C. Stoliker		
FORM COMPLETED BY J. McGuirk	DATE 09/06/2016 TIME 12:00	REASON FOR SURVEY Proposed pipeline

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 16	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE 13	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE 16	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 15	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE 13	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

	Habitat Parameter	Condition Category			
		Optimal	**Suboptimal**	**Marginal**	**Poor**
Parameters to be evaluated broader than sampling reach	**6. Channel Alteration**	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE 10	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
	SCORE 17	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
	SCORE 6 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	SCORE 6 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
	9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE 7 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	SCORE 7 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
	SCORE 7 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	SCORE 7 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 140

Insects	Count	Tolerance	TV
Ephemeroptera			57
Ameletidae		2	0
Baetidae	19	4	76
Beatiscidae		4	0
Caenidae		5	0
Ephemerellidae		3	0
Ephemeridae		5	0
Heptageniidae	31	3	93
Isonychiidae		3	0
Leptophlebiidae	7	4	28
Potamanthidae		5	0
Siphlonuridae		3	0
Tricorythidae		5	0
Plecoptera			0
Capniidae		2	0
Chloroperlidae		2	0
Leuctridae		2	0
Nemouridae		2	0
Peltoperlidae		1	0
Perlidae		1	0
Perlodidae		1	0
Pteronarcyidae		1	0
Taeniopterygidae		2	0
Trichoptera			13
Brachycentridae		2	0
Glossosomatidae		2	0
Helicopsychidae		3	0
Hydropsychidae	8	5	40
Hydroptilidae		3	0
Lepidostomatidae		3	0
Leptoceridae		3	0
Limnephilidae		4	0
Molannidae		3	0
Philopotamidae	5	4	20
Phryganeidae		4	0
Polycentropodidae		5	0
Psychomiidae		3	0
Rhyacophilidae		3	0
Uenoidae		2	0
Total Tolerance Value			453

Insects	Count	Tolerance	TV
Odonata			4
Aeshnidae		3	0
Calopterygidae	1	6	6
Coenagrionidae	1	7	7
Cordulegastridae		3	0
Gomphidae	2	5	10
Lestidae		7	0
Libellulidae		7	0
Coleoptera			20
Chrysomelidae		7	0
Dryopidae		5	0
Dytiscidae		6	0
Elmidae	18	4	72
Gyrinidae		5	0
Haliplidae		7	0
Hydrophilidae		7	0
Psephenidae	2	3	6
Ptilodactylidae		5	0
Hemiptera			0
Belostomatidae		8	0
Corixidae		8	0
Gerridae		10	0
Hydrometridae		8	0
Nepidae		8	0
Notonectidae		8	0
Megaloptera			0
Corydalidae		3	0
Sialidae		6	0
Diptera			3
Athericidae		3	0
Blephariceridae		2	0
Ceratopogonidae		8	0
Chironomidae		9	0
Culicidae		10	0
Dixidae		6	0
Empididae		7	0
Psychodidae		8	0
Ptychopteridae		8	0
Simuliidae		6	0
Stratiomyidae		10	0
Syrphidae		10	0
Tabanidae		7	0
Tipulidae	3	5	15

Non-Insects	Count	Tolerance	TV
Crustacea			2
Asellidae		7	0
Cambaridae	2	5	10
Gammaridae		5	0
Palaemonidae		5	0
Annelida			0
Hirudinea		10	0
Nematoda		10	0
Nematomorpha		10	0
Oligochaeta		10	0
Turbellaria			0
Turbellaria		7	0
Bivalvia			14
Corbiculidae		6	0
Sphaeriidae	14	5	70
Unionidae		4	0
Gastropoda			0
Ancylidae		7	0
Hydrobiidae		4	0
Physidae		7	0
Planorbidae		5	0
Pleuroceridae		5	0
Viviparidae		5	0
Miscellaneous			0
Collembola		6	0
Lepidoptera		5	0
Neuroptera		5	0
Hydrachnidae		6	0
Totals	**Total number**		**113**
	Total families		**13**

Metric calculations			
Richness			**Additional metrics**
Total Taxa	13	59.1	Ephemeroptera Taxa 3
EPT Taxa	5	38.5	Plecoptera Taxa 0
Tolerance			Trichoptera Taxa 2
Biotic Index	4.01	85.6	Long-lived Taxa 8
% Tolerant	0.9	100.0	Odonata Taxa 3
Composition			Diptera Taxa 1
% EPT Abundance	61.9	68.8	COET Taxa 10
% Dominance	27.4	90.7	% Sensitive 33.6
% Net-spinners	11.5	NA	% Chironomidae 0.0
Stream Condition Index		**73.8**	% Clingers 63.7
Integrity Rating	**Suboptimal**		More diversity measures

West Virginia Save Our Streams
601 57th Street, SE, Charleston WV 25304
http://www.dep.wv.gov/sos

Note: There may be instances when families are collected that are not listed above. In those cases choose a similar family/tolerance value if known, to calculate the metrics. You should contact the WV Save Our Streams Coordinator to confirm your choice. Provide as much detail as possible so that family-level identification can be determined.

No FCI form included. Not a high-gradient ephemeral or intermittent headwater stream.

S-OP9

Stream Photograph Page

Stream ID S-OP9 Date: 04/26/2016

Photograph Direction West

Comments:

STREAM ID S-OP9		**STREAM NAME** UNT to Indian Run	
CLIENT EQT		**PROJECT NAME** MVP	
LAT 39.320692	**LONG** -80.526499	**DATE** 04/26/2016	**COUNTY** Harrison
INVESTIGATORS S. Townsend, C. Stoliker, K. Lew			
WATER TYPE TNW ☐ RPW ☐ NRPW ☑		**FLOW REGIME** Perennial ☐ Intermittent ☐ Ephemeral ☑	

CHANNEL FEATURES

Estimate Measurements
Top of Bank Width: 3.0 ft
Top of Bank Height:
LB 1.0 ft RB 1.0 ft
Water Depth: 0.50 in
Water Width: 0.3 ft
Ordinary High Water Mark (Width): 1.0 ft
Ordinary High Water Mark (Height): 1.0 in
Flow Direction: South

Sinuosity ✔ Low ___Medium ___High

Gradient ___ Flat (0.5/100 ft) ___ Moderate (2 ft/100 ft) ✔ Severe (10 ft/100 ft)

Stream Erosion
✔ None ___Moderate ___Heavy

Artificial, Modified or Channelized
___ Yes ✔ No

Within Roadside Ditch
___ Yes ✔ No

Culvert Present ___Yes ✔ No
Culvert Material:_____
Culvert Size: _____in

FLOW CHARACTERISTICS

Water Present
___No water, stream bed dry
___Stream bed moist
___Standing water
✔ Flowing water

Velocity
___Fast ✔ Moderate
___Slow

Proportion of Reach Represented by Stream Morphology Types (Only enter if water present)
Riffle 90 % Run % Pool 10 %

Turbidity
✔ Clear ___Slightly turbid ___Turbid
___ Other_____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%) 100

Substrate Type	Diameter	% Composition in Sampling Reach
Bedrock		
Boulder	> 256 mm (10")	
Cobble	64-256 mm (2.5"-10")	10
Gravel	2-64 mm (0.1"-2.5")	25
Sand	0.06-2mm (gritty)	20
Silt	0.004-0.06 mm	20
Clay	< 0.004 mm (slick)	25

ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)

Substrate Type	Characteristic	% Composition in Sampling Area
Detritus	sticks, wood, coarse plant materials (CPOM)	10
Muck-Mud	black, very fine organic (FPOM)	
Marl	grey, shell fragments	

WATERSHED FEATURES

Predominant Surrounding Landuse
✔ Forest ___ Commercial
___ Field/Pasture ___Industrial
___ Agricultural ___ Residential
___ ROW ✔Other: Access road

Canopy Cover
___Open ___Partly shaded
✔ Shaded

Floodplain Width
___ Wide > 30ft ✔ Moderate 15-30ft
___ Narrow <15ft

MACROINVERTEBRATES/OTHER WILDLIFE OBSERVED OR OTHER NOTES AND OBSERVATIONS

USACE FILE NO./ Project Name: (v2.1, Sept 2015)	Mountain Valley Pipeline Project SWVM v2.1	IMPACT COORDINATES: (in Decimal Degrees)	Lat.	39.320682	Lon.	-80.526449	WEATHER:	Cloudy, 55	DATE:	6/1/2016
IMPACT STREAM/SITE ID AND SITE DESCRIPTION: (watershed size (acreage), unaltered or impairments)	S-OP9; UNT to Indian Run Form of Mitigation: Mitigation Ban	MITIGATION STREAM CLASS./SITE ID AND SITE DESCRIPTION: (watershed size (acreage), unaltered or impairments)							Comments:	No / low water flow at time of survey. Unable to sample water quality or WVSCI.
STREAM IMPACT LENGTH:	36	FORM OF MITIGATION:	RESTORATION (Levels I-III)	MIT COORDINATES: (in Decimal Degrees)	Lat.		Lon.		PRECIPITATION PAST 48 HRS:	0	Mitigation Length:	

Column No. 1- Impact Existing Condition (Debit)				Column No. 2- Mitigation Existing Condition - Baseline (Credit)				Column No. 3- Mitigation Projected at Five Years Post Completion (Credit)				Column No. 4- Mitigation Projected at Ten Years Post Completion (Credit)				Column No. 5- Mitigation Projected at Maturity (Credit)			
Stream Classification:	Ephemeral			Stream Classification:	Ephemeral			Stream Classification:	Ephemeral			Stream Classification:	Ephemeral			Stream Classification:	Ephemeral		
Percent Stream Channel Slope				Percent Stream Channel Slope				Percent Stream Channel Slope	0			Percent Stream Channel Slope	0			Percent Stream Channel Slope	0		
HGM Score (attach data forms):				HGM Score (attach data forms):				HGM Score (attach data forms):				HGM Score (attach data forms):				HGM Score (attach data forms):			
			Average				Average				Average				Average				Average
Hydrology	0.34			Hydrology				Hydrology				Hydrology				Hydrology			
Biogeochemical Cycling	0.7		0	Biogeochemical Cycling			0	Biogeochemical Cycling			0	Biogeochemical Cycling			0	Biogeochemical Cycling			0
Habitat	0.28			Habitat				Habitat				Habitat				Habitat			
PART I - Physical, Chemical and Biological Indicators				**PART I - Physical, Chemical and Biological Indicators**				**PART I - Physical, Chemical and Biological Indicators**				**PART I - Physical, Chemical and Biological Indicators**				**PART I - Physical, Chemical and Biological Indicators**			
	Points Scale	Range	Site Score		Points Scale	Range	Site Score		Points Scale	Range	Site Score		Points Scale	Range	Site Score		Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all streams classifications)				**PHYSICAL INDICATOR** (Applies to all streams classifications)				**PHYSICAL INDICATOR** (Applies to all streams classifications)				**PHYSICAL INDICATOR** (Applies to all streams classifications)				**PHYSICAL INDICATOR** (Applies to all streams classifications)			
USEPA RBP (High Gradient Data Sheet)				**USEPA RBP (High Gradient Data Sheet)**				**USEPA RBP (High Gradient Data Sheet)**				**USEPA RBP (High Gradient Data Sheet)**				**USEPA RBP (High Gradient Data Sheet)**			
1. Epifaunal Substrate/Available Cover	0-20	0-1	6	1. Epifaunal Substrate/Available Cover	0-20	0-1		1. Epifaunal Substrate/Available Cover	0-20	0-1		1. Epifaunal Substrate/Available Cover	0-20	0-1		1. Epifaunal Substrate/Available Cover	0-20	0-1	
2. Embeddedness	0-20		10	2. Embeddedness	0-20			2. Embeddedness	0-20			2. Embeddedness	0-20			2. Embeddedness	0-20		
3. Velocity/ Depth Regime	0-20		0	3. Velocity/ Depth Regime	0-20			3. Velocity/ Depth Regime	0-20			3. Velocity/ Depth Regime	0-20			3. Velocity/ Depth Regime	0-20		
4. Sediment Deposition	0-20		10	4. Sediment Deposition	0-20			4. Sediment Deposition	0-20			4. Sediment Deposition	0-20			4. Sediment Deposition	0-20		
5. Channel Flow Status	0-20		0	5. Channel Flow Status	0-20			5. Channel Flow Status	0-20			5. Channel Flow Status	0-20			5. Channel Flow Status	0-20		
6. Channel Alteration	0-20		12	6. Channel Alteration	0-20			6. Channel Alteration	0-20			6. Channel Alteration	0-20			6. Channel Alteration	0-20		
7. Frequency of Riffles (or bends)	0-20		0	7. Frequency of Riffles (or bends)	0-20			7. Frequency of Riffles (or bends)	0-20			7. Frequency of Riffles (or bends)	0-20			7. Frequency of Riffles (or bends)	0-20		
8. Bank Stability (LB & RB)	0-20		14	8. Bank Stability (LB & RB)	0-20			8. Bank Stability (LB & RB)	0-20			8. Bank Stability (LB & RB)	0-20			8. Bank Stability (LB & RB)	0-20		
9. Vegetative Protection (LB & RB)	0-20		4	9. Vegetative Protection (LB & RB)	0-20			9. Vegetative Protection (LB & RB)	0-20			9. Vegetative Protection (LB & RB)	0-20			9. Vegetative Protection (LB & RB)	0-20		
10. Riparian Vegetative Zone Width (LB & RB)	0-20		10	10. Riparian Vegetative Zone Width (LB & RB)	0-20			10. Riparian Vegetative Zone Width (LB & RB)	0-20			10. Riparian Vegetative Zone Width (LB & RB)	0-20			10. Riparian Vegetative Zone Width (LB & RB)	0-20		
Total RBP Score	Marginal		60	Total RBP Score	Poor		0	Total RBP Score	Poor		0	Total RBP Score	Poor		0	Total RBP Score	Poor		0
Sub-Total			0.5	Sub-Total			0	Sub-Total			0	Sub-Total			0	Sub-Total			0
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)				**CHEMICAL INDICATOR** (Applies to Intermittent and Perennial Streams)				**CHEMICAL INDICATOR** (Applies to Intermittent and Perennial Streams)				**CHEMICAL INDICATOR** (Applies to Intermittent and Perennial Streams)				**CHEMICAL INDICATOR** (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)				**WVDEP Water Quality Indicators (General)**				**WVDEP Water Quality Indicators (General)**				**WVDEP Water Quality Indicators (General)**				**WVDEP Water Quality Indicators (General)**			
Specific Conductivity				**Specific Conductivity**				**Specific Conductivity**				**Specific Conductivity**				**Specific Conductivity**			
<=99 - 90 points	0-90	0-1	50		0-90	0-1			0-90	0-1			0-90	0-1			0-90	0-1	
pH				**pH**				**pH**				**pH**				**pH**			
6.0-8.0 = 80 points	0-80		6		5-90				5-90		5.6		5-90				5-90		
DO				**DO**				**DO**				**DO**				**DO**			
>5.0 = 30 points	10-30		30		10-30				10-30				10-30				10-30		
Sub-Total			1	Sub-Total			0	Sub-Total			0	Sub-Total			0	Sub-Total			0
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)				**BIOLOGICAL INDICATOR** (Applies to Intermittent and Perennial Streams)				**BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)**				**BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)**				**BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)**			
WV Stream Condition Index (WVSCI)				**WV Stream Condition Index (WVSCI)**				**WV Stream Condition Index (WVSCI)**				**WV Stream Condition Index (WVSCI)**				**WV Stream Condition Index (WVSCI)**			
Very Good	0-100	0-1	100		0-100	0-1			0-100	0-1			0-100	0-1			0-100	0-1	
Sub-Total			1	Sub-Total			0	Sub-Total			0	Sub-Total			0	Sub-Total			0

PART II - Index and Unit Score			PART II - Index and Unit Score			PART II - Index and Unit Score			PART II - Index and Unit Score			PART II - Index and Unit Score		
Index	Linear Feet	Unit Score	Index	Linear Feet	Unit Score	Index	Linear Feet	Unit Score	Index	Linear Feet	Unit Score	Index	Linear Feet	Unit Score
0.833	36	30	0	0	0	0	0	0	0	0	0	0	0	0

West Virginia Stream and Wetland Valuation Metric (SWVM)
Version 2.1, September 2015

PART III - Impact Factors
(See instruction page to insert default values for MITIGATION BANKING and ILF)

Temporal Loss-Construction

**Note: Reflects duration of aquatic functional loss between the time of an impact (debit) and completion of compensatory mitigation (credit).*

Years	0
Sub-Total	0

Temporal Loss-Maturity

**Note: Period between completion of compensatory mitigation measures and the time required for maturity, as it relates to function (i.e. maturity of tree stratum to provide organic matter and detritus within riparian stream or wetland buffer corridor).*

% Add. Mitigation	Temporal Loss-Maturity (Years)
0%	0
Sub-Total	0

Long-term Protection

% Add. Mitigation and Monitoring Period	Long-Term Protection (Years)
0 + 5/10 Year Monitoring	101
Sub-Total	0

PART IV - Index to Unit Score Conversion

Final Index Score (Debit)	Linear Feet	Unit Score (Debit)	ILF Costs (Offsetting Debit Units)
0.833333333	36	30	$24,000.00

PART V- Comparison of Unit Scores and Projected Balance

Final Unit Score (Debit) [No Net Loss Value]	30	Mitigation Existing Condition - Baseline (Credit)		Mitigation Projected at Five Years Post Completion (Credit)		Mitigation Projected at Ten Years Post Completion (Credit)		Mitigation Projected At Maturity (Credit)	
FINAL PROJECTED NET BALANCE					0		0		0

Part VI - Mitigation Considerations (Incentives)

Extent of Stream Restoration

***Note1: Reference the Instructional handout to determine the correct Restoration Levels (below) for your project**
***Note2: Place an "X" in the appropriate category (only select one).**

☐ Restoration Level 1	
☐ Restoration Level 2	
☐ Restoration Level 3	

Compensatory Mitigation Plan incorporates HUC 12-based watershed approach? (Yes or No) *Note: HUC 12-based watershed approach required to obtain Stream Restoration incentive	No

Site	Impact Unit Yield (Debit)	Mitigation Unit Yield (Credit)
S-OP8	30	#DIV/0!

Extended Upland Buffer Zone

***Note[1]: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below)**
***Note[2]: Enter the buffer width for each channel side (Left Bank and Right Bank)**
***Note[3]: Select the appropriate mitigation type**

Buffer Width	Left Bank	
	0-50	None
	51-150	None
Buffer Width	**Right Bank**	
	0-50	None
	51-150	None
Average Buffer Width/Side	0	

Straight Preservation Ratio (v2.1, Sept 2015)	
Final Mitigation Unit Yield	
#DIV/0!	

Ver. 1-25-11

FCI Calculator for the High-Gradient Headwater Streams in eastern Kentucky and western West Virginia HGM Guidebook

To ensure accurate calculations, the UPPERMOST STRATUM of the plant community is determined based on the calculated value for $V_{CCANOPY}$ (≥20% cover is required for tree/sapling strata). Go to the SAR Data Entry tab and enter site characteristics and data in the yellow cells. For information on determining how to split a project into SARs, see Chapter 5 of the Operational Draft Regional Guidebook for the Functional Assessment of High-gradient Ephemeral and Intermittent Headwater Streams in Western West Virginia and Eastern Kentucky (Environmental Laboratory U.S. Army Corps of Engineers 2010).

Project Name: MVP
Location: S-OP9 (Harrison County)
Sampling Date: 11/06/2019

Project Site Before Project

Subclass for this SAR:
Ephemeral Stream

Uppermost stratum present at this SAR:
Tree/Sapling Strata

SAR number:

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.34
Biogeochemical Cycling	0.70
Habitat	0.28

Variable Measure and Subindex Summary:

Variable	Name	Average Measure	Subindex
$V_{CCANOPY}$	Percent canpoy over channel.	35.00	0.30
V_{EMBED}	Average embeddedness of channel.	3.43	0.98
$V_{SUBSTRATE}$	Median stream channel substrate particle size.	0.25	0.13
V_{BERO}	Total percent of eroded stream channel bank.	0.00	1.00
V_{LWD}	Number of down woody stems per 100 feet of stream.	0.00	0.00
V_{TDBH}	Average dbh of trees.	16.67	1.00
V_{SNAG}	Number of snags per 100 feet of stream.	0.00	0.10
V_{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V_{SRICH}	Riparian vegetation species richness.	2.70	1.00
$V_{DETRITUS}$	Average percent cover of leaves, sticks, etc.	15.00	0.18
V_{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V_{WLUSE}	Weighted Average of Runoff Score for Catchment.	0.58	0.61

Version 1-25-11

High-Gradient Headwater Streams in eastern Kentucky and western West Virginia
Field Data Sheet and Calculator

Team:	C. Vileno, R. Aber	Latitude/UTM Northing:	39.32069
Project Name:	MVP	Longitude/UTM Easting:	-80.526495
Location:	S-OP9 (Harrison County)	Sampling Date:	11/06/2019
SAR Number:		Reach Length (ft): 100	Stream Type: Ephemeral Stream

Top Strata: Tree/Sapling Strata (determined from percent calculated in $V_{CCANOPY}$)

Site and Timing: Project Site | Before Project

Sample Variables 1-4 in stream channel

1 $V_{CCANOPY}$ Average percent cover over channel by tree and sapling canopy. Measure at no fewer than 10 roughly equidistant points along the stream. Measure only if tree/sapling cover is at least 20%. (If less than 20%, enter at least one value between 0 and 19 to trigger Top Strata choice.)

35.0 %

List the percent cover measurements at each point below:

50	40	15	15	40	50				

2 V_{EMBED} Average embeddedness of the stream channel. Measure at no fewer than 30 roughly equidistant points along the stream. Select a particle from the bed. Before moving it, determine the percentage of the surface and area surrounding the particle that is covered by fine sediment, and enter the rating according to the following table. If the bed is an artificial surface, or composed of fine sediments, use a rating score of 1. If the bed is composed of bedrock, use a rating score of 5.

3.4

Embeddedness rating for gravel, cobble and boulder particles (rescaled from Platts, Megahan, and Minshall 1983)

Rating	Rating Description
5	<5 percent of surface covered, surrounded, or buried by fine sediment (or bedrock)
4	5 to 25 percent of surface covered, surrounded, or buried by fine sediment
3	26 to 50 percent of surface covered, surrounded, or buried by fine sediment
2	51 to 75 percent of surface covered, surrounded, or buried by fine sediment
1	>75 percent of surface covered, surrounded, or buried by fine sediment (or artificial surface)

List the ratings at each point below:

3	3	3	3	3	4	3	2	2	2
2	3	4	4	4	4	3	3	3	3
4	4	4	4	4	5	5	4	4	4

3 $V_{SUBSTRATE}$ Median stream channel substrate particle size. Measure at no fewer than 30 roughly equidistant points along the stream; use the same points and particles as used in V_{EMBED}.

0.25 in

Enter particle size in inches to the nearest 0.1 inch at each point below (bedrock should be counted as 99 in, asphalt or concrete as 0.0 in, sand or finer particles as 0.08 in):

0.25	0.25	0.25	0.10	0.10	0.10	0.10	0.10	0.25	1.00
1.00	0.10	0.10	0.25	0.25	2.00	2.00	0.25	1.00	1.00
0.10	0.10	1.00	1.00	2.00	2.00	0.25	0.25	0.25	0.25

4 V_{BERO} Total percent of eroded stream channel bank. Enter the total number of feet of eroded bank on each side and the total percentage will be calculated If both banks are eroded, total erosion for the stream may be up to 200%.

0 %

Left Bank: 0 ft Right Bank: 0 ft

Sample Variables 5-9 within the entire riparian/buffer zone adjacent to the stream channel (25 feet from each bank).

5	V_{LWD}	Number of down woody stems (at least 4 inches in diameter and 36 inches in length) per 100 feet of stream reach. Enter the number from the entire 50'-wide buffer and within the channel, and the amount per 100 feet of stream will be calculated. Number of downed woody stems: 0	0.0
6	V_{TDBH}	Average dbh of trees (measure only if $V_{CCANOPY}$ tree/sapling cover is at least 20%). Trees are at least 4 inches (10 cm) in diameter. Enter tree DBHs in inches.	16.7
7	V_{SNAG}	Number of snags (at least 4" dbh and 36" tall) per 100 feet of stream. Enter number of snags on each side of the stream, and the amount per 100 feet will be calculated. Left Side: 0 Right Side: 0	0.0
8	V_{SSD}	Number of saplings and shrubs (woody stems up to 4 inches dbh) per 100 feet of stream (measure only if tree cover is <20%). Enter number of saplings and shrubs on each side of the stream, and the amount per 100 ft of stream will be calculated. Left Side: Right Side:	Not Used
9	V_{SRICH}	Riparian vegetation species richness per 100 feet of stream reach. Check all species present from Group 1 in the tallest stratum. Check all exotic and invasive species present in all strata. Species richness per 100 feet and the subindex will be calculated from these data.	2.70

List the dbh measurements of individual trees (at least 4 in) within the buffer on each side of the stream below:

Left Side					Right Side				
25	10	15			20	20	10		

Group 1 = 1.0				Group 2 (-1.0)			
☑	*Acer rubrum*	☐	*Magnolia tripetala*	☐	*Ailanthus altissima*	☐	*Lonicera japonica*
☐	*Acer saccharum*	☐	*Nyssa sylvatica*	☐	*Albizia julibrissin*	☐	*Lonicera tatarica*
☐	*Aesculus flava*	☐	*Oxydendrum arboreum*	☐	*Alliaria petiolata*	☐	*Lotus corniculatus*
☐	*Asimina triloba*	☑	*Prunus serotina*	☐	*Alternanthera philoxeroides*	☐	*Lythrum salicaria*
☐	*Betula alleghaniensis*	☐	*Quercus alba*			☑	*Microstegium vimineum*
☐	*Betula lenta*	☐	*Quercus coccinea*	☐	*Aster tataricus*	☐	*Paulownia tomentosa*
☐	*Carya alba*	☐	*Quercus imbricaria*	☐	*Cerastium fontanum*	☐	*Polygonum cuspidatum*
☐	*Carya glabra*	☐	*Quercus prinus*	☐	*Coronilla varia*	☐	*Pueraria montana*
☐	*Carya ovalis*	☐	*Quercus rubra*	☐	*Elaeagnus umbellata*	☐	*Rosa multiflora*
☑	*Carya ovata*	☐	*Quercus velutina*	☐	*Lespedeza bicolor*	☐	*Sorghum halepense*
☐	*Cornus florida*	☐	*Sassafras albidum*	☐	*Lespedeza cuneata*	☐	*Verbena brasiliensis*
☑	*Fagus grandifolia*	☐	*Tilia americana*	☐	*Ligustrum obtusifolium*		
☐	*Fraxinus americana*	☐	*Tsuga canadensis*	☐	*Ligustrum sinense*		
☐	*Liriodendron tulipifera*	☐	*Ulmus americana*				
☐	*Magnolia acuminata*						
4	Species in Group 1			1	Species in Group 2		

Sample Variables 10-11 within at least 8 subplots (40" x 40", or 1m x 1m) in the riparian/buffer zone within 25 feet from each bank. The four subplots should be placed roughly equidistantly along each side of the stream.

10 $V_{DETRITUS}$ Average percent cover of leaves, sticks, or other organic material. Woody debris <4" diameter and <36" long are include. Enter the percent cover of the detrital layer at each subplot.

15.00 %

Left Side				Right Side			
15	15	15		15	15	15	

11 V_{HERB} Average percentage cover of herbaceous vegetation (measure only if tree cover is <20%). Do *not* include woody stems at least 4" dbh and 36" tall. Because there may be several layers of ground cover vegetation percentages up through 200% are accepted. Enter the percent cover of ground vegetation at each subplot.

Not Used

Left Side				Right Side			

Sample Variable 12 within the entire catchment of the stream.

12 V_{WLUSE} Weighted Average of Runoff Score for watershed:

0.58

Land Use (Choose From Drop List)	Runoff Score	% in Catch-ment	Running Percent (not >100)
Forest and native range (50% to 75% ground cover)	0.7	60	60
Forest and native range (<50% ground cover)	0.5	30	90
Open space (pasture, lawns, parks, etc.), grass cover <50%	0.1	10	100

Summary

Variable	Value	VSI
$V_{CCANOPY}$	35 %	0.30
V_{EMBED}	3.4	0.98
$V_{SUBSTRATE}$	0.25 in	0.13
V_{BERO}	0 %	1.00
V_{LWD}	0.0	0.00
V_{TDBH}	16.7	1.00
V_{SNAG}	0.0	0.10
V_{SSD}	Not Used	Not Used
V_{SRICH}	2.70	1.00
$V_{DETRITUS}$	15.0 %	0.18
V_{HERB}	Not Used	Not Used
V_{WLUSE}	0.58	0.61

Notes:

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME S-OP9	LOCATION Harrison County	
STATION #_____ RIVERMILE_____	STREAM CLASS Ephemeral	
LAT 39.32069 LONG -80.526495	RIVER BASIN Tenmile Creek	
STORET #	AGENCY Tetra Tech	
INVESTIGATORS CV, RA		
FORM COMPLETED BY C.Vileno	DATE 11/06/2019 TIME 11:00	REASON FOR SURVEY Proposed pipeline

	Habitat Parameter	Condition Category			
		Optimal	Suboptimal	Marginal	Poor
Parameters to be evaluated in sampling reach	**1. Epifaunal Substrate/ Available Cover**	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	SCORE 6	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
	SCORE 10	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
	SCORE 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE 10	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach	Habitat Parameter	Condition Category			
		Optimal	**Suboptimal**	**Marginal**	**Poor**
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE 12	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
	SCORE 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
	SCORE 7 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	SCORE 7 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
	9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE 2 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	SCORE 2 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
	SCORE 5 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	SCORE 5 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 66

DO: _____

pH: _____

SC: _____

No / low flow at time of survey. Unable to sample water quality or WVSCI.

S-OP8

Stream Photograph Page

Stream ID S-OP8 Date: 04/27/2016

Photograph Direction West

Comments:

STREAM ID S-OP8		**STREAM NAME** UNT to Indian Run	
CLIENT EQT		**PROJECT NAME** MVP	
LAT 39.320961	**LONG** -80.526442	**DATE** 04/27/2016	**COUNTY** Harrison
INVESTIGATORS S. Townsend, C. Stoliker, K. Lew			
WATER TYPE TNW ☐ RPW ☐ NRPW ☑		**FLOW REGIME** Perennial ☐ Intermittent ☐ Ephemeral ☑	

CHANNEL FEATURES

Estimate Measurements
Top of Bank Width: 5.0 ft
Top of Bank Height:
LB 3.0 ft RB 2.5 ft
Water Depth: 1.00 in
Water Width: 0.3 ft
Ordinary High Water Mark (Width): 2.0 ft
Ordinary High Water Mark (Height): 4.0 in
Flow Direction: South

Sinuosity ✔ Low ___Medium ___High

Gradient ___ Flat (0.5/100 ft) ___ Moderate (2 ft/100 ft) ✔ Severe (10 ft/100 ft)

Stream Erosion
✔ None ___Moderate ___Heavy

Artificial, Modified or Channelized
___ Yes ✔ No

Within Roadside Ditch
___ Yes ✔ No

Culvert Present ___Yes ✔ No
Culvert Material:_____
Culvert Size: _____in

FLOW CHARACTERISTICS

Water Present
___No water, stream bed dry
___Stream bed moist
___Standing water
✔ Flowing water

Velocity
___Fast ✔ Moderate
___Slow

Proportion of Reach Represented by Stream Morphology Types (Only enter if water present)
Riffle 70 % Run %
Pool 30 %

Turbidity
✔ Clear ___Slightly turbid ___Turbid
___ Other_____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%) 100

Substrate Type	Diameter	% Composition in Sampling Reach
Bedrock		
Boulder	> 256 mm (10")	
Cobble	64-256 mm (2.5"-10")	25
Gravel	2-64 mm (0.1"-2.5")	20
Sand	0.06-2mm (gritty)	35
Silt	0.004-0.06 mm	20
Clay	< 0.004 mm (slick)	

ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)

Substrate Type	Characteristic	% Composition in Sampling Area
Detritus	sticks, wood, coarse plant materials (CPOM)	15
Muck-Mud	black, very fine organic (FPOM)	0
Marl	grey, shell fragments	0

WATERSHED FEATURES

Predominant Surrounding Landuse
✔ Forest ___ Commercial
___ Field/Pasture ___Industrial
___ Agricultural ___ Residential
___ ROW ___Other:

Canopy Cover
___Open ___Partly shaded
✔ Shaded

Floodplain Width
___ Wide > 30ft ___ Moderate 15-30ft
✔ Narrow <15ft

MACROINVERTEBRATES/OTHER WILDLIFE OBSERVED OR OTHER NOTES AND OBSERVATIONS

West Virginia Stream and Wetland Valuation Metric (SWVM)
Version 2.1, September 2015

USACE FILE NO./ Project Name: (v2.1, Sept 2015)	Mountain Valley Pipeline Project SWVM v2.1	IMPACT COORDINATES: (in Decimal Degrees)	Lat.	39.320959	Lon.	-80.526445	WEATHER:	Cloudy, 55	DATE:	6/1/2016
IMPACT STREAM/SITE ID AND SITE DESCRIPTION: (watershed size (acreage), unaltered or impairments)	S-OP8; UNT to Indian Run Form of Mitigation: Mitigation Bank	MITIGATION STREAM CLASS./SITE ID AND SITE DESCRIPTION: (watershed size (acreage), unaltered or impairments)							Comments:	No / low water flow at time of survey. Unable to sample water quality or WVSCI.
STREAM IMPACT LENGTH:	41	FORM OF MITIGATION:	RESTORATION (Levels I-III)	MIT COORDINATES: (in Decimal Degrees)	Lat.	39.320961	Lon.	-80.526441	PRECIPITATION PAST 48 HRS:	0	Mitigation Length:	

Column No. 1- Impact Existing Condition (Debit)				Column No. 2- Mitigation Existing Condition - Baseline (Credit)				Column No. 3- Mitigation Projected at Five Years Post Completion (Credit)				Column No. 4- Mitigation Projected at Ten Years Post Completion (Credit)				Column No. 5- Mitigation Projected at Maturity (Credit)			
Stream Classification:	Ephemeral			Stream Classification:	Ephemeral			Stream Classification:	Ephemeral			Stream Classification:	Ephemeral			Stream Classification:	Ephemeral		
Percent Stream Channel Slope				Percent Stream Channel Slope				Percent Stream Channel Slope	0			Percent Stream Channel Slope	0			Percent Stream Channel Slope	0		
HGM Score (attach data forms):				HGM Score (attach data forms):				HGM Score (attach data forms):				HGM Score (attach data forms):				HGM Score (attach data forms):			
		Average				Average				Average				Average				Average	
Hydrology	0.43			Hydrology				Hydrology				Hydrology				Hydrology			
Biogeochemical Cycling	0.75	0		Biogeochemical Cycling		0		Biogeochemical Cycling		0		Biogeochemical Cycling		0		Biogeochemical Cycling		0	
Habitat	0.35			Habitat				Habitat				Habitat				Habitat			
PART I - Physical, Chemical and Biological Indicators				PART I - Physical, Chemical and Biological Indicators				PART I - Physical, Chemical and Biological Indicators				PART I - Physical, Chemical and Biological Indicators				PART I - Physical, Chemical and Biological Indicators			
	Points Scale	Range	Site Score		Points Scale	Range	Site Score		Points Scale	Range	Site Score		Points Scale	Range	Site Score		Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all streams classifications)				PHYSICAL INDICATOR (Applies to all streams classifications)				PHYSICAL INDICATOR (Applies to all streams classifications)				PHYSICAL INDICATOR (Applies to all streams classifications)				PHYSICAL INDICATOR (Applies to all streams classifications)			
USEPA RBP (High Gradient Data Sheet)				USEPA RBP (High Gradient Data Sheet)				USEPA RBP (High Gradient Data Sheet)				USEPA RBP (High Gradient Data Sheet)				USEPA RBP (High Gradient Data Sheet)			
1. Epifaunal Substrate/Available Cover	0-20	0-1	10	1. Epifaunal Substrate/Available Cover	0-20	0-1		1. Epifaunal Substrate/Available Cover	0-20	0-1		1. Epifaunal Substrate/Available Cover	0-20	0-1		1. Epifaunal Substrate/Available Cover	0-20	0-1	
2. Embeddedness	0-20		12	2. Embeddedness	0-20			2. Embeddedness	0-20			2. Embeddedness	0-20			2. Embeddedness	0-20		
3. Velocity/ Depth Regime	0-20		0	3. Velocity/ Depth Regime	0-20			3. Velocity/ Depth Regime	0-20			3. Velocity/ Depth Regime	0-20			3. Velocity/ Depth Regime	0-20		
4. Sediment Deposition	0-20		10	4. Sediment Deposition	0-20			4. Sediment Deposition	0-20			4. Sediment Deposition	0-20			4. Sediment Deposition	0-20		
5. Channel Flow Status	0-20		0	5. Channel Flow Status	0-20			5. Channel Flow Status	0-20			5. Channel Flow Status	0-20			5. Channel Flow Status	0-20		
6. Channel Alteration	0-20		16	6. Channel Alteration	0-20			6. Channel Alteration	0-20			6. Channel Alteration	0-20			6. Channel Alteration	0-20		
7. Frequency of Riffles (or bends)	0-20		0	7. Frequency of Riffles (or bends)	0-20			7. Frequency of Riffles (or bends)	0-20			7. Frequency of Riffles (or bends)	0-20			7. Frequency of Riffles (or bends)	0-20		
8. Bank Stability (LB & RB)	0-20		18	8. Bank Stability (LB & RB)	0-20			8. Bank Stability (LB & RB)	0-20			8. Bank Stability (LB & RB)	0-20			8. Bank Stability (LB & RB)	0-20		
9. Vegetative Protection (LB & RB)	0-20		6	9. Vegetative Protection (LB & RB)	0-20			9. Vegetative Protection (LB & RB)	0-20			9. Vegetative Protection (LB & RB)	0-20			9. Vegetative Protection (LB & RB)	0-20		
10. Riparian Vegetative Zone Width (LB & RB)	0-20		12	10. Riparian Vegetative Zone Width (LB & RB)	0-20			10. Riparian Vegetative Zone Width (LB & RB)	0-20			10. Riparian Vegetative Zone Width (LB & RB)	0-20			10. Riparian Vegetative Zone Width (LB & RB)	0-20		
Total RBP Score	Suboptimal		74	Total RBP Score	Poor		0	Total RBP Score	Poor		0	Total RBP Score	Poor		0	Total RBP Score	Poor		0
Sub-Total			0.616666667	Sub-Total			0	Sub-Total			0	Sub-Total			0	Sub-Total			0
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)				CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)				CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)				CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)				CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)				WVDEP Water Quality Indicators (General)				WVDEP Water Quality Indicators (General)				WVDEP Water Quality Indicators (General)				WVDEP Water Quality Indicators (General)			
Specific Conductivity				Specific Conductivity				Specific Conductivity				Specific Conductivity				Specific Conductivity			
100-199 - 85 points	0-90	0-1			0-90	0-1			0-90	0-1			0-90	0-1			0-90	0-1	
pH				pH				pH				pH				pH			
5.6-5.9 = 45 points	0-80				5-90				5-90		5.9		5-90				5-90		
DO				DO				DO				DO				DO			
	10-30				10-30				10-30				10-30				10-30		
Sub-Total				Sub-Total			0	Sub-Total			0	Sub-Total			0	Sub-Total			0
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)				BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)				BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)				BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)				BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)			
WV Stream Condition Index (WVSCI)				WV Stream Condition Index (WVSCI)				WV Stream Condition Index (WVSCI)				WV Stream Condition Index (WVSCI)				WV Stream Condition Index (WVSCI)			
0	0-100	0-1			0-100	0-1			0-100	0-1			0-100	0-1			0-100	0-1	
Sub-Total			0	Sub-Total			0	Sub-Total			0	Sub-Total			0	Sub-Total			0

PART II - Index and Unit Score			PART II - Index and Unit Score			PART II - Index and Unit Score			PART II - Index and Unit Score			PART II - Index and Unit Score		
Index	Linear Feet	Unit Score	Index	Linear Feet	Unit Score	Index	Linear Feet	Unit Score	Index	Linear Feet	Unit Score	Index	Linear Feet	Unit Score
0.708	41	29.04166667	0	0	0	0	0	0	0	0	0	0	0	0

West Virginia Stream and Wetland Valuation Metric (SWVM)
Version 2.1, September 2015

PART III - Impact Factors
(See instruction page to insert default values for MITIGATION BANKING and ILF)

Temporal Loss-Construction

**Note: Reflects duration of aquatic functional loss between the time of an impact (debit) and completion of compensatory mitigation (credit).*

Years	0
Sub-Total	0

Temporal Loss-Maturity

**Note: Period between completion of compensatory mitigation measures and the time required for maturity, as it relates to function (i.e. maturity of tree stratum to provide organic matter and detritus within riparian stream or wetland buffer corridor).*

% Add. Mitigation	Temporal Loss-Maturity (Years)
0%	0
Sub-Total	0

Long-term Protection

% Add. Mitigation and Monitoring Period	Long-Term Protection (Years)
0 + 5/10 Year Monitoring	101
Sub-Total	0

PART IV - Index to Unit Score Conversion

Final Index Score (Debit)	Linear Feet	Unit Score (Debit)	ILF Costs (Offsetting Debit Units)
0.708333333	41	29.04166667	$23,233.33

PART V- Comparison of Unit Scores and Projected Balance

Final Unit Score (Debit) [No Net Loss Value]	29.04166667	Mitigation Existing Condition - Baseline (Credit)		Mitigation Projected at Five Years Post Completion (Credit)		Mitigation Projected at Ten Years Post Completion (Credit)		Mitigation Projected At Maturity (Credit)	
FINAL PROJECTED NET BALANCE					0		0		0

Part VI - Mitigation Considerations (Incentives)

Extent of Stream Restoration

***Note1: Reference the Instructional handout to determine the correct Restoration Levels (below) for your project**
***Note2: Place an "X" in the appropriate category (only select one).**

☐ Restoration Level 1	
☐ Restoration Level 2	
☐ Restoration Level 3	

Compensatory Mitigation Plan incorporates HUC 12-based watershed approach? (Yes or No) *Note: HUC 12-based watershed approach required to obtain Stream Restoration incentive	No

Site	Impact Unit Yield (Debit)	Mitigation Unit Yield (Credit)
S-OP8	29.04166667	#DIV/0!

Extended Upland Buffer Zone

***Note[1]: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below)**
***Note[2]: Enter the buffer width for each channel side (Left Bank and Right Bank)**
***Note[3]: Select the appropriate mitigation type**

Buffer Width	Left Bank	
	0-50	None
	51-150	None
Buffer Width	**Right Bank**	
	0-50	None
	51-150	None
Average Buffer Width/Side	0	

Straight Preservation Ratio (v2.1, Sept 2015)	
Final Mitigation Unit Yield	
#DIV/0!	

Ver. 1-25-11

FCI Calculator for the High-Gradient Headwater Streams in eastern Kentucky and western West Virginia HGM Guidebook

To ensure accurate calculations, the UPPERMOST STRATUM of the plant community is determined based on the calculated value for $V_{CCANOPY}$ (≥20% cover is required for tree/sapling strata). Go to the SAR Data Entry tab and enter site characteristics and data in the yellow cells. For information on determining how to split a project into SARs, see Chapter 5 of the Operational Draft Regional Guidebook for the Functional Assessment of High-gradient Ephemeral and Intermittent Headwater Streams in Western West Virginia and Eastern Kentucky (Environmental Laboratory U.S. Army Corps of Engineers 2010).

Project Name: MVP
Location: S-OP8 (Harrison County)
Sampling Date: 11/06/2019

Project Site Before Project

Subclass for this SAR:
Ephemeral Stream

Uppermost stratum present at this SAR:
Tree/Sapling Strata

SAR number:

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.43
Biogeochemical Cycling	0.75
Habitat	0.35

Variable Measure and Subindex Summary:

Variable	Name	Average Measure	Subindex
$V_{CCANOPY}$	Percent canpoy over channel.	37.00	0.32
V_{EMBED}	Average embeddedness of channel.	3.77	1.00
$V_{SUBSTRATE}$	Median stream channel substrate particle size.	0.25	0.13
V_{BERO}	Total percent of eroded stream channel bank.	0.00	1.00
V_{LWD}	Number of down woody stems per 100 feet of stream.	3.00	0.38
V_{TDBH}	Average dbh of trees.	12.40	1.00
V_{SNAG}	Number of snags per 100 feet of stream.	2.00	1.00
V_{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V_{SRICH}	Riparian vegetation species richness.	1.80	0.86
$V_{DETRITUS}$	Average percent cover of leaves, sticks, etc.	15.00	0.18
V_{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V_{WLUSE}	Weighted Average of Runoff Score for Catchment.	0.58	0.61

Version 1-25-11

High-Gradient Headwater Streams in eastern Kentucky and western West Virginia
Field Data Sheet and Calculator

Team:	C. Vileno, R. Aber	Latitude/UTM Northing:	39.320961
Project Name:	MVP	Longitude/UTM Easting:	-80.526441
Location:	S-OP8 (Harrison County)	Sampling Date:	11/06/2019

SAR Number: | Reach Length (ft): 100 | Stream Type: Ephemeral Stream

Top Strata: Tree/Sapling Strata (determined from percent calculated in $V_{CCANOPY}$)

Site and Timing: Project Site | Before Project

Sample Variables 1-4 in stream channel

1 $V_{CCANOPY}$ Average percent cover over channel by tree and sapling canopy. Measure at no fewer than 10 roughly equidistant points along the stream. Measure only if tree/sapling cover is at least 20%. (If less than 20%, enter at least one value between 0 and 19 to trigger Top Strata choice.)

37.0 %

List the percent cover measurements at each point below:

40	40	20	20	30	30	40	50	50	50

2 V_{EMBED} Average embeddedness of the stream channel. Measure at no fewer than 30 roughly equidistant points along the stream. Select a particle from the bed. Before moving it, determine the percentage of the surface and area surrounding the particle that is covered by fine sediment, and enter the rating according to the following table. If the bed is an artificial surface, or composed of fine sediments, use a rating score of 1. If the bed is composed of bedrock, use a rating score of 5.

3.8

Embeddedness rating for gravel, cobble and boulder particles (rescaled from Platts, Megahan, and Minshall 1983)

Rating	Rating Description
5	<5 percent of surface covered, surrounded, or buried by fine sediment (or bedrock)
4	5 to 25 percent of surface covered, surrounded, or buried by fine sediment
3	26 to 50 percent of surface covered, surrounded, or buried by fine sediment
2	51 to 75 percent of surface covered, surrounded, or buried by fine sediment
1	>75 percent of surface covered, surrounded, or buried by fine sediment (or artificial

List the ratings at each point below:

4	5	4	4	3	4	4	3	3	3
3	3	4	4	4	4	4	4	4	4
5	5	3	3	3	3	3	5	5	3

3 $V_{SUBSTRATE}$ Median stream channel substrate particle size. Measure at no fewer than 30 roughly equidistant points along the stream; use the same points and particles as used in V_{EMBED}.

0.25 in

Enter particle size in inches to the nearest 0.1 inch at each point below (bedrock should be counted as 99 in, asphalt or concrete as 0.0 in, sand or finer particles as 0.08 in):

3.00	2.00	2.00	2.00	0.25	0.25	0.25	0.25	0.25	1.00
1.00	0.10	0.10	0.10	0.25	0.25	0.25	0.25	1.00	1.00
0.25	0.10	1.00	1.00	2.00	2.00	0.25	0.25	0.25	0.25

4 V_{BERO} Total percent of eroded stream channel bank. Enter the total number of feet of eroded bank on each side and the total percentage will be calculated If both banks are eroded, total erosion for the stream may be up to 200%.

0 %

Left Bank: 0 ft Right Bank: 0 ft

Sample Variables 5-9 within the entire riparian/buffer zone adjacent to the stream channel (25 feet from each bank).

5 V_{LWD} Number of down woody stems (at least 4 inches in diameter and 36 inches in length) per 100 feet of stream reach. Enter the number from the entire 50'-wide buffer and within the channel, and the amount per 100 feet of stream will be calculated. **3.0**

Number of downed woody stems: 3

6 V_{TDBH} Average dbh of trees (measure only if $V_{CCANOPY}$ tree/sapling cover is at least 20%). Trees are at least 4 inches (10 cm) in diameter. Enter tree DBHs in inches. **12.4**

List the dbh measurements of individual trees (at least 4 in) within the buffer on each side of the stream below:

Left Side					Right Side				
8	12	20	6	10	20	18	8	5	17

7 V_{SNAG} Number of snags (at least 4" dbh and 36" tall) per 100 feet of stream. Enter number of snags on each side of the stream, and the amount per 100 feet will be calculated. **2.0**

Left Side: 1 Right Side: 1

8 V_{SSD} Number of saplings and shrubs (woody stems up to 4 inches dbh) per 100 feet of stream (measure only if tree cover is <20%). Enter number of saplings and shrubs on each side of the stream, and the amount per 100 ft of stream will be calculated. **Not Used**

Left Side: Right Side:

9 V_{SRICH} Riparian vegetation species richness per 100 feet of stream reach. Check all species present from Group 1 in the tallest stratum. Check all exotic and invasive species present in all strata. Species richness per 100 feet and the subindex will be calculated from these data. **1.80**

Group 1 = 1.0				Group 2 (-1.0)			
☑	*Acer rubrum*	☐	*Magnolia tripetala*	☐	*Ailanthus altissima*	☐	*Lonicera japonica*
☐	*Acer saccharum*	☐	*Nyssa sylvatica*	☐	*Albizia julibrissin*	☐	*Lonicera tatarica*
☐	*Aesculus flava*	☐	*Oxydendrum arboreum*	☐	*Alliaria petiolata*	☐	*Lotus corniculatus*
☐	*Asimina triloba*	☑	*Prunus serotina*	☐	*Alternanthera philoxeroides*	☐	*Lythrum salicaria*
☐	*Betula alleghaniensis*	☐	*Quercus alba*			☑	*Microstegium vimineum*
☐	*Betula lenta*	☐	*Quercus coccinea*	☐	*Aster tataricus*	☐	*Paulownia tomentosa*
☐	*Carya alba*	☐	*Quercus imbricaria*	☐	*Cerastium fontanum*	☐	*Polygonum cuspidatum*
☐	*Carya glabra*	☐	*Quercus prinus*	☐	*Coronilla varia*	☐	*Pueraria montana*
☐	*Carya ovalis*	☐	*Quercus rubra*	☐	*Elaeagnus umbellata*	☐	*Rosa multiflora*
☐	*Carya ovata*	☐	*Quercus velutina*	☐	*Lespedeza bicolor*	☐	*Sorghum halepense*
☐	*Cornus florida*	☐	*Sassafras albidum*	☐	*Lespedeza cuneata*	☐	*Verbena brasiliensis*
☑	*Fagus grandifolia*	☐	*Tilia americana*	☐	*Ligustrum obtusifolium*		
☐	*Fraxinus americana*	☐	*Tsuga canadensis*	☐	*Ligustrum sinense*		
☐	*Liriodendron tulipifera*	☐	*Ulmus americana*				
☐	*Magnolia acuminata*						
3 Species in Group 1				1 Species in Group 2			

Sample Variables 10-11 within at least 8 subplots (40" x 40", or 1m x 1m) in the riparian/buffer zone within 25 feet from each bank. The four subplots should be placed roughly equidistantly along each side of the stream.

10 $V_{DETRITUS}$ Average percent cover of leaves, sticks, or other organic material. Woody debris <4" diameter and <36" long are include. Enter the percent cover of the detrital layer at each subplot. **15.00 %**

Left Side				Right Side			
15	15	15		15	15	15	

11 V_{HERB} Average percentage cover of herbaceous vegetation (measure only if tree cover is <20%). Do *not* include woody stems at least 4" dbh and 36" tall. Because there may be several layers of ground cover vegetation percentages up through 200% are accepted. Enter the percent cover of ground vegetation at each subplot. **Not Used**

Left Side				Right Side			

Sample Variable 12 within the entire catchment of the stream.

12 V_{WLUSE} Weighted Average of Runoff Score for watershed: **0.58**

Land Use (Choose From Drop List)	Runoff Score	% in Catch-ment	Running Percent (not >100)
Forest and native range (50% to 75% ground cover)	0.7	60	60
Forest and native range (<50% ground cover)	0.5	30	90
Open space (pasture, lawns, parks, etc.), grass cover <50%	0.1	10	100

Summary

Variable	Value	VSI
$V_{CCANOPY}$	37 %	0.32
V_{EMBED}	3.8	1.00
$V_{SUBSTRATE}$	0.25 in	0.13
V_{BERO}	0 %	1.00
V_{LWD}	3.0	0.38
V_{TDBH}	12.4	1.00
V_{SNAG}	2.0	1.00
V_{SSD}	Not Used	Not Used
V_{SRICH}	1.80	0.86
$V_{DETRITUS}$	15.0 %	0.18
V_{HERB}	Not Used	Not Used
V_{WLUSE}	0.58	0.61

Notes:

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME S-OP8	LOCATION Harrison County	
STATION #_____ RIVERMILE_____	STREAM CLASS Ephemeral	
LAT 39.320961 LONG -80.526441	RIVER BASIN Tenmile Creek	
STORET #	AGENCY Tetra Tech	
INVESTIGATORS CV, RA		
FORM COMPLETED BY C.Vileno	DATE 11/06/2019 TIME 10:30	REASON FOR SURVEY Proposed pipeline

	Habitat Parameter	Condition Category			
		Optimal	Suboptimal	Marginal	Poor
Parameters to be evaluated in sampling reach	**1. Epifaunal Substrate/ Available Cover**	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	SCORE 10	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
	SCORE 12	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
	SCORE 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE 10	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach	Habitat Parameter	Condition Category			
		Optimal	**Suboptimal**	**Marginal**	**Poor**
	6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE 16	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
	SCORE 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
	SCORE 9 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	SCORE 9 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
	9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE 3 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	SCORE 3 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
	SCORE 6 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	SCORE 6 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 84

No / low flow at time of survey. Unable to sample water quality or WVSCI.

S-B79

Stream Photograph Page

Stream ID S-B79 Date: 05/31/2015

Photograph Direction SW

Comments:

STREAM ID S-B79	**STREAM NAME** UNT to Big Elk Creek
LAT 39.423457 **LONG** -80.476453	**DATE** 05/31/2015
CLIENT MVP	**PROJECT NAME** MVP
INVESTIGATORS C. Ansari, M. Whitten, M. Brice	
FLOW REGIME Perennial ___ Intermittent___ Ephemeral ✔	**WATER TYPE** TNW ___ RPW ___ NRPW ✔

CHANNEL FEATURES

Estimate Measurements
Top of Bank Width: 1.5 ft
Top of Bank Height:
LB 10.0 in RB 10.0 in
Water Depth: 0.00 in
Water Width: 0.0 ft
High Water Mark: 4.0 in
Flow Direction: South

Stream Erosion
___None ✔ Moderate ___Heavy

Artificial, Modified or Channelized
___ Yes ✔ No

Dam Present ___Yes ✔ No

Sinuosity ✔ Low ___ Medium ___ High

Gradient
___ Flat (0.5/100 ft) ___Moderate (2 ft/100 ft) ✔ Severe (10 ft/100 ft)

FLOW CHARACTERISTICS

Water Present
✔ No water, stream bed dry
___ Stream bed moist
___ Standing water
___ Flowing water

Velocity
___ Fast ___ Moderate
___ Slow

Proportion of Reach Represented by Stream Morphology Types
Riffle % Run %
Pool %

Turbidity
___ Clear ___Slightly turbid ___Turbid
___ Opaque ___Stained
✔ Other None

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)

Substrate Type	Diameter	% Composition in Sampling Reach
Bedrock		
Boulder	> 256 mm (10")	
Cobble	64-256 mm (2.5"-10")	10
Gravel	2-64 mm (0.1"-2.5")	10
Sand	0.06-2mm (gritty)	20
Silt	0.004-0.06 mm	40
Clay	< 0.004 mm (slick)	20

ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)

Substrate Type	Characteristic	% Composition in Sampling Area
Detritus	sticks, wood, coarse plant materials (CPOM)	5
Muck-Mud	black, very fine organic (FPOM)	
Marl	grey, shell fragments	

WATERSHED FEATURES

Predominant Surrounding Landuse
___ Forest ___ Commercial
✔ Field/Pasture ___Industrial
___ Agricultural ___ Residential
___ Other:

Canopy Cover
___Partly open ___Partly shaded
___Shaded ✔ Open

Indicate the dominant type (Check one)
___ Trees ___ Shrubs
___ Grasses ✔ Herbaceous

Floodplain Width
___ Wide > 30ft ___ Moderate 15-30ft
✔ Narrow <16ft

Wetland Present ___Yes ✔ No
Wetland ID

AQUATIC VEGETATION

Indicate the dominant type and record the dominant species present
___Rooted emergent ___Rooted submergent ___Rooted floating ___Free floating
___Floating algae ___Attached algae

MACROINVERTEBRATES OR OTHER WILDLIFE OBSERVED/OTHER OBSERVATIONS AND NOTES

West Virginia Stream and Wetland Valuation Metric (SWVM)
Version 2.1, September 2015

USACE FILE NO./ Project Name: (v2.1, Sept 2015)	**Mountain Valley Pipeline Project SWVM v2.1**	**IMPACT COORDINATES: (in Decimal Degrees)**	**Lat.**	**39.423499**	**Lon.**	**-80.476392**	**WEATHER:**	**Cloudy, 70°**	**DATE:**	**June 2, 2016**
IMPACT STREAM/SITE ID AND SITE DESCRIPTION: (watershed size {acreage}, unaltered or impairments)	**S-B79; UNT to Big Elk Creek; 1.81ac watershed** **Form of Mitigation: Mitigation Bank**	**MITIGATION STREAM CLASS./SITE ID AND SITE DESCRIPTION:** (watershed size {acreage}, unaltered or impairments)							**Comments:**	**No/low water flow at time of survey. Unable to sample water quality or WVSCI**
STREAM IMPACT LENGTH: **60** **FORM OF MITIGATION:**	**RESTORATION (Levels I-III)**	**MIT COORDINATES: (in Decimal Degrees)**	**Lat.**		**Lon.**		**PRECIPITATION PAST 48 HRS:**	**0.75"**	**Mitigation Length:**	

Column No. 1- Impact Existing Condition (Debit)				Column No. 2- Mitigation Existing Condition - Baseline (Credit)				Column No. 3- Mitigation Projected at Five Years Post Completion (Credit)				Column No. 4- Mitigation Projected at Ten Years Post Completion (Credit)				Column No. 5- Mitigation Projected at Maturity (Credit)			
Stream Classification:	**Ephemeral**			**Stream Classification:**	**Ephemeral**			**Stream Classification:**	**Ephemeral**			**Stream Classification:**	**Ephemeral**			**Stream Classification:**	**Ephemeral**		
Percent Stream Channel Slope	**9**			**Percent Stream Channel Slope**				**Percent Stream Channel Slope**	**0**			**Percent Stream Channel Slope**	**0**			**Percent Stream Channel Slope**	**0**		
HGM Score (attach data forms):				**HGM Score (attach data forms):**				**HGM Score (attach data forms):**				**HGM Score (attach data forms):**				**HGM Score (attach data forms):**			
			Average				**Average**				**Average**				**Average**				**Average**
Hydrology	0.42			**Hydrology**				**Hydrology**				**Hydrology**				**Hydrology**			
Biogeochemical Cycling	0.28		0.256666667	**Biogeochemical Cycling**			0	**Biogeochemical Cycling**			0	**Biogeochemical Cycling**			0	**Biogeochemical Cycling**			0
Habitat	0.07			Habitat				Habitat				Habitat				Habitat			
PART I - Physical, Chemical and Biological Indicators				**PART I - Physical, Chemical and Biological Indicators**				**PART I - Physical, Chemical and Biological Indicators**				**PART I - Physical, Chemical and Biological Indicators**				**PART I - Physical, Chemical and Biological Indicators**			
	Points Scale	Range	Site Score		Points Scale	Range	Site Score		Points Scale	Range	Site Score		Points Scale	Range	Site Score		Points Scale	Range	Site Score
PHYSICAL INDICATOR (Applies to all streams classifications)				**PHYSICAL INDICATOR** (Applies to all streams classifications)				**PHYSICAL INDICATOR** (Applies to all streams classifications)				**PHYSICAL INDICATOR** (Applies to all streams classifications)				**PHYSICAL INDICATOR** (Applies to all streams classifications)			
USEPA RBP (High Gradient Data Sheet)				**USEPA RBP (High Gradient Data Sheet)**				**USEPA RBP (High Gradient Data Sheet)**				**USEPA RBP (High Gradient Data Sheet)**				**USEPA RBP (High Gradient Data Sheet)**			
1. Epifaunal Substrate/Available Cover	0-20	0-1	0	1. Epifaunal Substrate/Available Cover	0-20	0-1		1. Epifaunal Substrate/Available Cover	0-20	0-1		1. Epifaunal Substrate/Available Cover	0-20	0-1		1. Epifaunal Substrate/Available Cover	0-20	0-1	
2. Embeddedness	0-20		2	2. Embeddedness	0-20			2. Embeddedness	0-20			2. Embeddedness	0-20			2. Embeddedness	0-20		
3. Velocity/ Depth Regime	0-20		0	3. Velocity/ Depth Regime	0-20			3. Velocity/ Depth Regime	0-20			3. Velocity/ Depth Regime	0-20			3. Velocity/ Depth Regime	0-20		
4. Sediment Deposition	0-20		1	4. Sediment Deposition	0-20			4. Sediment Deposition	0-20			4. Sediment Deposition	0-20			4. Sediment Deposition	0-20		
5. Channel Flow Status	0-20		0	5. Channel Flow Status	0-20			5. Channel Flow Status	0-20			5. Channel Flow Status	0-20			5. Channel Flow Status	0-20		
6. Channel Alteration	0-20		4	6. Channel Alteration	0-20			6. Channel Alteration	0-20			6. Channel Alteration	0-20			6. Channel Alteration	0-20		
7. Frequency of Riffles (or bends)	0-20		0	7. Frequency of Riffles (or bends)	0-20			7. Frequency of Riffles (or bends)	0-20			7. Frequency of Riffles (or bends)	0-20			7. Frequency of Riffles (or bends)	0-20		
8. Bank Stability (LB & RB)	0-20		6	8. Bank Stability (LB & RB)	0-20			8. Bank Stability (LB & RB)	0-20			8. Bank Stability (LB & RB)	0-20			8. Bank Stability (LB & RB)	0-20		
9. Vegetative Protection (LB & RB)	0-20		8	9. Vegetative Protection (LB & RB)	0-20			9. Vegetative Protection (LB & RB)	0-20			9. Vegetative Protection (LB & RB)	0-20			9. Vegetative Protection (LB & RB)	0-20		
10. Riparian Vegetative Zone Width (LB & RB)	0-20		6	10. Riparian Vegetative Zone Width (LB & RB)	0-20			10. Riparian Vegetative Zone Width (LB & RB)	0-20			10. Riparian Vegetative Zone Width (LB & RB)	0-20			10. Riparian Vegetative Zone Width (LB & RB)	0-20		
Total RBP Score	Poor		27	Total RBP Score	Poor		0	Total RBP Score	Poor		0	Total RBP Score	Poor		0	Total RBP Score	Poor		0
Sub-Total			0.225	Sub-Total			0	Sub-Total			0	Sub-Total			0	Sub-Total			0
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)				**CHEMICAL INDICATOR** (Applies to Intermittent and Perennial Streams)				**CHEMICAL INDICATOR** (Applies to Intermittent and Perennial Streams)				**CHEMICAL INDICATOR** (Applies to Intermittent and Perennial Streams)				**CHEMICAL INDICATOR** (Applies to Intermittent and Perennial Streams)			
WVDEP Water Quality Indicators (General)				**WVDEP Water Quality Indicators (General)**				**WVDEP Water Quality Indicators (General)**				**WVDEP Water Quality Indicators (General)**				**WVDEP Water Quality Indicators (General)**			
Specific Conductivity				**Specific Conductivity**				**Specific Conductivity**				**Specific Conductivity**				**Specific Conductivity**			
100-199 - 85 points	0-90	0-1			0-90	0-1			0-90	0-1			0-90	0-1			0-90	0-1	
pH				**pH**				**pH**				**pH**				**pH**			
5.6-5.9 = 45 points	0-80				5-90				5-90				5-90				5-90		
DO				**DO**				**DO**				**DO**				**DO**			
	10-30				10-30				10-30				10-30				10-30		
Sub-Total				Sub-Total			0	Sub-Total			0	Sub-Total			0	Sub-Total			0
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)				**BIOLOGICAL INDICATOR** (Applies to Intermittent and Perennial Streams)				**BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)**				**BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)**				**BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)**			
WV Stream Condition Index (WVSCI)				**WV Stream Condition Index (WVSCI)**				**WV Stream Condition Index (WVSCI)**				**WV Stream Condition Index (WVSCI)**				**WV Stream Condition Index (WVSCI)**			
0	0-100	0-1			0-100	0-1			0-100	0-1			0-100	0-1			0-100	0-1	
Sub-Total			0	Sub-Total			0	Sub-Total			0	Sub-Total			0	Sub-Total			0

PART II - Index and Unit Score			PART II - Index and Unit Score			PART II - Index and Unit Score			PART II - Index and Unit Score			PART II - Index and Unit Score		
Index	**Linear Feet**	**Unit Score**	**Index**	**Linear Feet**	**Unit Score**	**Index**	**Linear Feet**	**Unit Score**	**Index**	**Linear Feet**	**Unit Score**	**Index**	**Linear Feet**	**Unit Score**
0.385	**60**	**23.075**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

West Virginia Stream and Wetland Valuation Metric (SWVM)
Version 2.1, September 2015

PART III - Impact Factors
(See instruction page to insert default values for MITIGATION BANKING and ILF)

Temporal Loss-Construction

**Note: Reflects duration of aquatic functional loss between the time of an impact (debit) and completion of compensatory mitigation (credit).*

Years	0
Sub-Total	0

Temporal Loss-Maturity

**Note: Period between completion of compensatory mitigation measures and the time required for maturity, as it relates to function (i.e. maturity of tree stratum to provide organic matter and detritus within riparian stream or wetland buffer corridor).*

% Add. Mitigation	Temporal Loss-Maturity (Years)
0%	0
Sub-Total	0

Long-term Protection

% Add. Mitigation and Monitoring Period	Long-Term Protection (Years)
0 + 5/10 Year Monitoring	101
Sub-Total	0

PART IV - Index to Unit Score Conversion

Final Index Score (Debit)	Linear Feet	Unit Score (Debit)	ILF Costs (Offsetting Debit Units)
0.384583333	60	23.075	$18,460.00

PART V- Comparison of Unit Scores and Projected Balance

Final Unit Score (Debit) [No Net Loss Value]	23.075	Mitigation Existing Condition - Baseline (Credit)		Mitigation Projected at Five Years Post Completion (Credit)		Mitigation Projected at Ten Years Post Completion (Credit)		Mitigation Projected At Maturity (Credit)	
FINAL PROJECTED NET BALANCE					0		0		0

Part VI - Mitigation Considerations (Incentives)

Extent of Stream Restoration

***Note1: Reference the Instructional handout to determine the correct Restoration Levels (below) for your project**
***Note2: Place an "X" in the appropriate category (only select one).**

☐ Restoration Level 1	
☐ Restoration Level 2	
☐ Restoration Level 3	

Compensatory Mitigation Plan incorporates HUC 12-based watershed approach? (Yes or No) *Note: HUC 12-based watershed approach required to obtain Stream Restoration incentive	No

Site	Impact Unit Yield (Debit)	Mitigation Unit Yield (Credit)
S-B79	23.075	#DIV/0!

Extended Upland Buffer Zone

***Note[1]: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below)**
***Note[2]: Enter the buffer width for each channel side (Left Bank and Right Bank)**
***Note[3]: Select the appropriate mitigation type**

Buffer Width	Left Bank	
	0-50	None
	51-150	None
Buffer Width	**Right Bank**	
	0-50	None
	51-150	None
Average Buffer Width/Side	0	

Straight Preservation Ratio (v2.1, Sept 2015)	
Final Mitigation Unit Yield	
#DIV/0!	

Ver. 1-25-11

FCI Calculator for the High-Gradient Headwater Streams in eastern Kentucky and western West Virginia HGM Guidebook

To ensure accurate calculations, the UPPERMOST STRATUM of the plant community is determined based on the calculated value for $V_{CCANOPY}$ (≥20% cover is required for tree/sapling strata). Go to the SAR Data Entry tab and enter site characteristics and data in the yellow cells. For information on determining how to split a project into SARs, see Chapter 5 of the Operational Draft Regional Guidebook for the Functional Assessment of High-gradient Ephemeral and Intermittent Headwater Streams in Western West Virginia and Eastern Kentucky (Environmental Laboratory U.S. Army Corps of Engineers 2010).

Project Name: MVP
Location: S-B79 (Harrison County)
Sampling Date: 06/02/2016

Project Site Before Project

Subclass for this SAR:
Ephemeral Stream

Uppermost stratum present at this SAR:
Shrub/Herb Strata

SAR number:

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.42
Biogeochemical Cycling	0.28
Habitat	0.07

Variable Measure and Subindex Summary:

Variable	Name	Average Measure	Subindex
$V_{CCANOPY}$	Percent canpoy over channel.	Not Used, <20%	Not Used
V_{EMBED}	Average embeddedness of channel.	1.72	0.36
$V_{SUBSTRATE}$	Median stream channel substrate particle size.	0.08	0.04
V_{BERO}	Total percent of eroded stream channel bank.	160.00	0.22
V_{LWD}	Number of down woody stems per 100 feet of stream.	0.00	0.00
V_{TDBH}	Average dbh of trees.	Not Used	Not Used
V_{SNAG}	Number of snags per 100 feet of stream.	0.00	0.10
V_{SSD}	Number of saplings and shrubs per 100 feet of stream.	0.00	0.00
V_{SRICH}	Riparian vegetation species richness.	0.00	0.00
$V_{DETRITUS}$	Average percent cover of leaves, sticks, etc.	5.63	0.07
V_{HERB}	Average percent cover of herbaceous vegetation.	6.88	0.09
V_{WLUSE}	Weighted Average of Runoff Score for Catchment.	0.77	0.81

Version 1-25-11

High-Gradient Headwater Streams in eastern Kentucky and western West Virginia
Field Data Sheet and Calculator

Team:	C. Vileno, J. McGuirk, A. Mengel	Latitude/UTM Northing:	39.423499
Project Name:	MVP	Longitude/UTM Easting:	-80.476392
Location:	S-B79 (Harrison County)	Sampling Date:	06/02/2016

SAR Number: | Reach Length (ft): 100 | Stream Type: Ephemeral Stream

Top Strata: Shrub/Herb Strata (determined from percent calculated in $V_{CCANOPY}$)

Site and Timing: Project Site | Before Project

Sample Variables 1-4 in stream channel

1 $V_{CCANOPY}$ Average percent cover over channel by tree and sapling canopy. Measure at no fewer than 10 roughly equidistant points along the stream. Measure only if tree/sapling cover is at least 20%. (If less than 20%, enter at least one value between 0 and 19 to trigger Top Strata choice.)

Not Used, <20%

List the percent cover measurements at each point below:

0	0	0	0	0	0	0	0	0	0

2 V_{EMBED} Average embeddedness of the stream channel. Measure at no fewer than 30 roughly equidistant points along the stream. Select a particle from the bed. Before moving it, determine the percentage of the surface and area surrounding the particle that is covered by fine sediment, and enter the rating according to the following table. If the bed is an artificial surface, or composed of fine sediments, use a rating score of 1. If the bed is composed of bedrock, use a rating score of 5.

1.7

Embeddedness rating for gravel, cobble and boulder particles (rescaled from Platts, Megahan, and Minshall 1983)

Rating	Rating Description
5	<5 percent of surface covered, surrounded, or buried by fine sediment (or bedrock)
4	5 to 25 percent of surface covered, surrounded, or buried by fine sediment
3	26 to 50 percent of surface covered, surrounded, or buried by fine sediment
2	51 to 75 percent of surface covered, surrounded, or buried by fine sediment
1	>75 percent of surface covered, surrounded, or buried by fine sediment (or artificial surface)

List the ratings at each point below:

2	2	2	2	2	2	2	2	2	2
2	2	2	2	2	2	2	2	2	2
1	1	1	1	1	1	1	1	2	2
2	2	2	2	2	2	2	2	2	2
2	2	2	2	1	1	1	1	1	1

3 $V_{SUBSTRATE}$ Median stream channel substrate particle size. Measure at no fewer than 30 roughly equidistant points along the stream; use the same points and particles as used in V_{EMBED}.

0.08 in

Enter particle size in inches to the nearest 0.1 inch at each point below (bedrock should be counted as 99 in, asphalt or concrete as 0.0 in, sand or finer particles as 0.08 in):

0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08

4 V_{BERO} Total percent of eroded stream channel bank. Enter the total number of feet of eroded bank on each side and the total percentage will be calculated If both banks are eroded, total erosion for the stream may be up to 200%.

160 %

Left Bank: 80 ft Right Bank: 80 ft

Sample Variables 5-9 within the entire riparian/buffer zone adjacent to the stream channel (25 feet from each bank).

5 V_{LWD} Number of down woody stems (at least 4 inches in diameter and 36 inches in length) per 100 feet of stream reach. Enter the number from the entire 50'-wide buffer and within the channel, and the amount per 100 feet of stream will be calculated. **0.0**

Number of downed woody stems: 0

6 V_{TDBH} Average dbh of trees (measure only if $V_{CCANOPY}$ tree/sapling cover is at least 20%). Trees are at least 4 inches (10 cm) in diameter. Enter tree DBHs in inches. **Not Used**

List the dbh measurements of individual trees (at least 4 in) within the buffer on each side of the stream below:

Left Side					Right Side				

7 V_{SNAG} Number of snags (at least 4" dbh and 36" tall) per 100 feet of stream. Enter number of snags on each side of the stream, and the amount per 100 feet will be calculated. **0.0**

Left Side: 0 Right Side: 0

8 V_{SSD} Number of saplings and shrubs (woody stems up to 4 inches dbh) per 100 feet of stream (measure only if tree cover is <20%). Enter number of saplings and shrubs on each side of the stream, and the amount per 100 ft of stream will be calculated. **0.0**

Left Side: 0 Right Side: 0

9 V_{SRICH} Riparian vegetation species richness per 100 feet of stream reach. Check all species present from Group 1 in the tallest stratum. Check all exotic and invasive species present in all strata. Species richness per 100 feet and the subindex will be calculated from these data. **0.00**

Group 1 = 1.0				Group 2 (-1.0)			
☐	*Acer rubrum*	☐	*Magnolia tripetala*	☐	*Ailanthus altissima*	☐	*Lonicera japonica*
☐	*Acer saccharum*	☐	*Nyssa sylvatica*	☐	*Albizia julibrissin*	☐	*Lonicera tatarica*
☐	*Aesculus flava*	☐	*Oxydendrum arboreum*	☐	*Alliaria petiolata*	☐	*Lotus corniculatus*
☐	*Asimina triloba*	☐	*Prunus serotina*	☐	*Alternanthera philoxeroides*	☐	*Lythrum salicaria*
☐	*Betula alleghaniensis*	☐	*Quercus alba*			☐	*Microstegium vimineum*
☐	*Betula lenta*	☐	*Quercus coccinea*	☐	*Aster tataricus*	☐	*Paulownia tomentosa*
☐	*Carya alba*	☐	*Quercus imbricaria*	☐	*Cerastium fontanum*	☐	*Polygonum cuspidatum*
☐	*Carya glabra*	☐	*Quercus prinus*	☐	*Coronilla varia*	☐	*Pueraria montana*
☐	*Carya ovalis*	☐	*Quercus rubra*	☐	*Elaeagnus umbellata*	☑	*Rosa multiflora*
☐	*Carya ovata*	☐	*Quercus velutina*	☐	*Lespedeza bicolor*	☐	*Sorghum halepense*
☐	*Cornus florida*	☐	*Sassafras albidum*	☐	*Lespedeza cuneata*	☐	*Verbena brasiliensis*
☐	*Fagus grandifolia*	☐	*Tilia americana*	☐	*Ligustrum obtusifolium*		
☐	*Fraxinus americana*	☐	*Tsuga canadensis*	☐	*Ligustrum sinense*		
☐	*Liriodendron tulipifera*	☐	*Ulmus americana*				
☐	*Magnolia acuminata*						
0	Species in Group 1			1	Species in Group 2		

Sample Variables 10-11 within at least 8 subplots (40" x 40", or 1m x 1m) in the riparian/buffer zone within 25 feet from each bank. The four subplots should be placed roughly equidistantly along each side of the stream.

10 $V_{DETRITUS}$ Average percent cover of leaves, sticks, or other organic material. Woody debris <4" diameter and <36" long are include. Enter the percent cover of the detrital layer at each subplot.

5.63 %

Left Side				Right Side			
10	5	5	5	5	5	5	5

11 V_{HERB} Average percentage cover of herbaceous vegetation (measure only if tree cover is <20%). Do *not* include woody stems at least 4" dbh and 36" tall. Because there may be several layers of ground cover vegetation percentages up through 200% are accepted. Enter the percent cover of ground vegetation at each subplot.

7 %

Left Side				Right Side			
10	5	10	5	10	5	5	5

Sample Variable 12 within the entire catchment of the stream.

12 V_{WLUSE} Weighted Average of Runoff Score for watershed:

0.77

Land Use (Choose From Drop List)	Runoff Score	% in Catchment	Running Percent (not >100)
Open space (pasture, lawns, parks, etc.), grass cover >75%	0.3	20	20
Forest and native range (>75% ground cover)	1	70	90
Residential districts, 1/4 - 1/3 ac (38% to 30% cover)	0.1	10	100

Summary

Variable	Value	VSI
$V_{CCANOPY}$	Not Used, <20%	Not Used
V_{EMBED}	1.7	0.36
$V_{SUBSTRATE}$	0.08 in	0.04
V_{BERO}	160 %	0.22
V_{LWD}	0.0	0.00
V_{TDBH}	Not Used	Not Used
V_{SNAG}	0.0	0.10
V_{SSD}	0.0	0.00
V_{SRICH}	0.00	0.00
$V_{DETRITUS}$	5.6 %	0.07
V_{HERB}	7 %	0.09
V_{WLUSE}	0.77	0.81

Notes:

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME S-B79	LOCATION Harrison County	
STATION #_____ RIVERMILE_____	STREAM CLASS Ephemeral	
LAT 39.423499 LONG -80.476392	RIVER BASIN West Fork	
STORET #	AGENCY Tetra Tech	
INVESTIGATORS C. Vileno, J. McGuirk, A. Mengel		
FORM COMPLETED BY C. Vileno	DATE 06/02/2016 TIME 12:45	REASON FOR SURVEY SWVM

	Habitat Parameter	Condition Category			
		Optimal	Suboptimal	Marginal	Poor
Parameters to be evaluated in sampling reach	**1. Epifaunal Substrate/ Available Cover**	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	SCORE 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
	SCORE 2	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
	SCORE 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE 1	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

	Habitat Parameter	Condition Category			
		Optimal	**Suboptimal**	**Marginal**	**Poor**
Parameters to be evaluated broader than sampling reach	**6. Channel Alteration**	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	SCORE 4	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
	SCORE 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
	SCORE 3 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	SCORE 3 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
	9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
	SCORE 4 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	SCORE 4 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
	SCORE 3 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	SCORE 3 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 27

No / low flow at time of survey. Unable to sample water quality or WVSCI.