S-A120



Photograph Direction West

Comments:

| STREAM ID S-A120 | STREAM NAME Stout Run |
|--|---------------------------|
| LAT 39.489692 LONG -80.520845 | DATE 06/03/2015 |
| CLIENT MVP | PROJECT NAME MVP |
| INVESTIGATORS SY, KL, RS, WS | |
| FLOW REGIME Perennial Intermittent Ephemeral | WATER TYPE TNW RPW ✓ NRPW |

| Perenniai _ | | nt <u> </u> | erai INVV — | RPW — | NRPW — | |
|--------------------------|-----------|---------------------------|---|-------------------|--|-----------------------------------|
| | | F-4!4: • | 1 | | Otroom Front | |
| | | | /leasurements k Width: 6.0 ft | | Stream Erosion None ✓ Moderate | Heavy |
| | | · | <u> </u> | | | · |
| | | Top of Ban | ŭ | | Artificial, Modified or Char | nnelized |
| | | LB <u>18.0</u> | | <u>n</u> | Yes No | |
| CHANNEL FE | ATURES | · | th: 3.00 in | | Dam PresentYes _ | <u>∕</u> No |
| | | | th: 27.0 in | | Sinuosity <u>v</u> Low | Modium High |
| | | | Mark: <u>13.0 in</u> | | Siliuosity V Low | iviedidiri riigiri |
| | | Flow Direc | tion: West | | Gradient | |
| | | | | | | Severe (10 ft/100 ft) |
| | | Water Pres | sent | | Proportion of Reach Repre | esented by Stream |
| | | | r, stream bed dry | | Morphology Types | • |
| | | _ | bed moist | | Riffle 20 % Run 30 Pool 50 % | % |
| FLOW | | Standing | - | | F001 50 % | |
| CHARACTER | ISTICS | <u>v</u> riowing | water | | Turbidity | |
| | | Velocity | | | Clear Slightly | |
| | | Fast ✓ Slow | Moderate | | OpaqueStainedOther | |
| INOD | | | MOONENTO | _ | RGANIC SUBSTRATE CON | IDONENTO |
| INOR | | STRATE CO add up to 10 | | | p to 100%) | |
| Substrate Type | Diame | eter | % Composition in Sampling Reach | Substrate Type | Characteristic | % Composition in Sampling Area |
| Bedrock | | | 10 | Dotrituo | sticks, wood, coarse | |
| Boulder | > 256 | mm (10") | 10 | Detritus | plant materials (CPOM) | 10 |
| Cobble | 64-256 m | m (2.5"-10") | 25 | Muck-Mud | black, very fine organic | |
| Gravel | 2-64 mm | า (0.1"-2.5") | 0 | IVIUCK-IVIUU | (FPOM) | |
| Sand | 0.06-2n | nm (gritty) | 40 | | | |
| Silt | 0.004-0 | 0.06 mm | 10 | Marl | grey, shell fragments | |
| Clay | < 0.004 | mm (slick) | 5 | | | |
| | | | ant Surrounding Lan | | Indicate the dominant type | |
| | | Field/P | Commer asture Industrial | | ✓ Trees Shrub Grasses Herba | |
| | | — Agricul | - · · · · · · - · · · · · · · · · · · · | tial | _ | |
| WATERSHED FEATURES | | Other: | | | Floodplain Width Wide > 30ft Mode | rate 15-30ft |
| LATORES | | 0 | | | Narrow <16ft | rate 15-50ft |
| | | Canopy Co | over open ✓ Partly sh | aded | _ | |
| | | Shaded | | | Wetland Present ✓ Yes Wetland ID W-A34 | No |
| | | Indicate th | e dominant type and | | dominant species present | |
| AQUATIC VE | GETATION | | | Rooted subme | | tingFree floating |
| | | Floatin | g algae | Attached algae | e | _ |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| MACROINVER OR OTHER | RTEBRATES | ; | | | | |
| WILDLIFE | THER | | | | | |
| OBSERVED/C OBSERVATIO | | | | | | |
| NOTES | | | | | | |
| | | | | | | |
| | | | | | | |

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

| USACE FILE NO./ Project Name: (v2.1, Sept 2015) | | Mounta | nin Valley Pipeli SWVM v2.1 | | | COORDINATES: cimal Degrees) | Lat. | 39.489890 | Lon. | -80.522083 | WEATHER: | | Sunny, 55° | | DATE: | November 10, 2 | 2016 |
|---|----------------------|-----------------------|--------------------------------|---|-----------------------|--------------------------------|------|---|----------------|-------------------|---|---------------------------------------|--------------------|----------|---|-----------------------------|------------|
| IMPACT STREAM/SITE ID (watershed size {acreage}, | | | | S-A120; Stout Ru Form of Mitiga | in; 57.60 ac wate | | | MITIGATION STREAM CLASS./ (watershed size {acreage} | | | | | | | Comments: | | |
| STREAM IMPACT LENGTH: | 26 | FORM OF MITIGATION | | PRESERVATION | | DORDINATES: cimal Degrees) | Lat. | | Lon. | | PRECIPITATION PAST 48 H | RS: | 0.40" | | Mitigation Length: | | |
| Column No. 1- Impact Existing | g Condition (Deb | pit) | C | Column No. 2- Mitigation Existing | Condition - Base | line (Credit) | | Column No. 3- Mitigation Pr Post Completion | | ive Years | Column No. 4- Mitigati Post Comp | on Projected at T pletion (Credit) | en Years | | Column No. 5- Mitigation Project | cted at Maturity (Credit) | |
| Stream Classification: | Interm | nittent | Stream | Classification: | Inte | ermittent | | Stream Classification: | | Intermittent | Stream Classification: | | Intermittent | Stre | am Classification: | Intermittent | |
| Percent Stream Channel Slo | ope | 8 | | Percent Stream Channel S | lope | | | Percent Stream Channel Sl | ре | 0 | Percent Stream Cha | nnel Slope | 0 | | Percent Stream Channel S | Slope | 0 |
| HGM Score (attach d | ata forms): | | | HGM Score (attac | h data forms): | | | HGM Score (attach | data forms | s): | HGM Score (at | ttach data forms |): | | HGM Score (attach | data forms): | |
| | | Average | | | | Average | | | | Average | | | Average | <u> </u> | | A ₁ | verage |
| Hydrology Biogeochemical Cycling Habitat | 0.62 0.58 0.12 | 0.44 | Hydrolo | ogy chemical Cycling | | 0 | | Hydrology Biogeochemical Cycling Habitat | | 0 | Hydrology Biogeochemical Cycling Habitat | | 0 | | rology geochemical Cycling | | 0 |
| PART I - Physical, Chemical and | Biological Indica | ators | | PART I - Physical, Chemical a | _ | licators | | PART I - Physical, Chemical ar | _ | I Indicators | PART I - Physical, Chemi | | | | PART I - Physical, Chemical an | | |
| | | Site Score | | | Points Scale Range | Site Score | | | | Range Site Score | | Points Scale | Range Site Score | <u> </u> | | . | Site Score |
| PHYSICAL INDICATOR (Applies to all streams | s classifications) | | PHYSIC | CAL INDICATOR (Applies to all stream | ns classifications) | | | PHYSICAL INDICATOR (Applies to all streams | classification | s) | PHYSICAL INDICATOR (Applies to a | II streams classificati | ons) | PHY | SICAL INDICATOR (Applies to all stream | ns classifications) | |
| USEPA RBP (High Gradient Data Sheet) | T T | 44 | | RBP (High Gradient Data Sheet) | | | | USEPA RBP (High Gradient Data Sheet) | 1 1 | | USEPA RBP (High Gradient Data S | | | | PA RBP (High Gradient Data Sheet) | | |
| Epifaunal Substrate/Available Cover Embeddedness | 0-20 0-20 | 11 | | unal Substrate/Available Cover eddedness | 0-20 0-20 | | | Epifaunal Substrate/Available Cover Embeddedness | 0-20 0-20 | | Epifaunal Substrate/Available Cov Embeddedness | er 0-20 0-20 | | | pifaunal Substrate/Available Cover mbeddedness | 0-20 0-20 | |
| Velocity/ Depth Regime | 0-20 | 4 | | city/ Depth Regime | 0-20 | | | Velocity/ Depth Regime | 0-20 | | 3. Velocity/ Depth Regime | 0-20 | | | elocity/ Depth Regime | 0-20 | |
| Sediment Deposition | 0-20 | 16 | | nent Deposition | 0-20 | | | Sediment Deposition | 0-20 | | Sediment Deposition | 0-20 | | | ediment Deposition | 0-20 | |
| Channel Flow Status | 0-20 | 6 | Chan | nel Flow Status | 0-20 | | | 5. Channel Flow Status | 0-20 | 0.4 | 5. Channel Flow Status | 0-20 | 0.4 | | hannel Flow Status | 0-20 | |
| Channel Alteration | 0-20 | 14 | Chan | nel Alteration | 0-20 | | | 6. Channel Alteration | 0-20 | U-1 | Channel Alteration | 0-20 | 0-1 | 6. Cł | hannel Alteration | 0-20 | |
| 7. Frequency of Riffles (or bends) | 0-20 | 3 | | uency of Riffles (or bends) | 0-20 | | | 7. Frequency of Riffles (or bends) | 0-20 | | Frequency of Riffles (or bends) | 0-20 | | | requency of Riffles (or bends) | 0-20 | |
| Bank Stability (LB & RB) | 0-20 | 12 | | Stability (LB & RB) | 0-20 | | | Bank Stability (LB & RB) | 0-20 | | Bank Stability (LB & RB) | 0-20 | | | ank Stability (LB & RB) | 0-20 | |
| Vegetative Protection (LB & RB) | 0-20 | 12 | | tative Protection (LB & RB) | 0-20 | | | Vegetative Protection (LB & RB) | 0-20 | | Vegetative Protection (LB & RB) | 0-20 | | | egetative Protection (LB & RB) | 0-20 | |
| 10. Riparian Vegetative Zone Width (LB & RB) | 0-20 | 8 | | rian Vegetative Zone Width (LB & RB) | 0-20 | | | 10. Riparian Vegetative Zone Width (LB & RB) | 0-20 | | 10. Riparian Vegetative Zone Width (LB | | | | Riparian Vegetative Zone Width (LB & RB) | | |
| Total RBP Score | Marginal | 98 | | BP Score | Poor | 0 | | Total RBP Score | Poor | | Total RBP Score | Poo | | | I RBP Score | Poor | 0 |
| Sub-Total CHEMICAL INDICATOR (Applies to Intermitter | nt and Perennial Str | 0.49 | Sub-Tot | cal INDICATOR (Applies to Intermitt | ent and Perennial Str | reams) | | Sub-Total CHEMICAL INDICATOR (Applies to Intermitter | t and Perenni | ial Streams) | Sub-Total CHEMICAL INDICATOR (Applies to I | ntermittent and Pere | nnial Streams) | | Total MICAL INDICATOR (Applies to Intermitt | tent and Perennial Streams) | 0 |
| WVDEP Water Quality Indicators (General | | , | | Water Quality Indicators (General | | , | | WVDEP Water Quality Indicators (General | | , | WVDEP Water Quality Indicators (| | , | | DEP Water Quality Indicators (General | | |
| Specific Conductivity | | | | Conductivity | | | | Specific Conductivity | | | Specific Conductivity | ocherul) | | | cific Conductivity | | |
| <=99 - 90 points | 0-90 | 0.135 | | | 0-90 | | | | 0-90 | | | 0-90 | | | | 0-90 | |
| рН | | | рН | | | | | рН | | 24 | рН | | 0.4 | рН | | | |
| 6.0-8.0 = 80 points | 0-80 | 8.04 | | | 5-90 | | | | 5-90 | 0-1 5.6 | | 5-90 | 0-1 | | | 5-90 | |
| DO | | | DO | | | | | DO | | | DO | | | DO | | | |
| | 10-30 | 38 | | | 10-30 | | | | 10-30 | | | 10-30 | | | | 10-30 | |
| >5.0 = 30 points Sub-Total | 10 00 | 1 | Sub-Tot | al | .0 00 | 0 | | Sub-Total | 10 00 | 0 | Sub-Total | 10 00 | 0 | Sub- | ·Total | 1.0 00 | 0 |
| BIOLOGICAL INDICATOR (Applies to Intermi | ittent and Perennial | Streams) | BIOLOG | GICAL INDICATOR (Applies to Intern | nittent and Perennial | Streams) | | BIOLOGICAL INDICATOR (Applies to Interm | ittent and Pe | erennial Streams) | BIOLOGICAL INDICATOR (Applies | to Intermittent and | Perennial Streams) | вю | LOGICAL INDICATOR (Applies to Inter | rmittent and Perennial Stre | eams) |
| WV Stream Condition Index (WVSCI) | | - | WV Stre | eam Condition Index (WVSCI) | | | | WV Stream Condition Index (WVSCI) | | | WV Stream Condition Index (WVS | CI) | | wv s | Stream Condition Index (WVSCI) | | |
| 5 | 0-100 0-1 | 39.4 | | | 0-100 0-1 | | | | 0-100 | 0-1 | | 0-100 | 0-1 | | | 0-100 0-1 | |
| Poor Sub-Total | | 0.294 | Sub-Tot | al | | 0 | | Sub-Total | | 0 | Sub-Total | | 0 | Sub- | -Total | | 0 |
| | | | | | | | | | | | | | | | | | |
| PART II - Index and U | Jnit Score | | | PART II - Index an | d Unit Score | | | PART II - Index and | Unit Score | | PART II - Inde | x and Unit Score | | | PART II - Index and | Unit Score | |
| Index | Linear Feet | Unit Score | | Index | Linear Feet | Unit Score | | Index | Linear F | eet Unit Score | Index | Linear | Feet Unit Score | | Index | Linear Feet Uni | nit Score |
| 0.517 | 26 | 13.45066667 | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |

| | | (See instruction page | | Impact Factors It values for MITIGATIO | N BANKING and II | LF) | | | |
|---|--|--|-----------------------|---|---------------------------|---|--|----------------------------------|-----------|
| Temp | oral Loss-Construction | | | | | Long | -term Protection | | |
| *Note: Reflects duration of aquatic functional loss | | ct (debit) and completion of compensatory | | | % Add. Mitigati | ion and Monitoring Period | | -Term Protection (Years) | |
| Years | | 0 | | | | | | | |
| Sub-Total | | 0 | | | | | | | |
| | mporal Loss-Maturity | | | | | 10 Year Monitoring | | 101 | |
| *Note: Period between completion of compensator function (i.e. maturity of tree stratum to provide | | | | | Sub-Total | | | 0 | |
| tunction (i.e. maturity of tree stratum to provide | corridor). | within riparian stream of wettand burier | | | | PART IV - Index | to Unit Score Cor | nversion | |
| % Add. Mitigation | | Temporal Loss-Maturity (Years) | | | Final Index Score | Linear Feet | Unit Score | ILF Costs | |
| % Add. Miligation | | Temporal Loss-Maturity (Tears) | | | (Debit) 0.517333333 | 26 | (Debit) 13.45066667 | (Offsetting Debit \$10,760.53 | |
| | | | | | | | | ¥16,1 co.o. | |
| 0% | | 0 | | | | | | | |
| Sub-Total | | 0 | | | | | | | |
| | | | | | | | | | |
| | | PART V | - Comparison of U | nit Scores and Projecte | ed Balance | | | | |
| | | | | | | | | | |
| Final Unit Score (Debit) | | Mitigation Existing | | Mitigation Projected at | | Mitigation Projected at Ten | | Mitigation Projected At | |
| [No Net Loss Value] | 13.45066667 | Condition - Baseline | | Five Years | | Years | | Maturity | |
| | | (Credit) | | Post Completion (Credit) | | Post Completion (Credit) | | (Credit) | |
| FINAL PROJECTED NET BALANCE | | | | | 0 | | 0 | | 0 |
| | | Р | art VI - Mitigation (| Considerations (Incentiv | voe) | | | | |
| | | ' | art VI - Willigation | Sonsiderations (incentiv | ves, | | | | |
| | Extent of Stream Re | | | | | Extended | Upland Buffer Zone | e | |
| | onal handout to determine the c Place an "X" in the appropriate | correct Restoration Levels (below) for your pr | oject | | *Note1: Referen | nce Instructional handout for the de | initions of the Buffer Zo | ne Mitigation Extents and Type | s (below) |
| | | satisfier y (e.m.y solicet ello). | | | | *Note ² : Enter the buffer width for | each channel side (Left ne appropriate mitigation | | |
| Restoration Level 1 | | | | | | 1,010 1,00001 11 | e appropriate intigation | . 1,950 | |
| Restoration Level 2 | | | | | Buffer Width | | Left Banl | k | |
| Restoration Level 3 | | | | | | 0-50 | | None | |
| | | | | _ | Buffer Width | 51-150 | Dight Day | None | |
| | | | | | buller width | 0-50 | Right Ban | None | |
| Compensatory Mitigation Plan incorpo | | | | | | 51-150 | | None | |
| *Note: HUC 12-based watershed | approach required to obtain Stream | am Restoration incentive | No | J | Average Buffer Width/Side | 0 | | | |
| | | Impact | Mitigation Unit | | | | Stra | night Preservation Ratio | |
| Site | | Unit Yield (Debit) | Yield (Credit) | | | | Sila | (v2.1, Sept 2015) | |
| S-A120 | | 13.45066667 | #VALUE! | 1 | | Final Mitigation Unit Yield | | | |
| 0-A120 | | 13:4300001 | #VALUE: |] | | #VALUE! | | | |
| | | | | | | #VALUE: | | | |

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

To ensure accurate calculations, the <u>UPPERMOST STRATUM</u> 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-A120

Sampling Date: Enter dates on Data Form Project Site Before Project

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR: SAR number:

Shrub/Herb Strata

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

| Function | Functional Capacity Index |
|------------------------|------------------------------|
| Hydrology | 0.62 |
| Biogeochemical Cycling | 0.58 |
| Habitat | 0.12 |

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. | 3.20 | 0.89 |
| V _{SUBSTRATE} | Median stream channel substrate particle size. | 0.08 | 0.04 |
| 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. | 4.00 | 0.50 |
| 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. | 31.00 | 0.48 |
| V _{SRICH} | Riparian vegetation species richness. | 0.00 | 0.00 |
| V _{DETRITUS} | Average percent cover of leaves, sticks, etc. | 19.38 | 0.24 |
| V _{HERB} | Average percent cover of herbaceous vegetation. | 115.00 | 1.00 |
| V _{WLUSE} | Weighted Average of Runoff Score for Catchment. | 0.93 | 0.98 |

Version 1-25-11

| | High-G | Gradient | Headwat | | | | entucky a alculato | | tern Wes | t Virgini | a |
|--------|------------------------|---------------|------------------------------|---------------|--------------|---------------|---------------------------------------|-------------------------|----------------|-------------------|---------|
| | Team: | C. Vileno, C | C. Stoliker | | | | | Latitude/UT | M Northing: | 39.489890 | |
| Pr | oject Name: | MVP | | | | | L | ongitude/U | TM Easting: | -80.522083 | |
| | Location: | S-A120 | | | | | | San | npling Date: | | |
| Si | AR Number: | | Reach | Length (ft): | 100 | Stream Ty | /pe: Inter | mittent Stream | m | | • |
| | Top Strata: | Sh | rub/Herb Str | ata | (determined | d from perce | ent calculate | d in V _{CCANO} | PY) | | |
| Site | and Timing: | Project Site | | | | | Before Proje | ct | | | • |
| Sample | e Variables | | | | | | | | | | |
| | | | | | | | | | | Not Used, <20% | |
| | List the per | cent cover r | measuremer | nts at each p | oint below: | | | | | | |
| | 15 | | | | | | | | | | |
| | | | | | | | | | | | |
| 2 | V_{EMBED} | along the s | tream. Sele | ct a particle | from the be | d. Before n | at no fewer to noving it, de | termine the | percentage | of the | 3.2 |
| | | | | | | | y fine sedim | | | | |
| | | | ving table. I bed is comp | | | | composed of | tine seaim | ents, use a r | ating score | |
| | | | | | | _ | les (rescale | d from Platt | e Megahan | and | ı |
| | | Minshall 19 | 983) | | obble and bo | odider partic | ies (rescale | u IIOIII Fiall | s, iviegariari | , and | |
| | | Rating | Rating Des | | | | la contra al la contra | C | / | \ | |
| | | 5 4 | | | | | buried by fir I, or buried b | | | .) | |
| | | 3 | | | | | ed, or buried | | | | |
| | | 2 | | | | | ed, or buried | | | | |
| | | 1 | | | | | r buried by f | | | al surface) | |
| | List the rati | ngs at each | point below | | | | | | | | - |
| | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | |
| | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | |
| | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 3 | V _{SUBSTRATE} | | | | | | t no fewer thed in V _{EMBED} | | hly equidista | ant points | 0.08 in |
| | Enter partic | le size in in | ches to the r | nearest 0.1 i | inch at each | point below | (bedrock sl | nould be co | unted as 99 | in, asphalt | |
| | or concrete | as 0.0 in, s | and or finer | particles as | 0.08 in): | | | | | | |
| | 4.00 | 4.00 | 1.00 | 0.08 | 1.00 | 0.08 | 0.08 | 0.08 | 3.00 | 3.00 | |
| | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 2.00 | 0.08 | 0.08 | 0.08 | |
| | 0.08 | 1.00 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 2.00 | 1.00 | 1.00 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 4 | V_{BERO} | and the tota | al percentag | | | | tal number or re eroded, t | | | | 0 % |
| | | up to 200% |) . | | | | | | | | |

| Sample | e Variables | 5-9 within t | he entire ri | parian/buff | er zone adj | acent to th | e stream ch | annel (25 f | eet from ea | ch bank). | |
|--------|--------------|--------------|--------------|---------------------------|-------------------------|----------------|---------------------------------|---------------|------------------|---------------|------------|
| 5 | V_{LWD} | stream read | ch. Enter th | | om the entir llated. | e 50'-wide l | ter and 36 inc buffer and wi | thin the cha | | | 4.0 |
| | | A 11 | | | | | oody stems: | | 4 | .14 | |
| 6 | V_{TDBH} | | | measure on eter. Enter | | | ng cover is at | t least 20%) | . Trees are | at least 4 | Not Used |
| | | • | , | | | | n) within the | huffer on ea | ich side of | | |
| | | the stream | | ents of man | nuuai liees | (at least 4 ii | i) within the | builei oli ea | ich side of | | |
| | | | Left Side | | | | | Right Side | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 7 | V_{SNAG} | | | ast 4" dbh a | | | t of stream. Iculated. | Enter numb | er of snags | on each | 0.0 |
| | | | | | • | | D: 1 . 0: 1 | | • | | |
| 8 | V | Number of | Left Side: | | 0 oody stoms | up to 4 inch | Right Side: nes dbh) per | | 0 stroom (mos | acuro only if | |
| 0 | V_{SSD} | | | | | | s on each sic | | | | 31.0 |
| | | | f stream wil | l be calculat | | | | | | | |
| 0 | \/ | Dinarian | Left Side: | | 1 | ant of atroo | Right Side: m reach. Ch | | 20 | from | |
| 9 | V_{SRICH} | | | | | | ve species p | | | | 0.00 |
| | | | | | | | from these d | | | | 0.00 |
| | | Grou | p 1 = 1.0 | | | | | Group | 2 (-1.0) | | |
| Ш | Acer rubru | ım | | Magnolia ti | ripetala | | Ailanthus a | ltissima | | Lonicera ja | ponica |
| | Acer sacci | harum | | Nyssa sylv | atica | | Albizia julib | orissin | | Lonicera ta | tarica |
| Ш | Aesculus f | flava | | Oxydendrun | arboreum | | Alliaria peti | olata | | Lotus corni | culatus |
| Ш | Asimina tri | iloba | | Prunus ser | otina | | Alternanthe | era | | Lythrum sa | licaria |
| | Betula alleg | ghaniensis | | Quercus ai | 'ba | | philoxeroid | es | 1 | Microstegiun | n vimineum |
| | Betula leni | ta | | Quercus co | occinea | | Aster tatari | cus | | Paulownia | tomentosa |
| Ш | Carya alba | a | | Quercus in | nbricaria | | Cerastium | fontanum | | Polygonum d | cuspidatum |
| | Carya glab | ora | | Quercus pi | rinus | | Coronilla va | aria | | Pueraria m | ontana |
| Ш | Carya ova | lis | | Quercus ru | ıbra | | Elaeagnus u | mbellata | J | Rosa multit | flora |
| | Carya ova | ta | | Quercus ve | elutina | | Lespedeza | bicolor | | Sorghum h | alepense |
| | Cornus flo | rida | | Sassafras | albidum | | Lespedeza | cuneata | | Verbena br | asiliensis |
| Ш | Fagus gra | ndifolia | | Tilia amerio | cana | \Box | Ligustrum ob | otusifolium | | | |
| | Fraxinus a | | | Tsuga can | adensis | | Ligustrum s | sinense | | | |
| | Liriodendroi | n tulipifera | | Ulmus ame | | | - | | | | |
| | Magnolia a | • | | | | | | | | | |
| | | | | | | | | | | | |
| | | 0 | Species in | Group 1 | | | | 2 | Species in | Group 2 | |

| Sample | e Variables | 10-11 withir | n at least 8 | subplots (4 | 40" x 40". o | r 1m x 1m) | in the ripar | ian/buffer z | one within | 25 feet fron | n each |
|----------------|-----------------------|--------------------|------------------|---------------|-----------------------------------|-------------|--------------|---------------|--------------|--------------|--------------------|
| | | pplots shou | ld be place | d roughly | equidistant | y along ea | ch side of t | he stream. | | | |
| 10 | V _{DETRITUS} | | | | ticks, or other t cover of the | | | | <4" diamete | r and <36" | 19.38 % |
| | | | Left | Side | | | Righ | t Side | |] ' | |
| | | 20 | 15 | 20 | 20 | 20 | 20 | 20 | 20 | | |
| 11 | V_{HERB} | Average pe | rcentage co | over of herb | aceous vege | tation (mea | sure only if | tree cover is | s <20%). Do | o not | |
| | | include woo | ody stems a | t least 4" db | h and 36" ta | II. Because | there may b | e several la | yers of grou | und cover | 115 % |
| | | each subplo | - | s up througr | n 200% are a | іссертеа. Е | nter the per | cent cover o | or ground ve | egetation at | |
| | | | | Side | | | | t Side | • | | |
| | | 120 | 100 | 115 | 115 | 120 | 120 | 115 | 115 | | |
| Sample | e Variable 1 | 2 within the | entire cate | chment of t | he stream | | | | | | |
| 12 | V _{WLUSE} | | | | e for watersh | od: | | | | 1 | |
| 12 | V WLUSE | vveignted A | werage or N | COTOTI SCOTE | o ioi watersii | eu. | | | | | 0.93 |
| | | | 11 | (Ob | | - 1 !- 0 | | | Runoff | % in Catch | Running |
| | | | Land | Use (Choos | se From Dro | o List) | | | Score | ment | Percent (not >100) |
| | Forest and n | alive range (> | 75% ground | cover) | | | | - | 1 | 90 | 90 |
| | Open space | (pasture, lawn | s, parks, etc.), | , grass cover | >75% | | | - | 0.3 | 10 | 100 |
| | - | | | | | | | • | | | |
| | | | | | | | | ~ | | | |
| | - | | | | | | | • | | | |
| | | | | | | | | _ | | | |
| | _ | | | | | | | | | | |
| | - | | | | | | | Ţ | | | |
| | 5 | | | | | | | _ | <u> </u> | | |
| | | mmary | | | | | No | tes: | | | |
| | ariable | Value Not Used, | VSI | | | | | | | | |
| V _c | CANOPY | <20% | Not Used | | | | | | | | |
| VE | MBED | 3.2 | 0.89 | | | | | | | | |
| Vs | UBSTRATE | 0.08 in | 0.04 | | | | | | | | |
| V_{B} | ERO | 0 % | 1.00 | | | | | | | | |
| V _L | WD | 4.0 | 0.50 | | | | | | | | |
| V _T | DBH | Not Used | Not Used | | | | | | | | |
| Vs | NAG | 0.0 | 0.10 | | | | | | | | |
| Vs | | 31.0 | 0.48 | | | | | | | | |
| | RICH | 0.00 | 0.00 | | | | | | | | |
| | ETRITUS | 19.4 % | 0.24 | | | | | | | | |
| | ERB | 115 % | 1.00 | | | | | | | | |
| Vw | /LUSE | 0.93 | 0.98 | | | | | | | | |

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

| STREAM NAME S-A120 | LOCATION Wetzel, County | | | | |
|---|--------------------------------|---|--|--|--|
| STATION # RIVERMILE | STREAM CLASS Intermittent | | | | |
| Lat <u>39.489890</u> long <u>-80.522083</u> | RIVER BASIN Headwater | RIVER BASIN Headwaters South Fork Fishing Creek | | | |
| STORET# | AGENCY Tetra Tech | | | | |
| INVESTIGATORS C. Vileno, C. Stoliker | | | | | |
| FORM COMPLETED BY C. Vileno | DATE 11/10/2016 TIME 3:00pm | REASON FOR SURVEY SWVM | | | |

| | Habitat | | Condition | ı Category | |
|--|---|---|---|---|---|
| | Parameter | 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 11 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| ı sampling reach | 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. |
| ted in | SCORE 12 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| Parameters to be evaluated in sampling reach | 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). |
| ıram | SCORE 4 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| Par | 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 16 | 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 6 | 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 | | Condition | ı Category | |
|--|--|--|--|--|---|
| | Habitat Parameter | 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 14 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| ling reach | 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. |
| samp | SCORE 3 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| Parameters to be evaluated broader than sampling reach | 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. |
| e eva | SCORE 6 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 |
| to b | SCORE 6 (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 |
| Parameters | 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 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 |
| | 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 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 |

Total Score 98

| Insects | Count | Tolerance | TV | Insects | Count | Tolerance | TV | Non-Insects | Count | Tolerance | TV | 7 | |
|-------------------|-----------|--------------|-----|------------------|-------|----------------|----|-----------------|---------------|----------------|-------------|--------------------|-------|
| Ephemeroptera | | | 0 | Odonata | | 1 | 0 | Crustacea | • | • | 1 | | |
| Ameletidae | | 2 | 0 | Aeshnidae | | 3 | 0 | Asellidae | | 7 | 0 | 1 | |
| Baetidae | | 4 | 0 | Calopterygidae | | 6 | 0 | Cambaridae | 1 | 5 | 5 | 1 | |
| Beatiscidae | | 4 | 0 | Coenagrionidae | | 7 | 0 | Gammaridae | | 5 | 0 | | |
| Caenidae | | 5 | 0 | Cordulegastridae | | 3 | 0 | Palaemonidae | | 5 | 0 | | |
| Ephemerellidae | | 3 | 0 | Gomphidae | | 5 | 0 | Annelida | • | • | 5 | | |
| Ephemeridae | | 5 | 0 | Lestidae | | 7 | 0 | Hirudinea | | 10 | 0 | | |
| Heptageniidae | | 3 | 0 | Libellulidae | | 7 | 0 | Nematoda | | 10 | 0 | | |
| Isonychiidae | | 3 | 0 | Coleoptera | | • | 0 | Nematomorpha | | 10 | 0 | | |
| Leptophlebiidae | | 4 | 0 | Chrysomelidae | | 7 | 0 | Oligochaeta | 5 | 10 | 50 | | |
| Potamanthidae | | 5 | 0 | Dryopidae | | 5 | 0 | Turbellaria | | | 0 | | |
| Siphlonuridae | | 3 | 0 | Dytiscidae | | 6 | 0 | Turbellaria | | 7 | 0 | | |
| Tricorythidae | | 5 | 0 | Elmidae | | 4 | 0 | Bivalvia | | | 0 | | |
| Plecoptera | | | 3 | Gyrinidae | | 5 | 0 | Corbiculidae | | 6 | 0 | | |
| Capniidae | | 2 | 0 | Haliplidae | | 7 | 0 | Sphaeriidae | | 5 | 0 | | |
| Chloroperlidae | 1 | 2 | 2 | Hydrophilidae | | 7 | 0 | Unionidae | | 4 | 0 | | |
| Leuctridae | | 2 | 0 | Psephenidae | | 3 | 0 | Gastropoda | | | 0 | | |
| Nemouridae | | 2 | 0 | Ptilodactylidae | | 5 | 0 | Ancylidae | | 7 | 0 | | |
| Peltoperlidae | | 1 | 0 | Hemiptera | | | 0 | Hydrobiidae | | 4 | 0 | | |
| Perlidae | 2 | 1 | 2 | Belostomatidae | | 8 | 0 | Physidae | | 7 | 0 | | |
| Perlodidae | | 1 | 0 | Corixidae | | 8 | 0 | Planorbidae | | 5 | 0 | | |
| Pteronarcyidae | | 1 | 0 | Gerridae | | 10 | 0 | Pleuroceridae | | 5 | 0 | | |
| Taeniopterygidae | | 2 | 0 | Hydrometridae | | 8 | 0 | Viviparidae | | 5 | 0 | | |
| Trichoptera | | | 0 | Nepidae | | 8 | 0 | Miscellaneous | | | 0 | | |
| Brachycentridae | | 2 | 0 | Notonectidae | | 8 | 0 | Collembola | | 6 | 0 | | |
| Glossosomatidae | | 2 | 0 | Megaloptera | | | 0 | Lepidoptera | | 5 | 0 | | |
| Helicopsychidae | | 3 | 0 | Corydalidae | | 3 | 0 | Neuroptera | | 5 | 0 | | |
| Hydropsychidae | | 5 | 0 | Sialidae | | 6 | 0 | Hydrachnidae | | 6 | 0 | | |
| Hydroptilidae | | 3 | 0 | Diptera | | • | 1 | Totals | Total r | number | 10 | | |
| Lepidostomatidae | | 3 | 0 | Athericidae | | 3 | 0 | Totals | Total f | amilies | 5 | | |
| Leptoceridae | | 3 | 0 | Blephariceridae | | 2 | 0 | | • | Metric o | alculations | • | |
| Limnephilidae | | 4 | 0 | Ceratopogonidae | | 8 | 0 | | Richnes | ss | | Additional metri | ics |
| Molannidae | | 3 | 0 | Chironomidae | | 9 | 0 | Total Taxa | | 5 | 22.7 | Ephemeroptera Taxa | 0 |
| Philopotamidae | | 4 | 0 | Culicidae | | 10 | 0 | EPT Taxa | | 2 | 15.4 | Plecoptera Taxa | 2 |
| Phryganeidae | | 4 | 0 | Dixidae | | 6 | 0 | | Toleran | ce | | Trichoptera Taxa | 0 |
| Polycentropodidae | | 5 | 0 | Empididae | | 7 | 0 | Biotic Index | | 6.40 | 51.4 | Long-lived Taxa | 5 |
| Psychomiidae | | 3 | 0 | Psychodidae | | 8 | 0 | % Tolerant | | 50.0 | 51.0 | Odonata Taxa | 0 |
| Rhyacophilidae | | 3 | 0 | Ptychopteridae | | 8 | 0 | | Composit | ion | | Diptera Taxa | 1 |
| Uenoidae | | 2 | 0 | Simuliidae | | 6 | 0 | % EPT Abundance | | 30.0 | 33.3 | COET Taxa | 0 |
| | | erance Value | 64 | Stratiomyidae | | 10 | 0 | % Dominance | | 50.0 | 62.5 | % Sensitive | 30.0 |
| | | Syrphidae | | 10 | 0 | % Net-spinners | | 0.0 | NA | % Chironomidae | 0.0 | | |
| 601 57th Stre | | | 304 | Tabanidae | | 7 | 0 | Stream (| Condition Ind | ex | 39.4 | % Clingers | 30.0 |
| http:// | www.dep.w | v.gov/sos | | Tipulidae | 1 | 5 | 5 | Integrity Ra | ating | Po | or | More diversity mea | sures |

<u>Note</u>: 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.



Photograph Direction West

Comments:

| STREAM ID | S-QR34 | | STREAM N | STREAM NAME UNT to Stout Run | | | | | | |
|-----------------------|-----------------|--|--|------------------------------|--|-----------------------------------|--|--|--|--|
| CLIENT EQT | | | PROJECT N | | | | | | | |
| LAT 39.48914 | | ONG -80.52069 | | | COUNTY Wetzel | | | | | |
| INVESTIGATO | DRS D Ha | dersbeck, J McC | Guirk, C Sapusek | | | | | | | |
| WATER TYPE | RPW | NRPW | FLOW REG Perennial | SIME Intermi | ittent Ephemeral | | | | | |
| | | Estimata Mar | euromonte | ı | Sinuosity Low 🗸 | Medium High | | | | |
| CHANNEL FE | ATURES | Top of Bank H LB0.5fl Water Depth: Water Width:_ Ordinary High | Vidth: 2.5 ft leight: RB 0.5 1.00 in 1.0 ft Water Mark (Width) Water Mark (Height | : <u>2.0</u> ft | Within Roadside Ditch Yes No Culvert Present Yes No Culvert Material: | | | | | |
| | | | | | Culvert Size:in | | | | | |
| FLOW CHARACTER | ISTICS | Stream bed Standing w Flowing wa | tream bed dry I moist vater | | Proportion of Reach Repres Morphology Types (Only ente Riffle % Run 10 Pool % Turbidity Clear Slightly to Other | er if water present) 10 % | | | | |
| INOR | | JBSTRATE CO | | | ORGANIC SUBSTRATE COM | | | | | |
| Cubatasta | (shou | ld add up to 100 | | Cubatast | (does not necessarily add u | , | | | | |
| Substrate Type | Dia | meter | % Composition in Sampling Reach | Substrat Type | Characteristic | % Composition in Sampling Area | | | | |
| Bedrock | | // | | Detritus | sticks, wood, coarse | | | | | |
| Boulder | | 56 mm (10") | 5 | | plant materials (CPOM) | 40 | | | | |
| Cobble | | mm (2.5"-10") | 15 | Muck-Muc | black, very fine organic (FPOM) | | | | | |
| Gravel Sand | | nm (0.1"-2.5") | 25 | | (11 OW) | | | | | |
| Sand | | -2mm (gritty) 04-0.06 mm | 30 | Marl | grey, shell fragments | | | | | |
| Clay | |)4 mm (slick) | 25 | IVIAII | grey, shell fragilielits | | | | | |
| WATERSHED FEATURES | | ` ' | Residentia | al ıl ad | Floodplain Width Wide > 30ft Modera Narrow <15ft | 1 ate 15-30ft | | | | |
| | | | | | | | | | | |
| MAC | ROINVER | TEBRATES/OT | HER WILDLIFE OB | SERVED OR | OTHER NOTES AND OBSER | RVATIONS | | | | |
| Starts as epher | meral and | turns into roadsi | de stream that joins | into S-A121. | | | | | | |

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

| JSACE FILE NO./ Project Name: v2.1, Sept 2015) | | Mounta | ain Valley Pipeline Project SWVM v2.1 | | COORDINATES: imal Degrees) | Lat. | 39.489083 Lo | n. | -80.520519 | WEATHER: | Sunny, 55° | DATE: | November 10, 2016 |
|---|---------------------|----------------------|--|-------------------------|-------------------------------|------|--|-------------|-----------------|--|---------------------------------------|--|---|
| IMPACT STREAM/SITE ID A (watershed size {acreage}, u | | | S-QR34; UNT to Stou | ŕ | | | MITIGATION STREAM CLASS./SITE (watershed size {acreage}, una | | | | | Comments: | No / low water flow at time of survey. Unable to sample water quality or WVSCI. |
| STREAM IMPACT LENGTH: | 125 | FORM OI MITIGATIO | | | OORDINATES: imal Degrees) | Lat. | Lo | n. | | PRECIPITATION PAST 48 HRS: | 0.40" | Mitigation Length: | |
| Column No. 1- Impact Existing | Condition (Deb | it) | Column No. 2- Mitigation Existing C | ondition - Basel | ine (Credit) | | Column No. 3- Mitigation Project Post Completion (Cro | | e Years | Column No. 4- Mitigation Project Post Completion (C | | Column No. 5- Mitigation Project | ted at Maturity (Credit) |
| Stream Classification: | Epher | neral | Stream Classification: | Eph | nemeral | | Stream Classification: | I | Ephemeral | Stream Classification: | Ephemeral | Stream Classification: | Ephemeral |
| Percent Stream Channel Slo | ре | 15 | Percent Stream Channel Sle | рре | | | Percent Stream Channel Slope | | 0 | Percent Stream Channel Slo | pe 0 | Percent Stream Channel S | lope 0 |
| HGM Score (attach da | a forms): | | HGM Score (attach | data forms): | | | HGM Score (attach data | forms): | | HGM Score (attach dat | ta forms): | HGM Score (attach o | lata forms): |
| | · · · · · · · · | Average | | · · · · · · · · · · · · | Average | | | | Average | | Average | | Average |
| lydrology | 0.5 | 7100.030 | Hydrology | | Attorage | | Hydrology | | , morago | Hydrology | , , , , , , , , , , , , , , , , , , , | Hydrology | , , , , , , , , , , , , , , , , , , , |
| Biogeochemical Cycling | 0.54 0.2 | 0.413333333 | Biogeochemical Cycling | | 0 | | Biogeochemical Cycling | | 0 | Biogeochemical Cycling Habitat | 0 | Biogeochemical Cycling | 0 |
| Habitat PART I - Physical, Chemical and E | liological Indica | ators | PART I - Physical, Chemical an | _ | icators | | PART I - Physical, Chemical and Bi | _ | Indicators | PART I - Physical, Chemical and E | | Habitat PART I - Physical, Chemical and | |
| | Points Scale Range | Site Score | | Points Scale Range | Site Score | | Poin | s Scale Ra | nge Site Score | | Points Scale Range Site Score | | Points Scale Range Site Score |
| PHYSICAL INDICATOR (Applies to all streams of | classifications) | | PHYSICAL INDICATOR (Applies to all streams | classifications) | | | PHYSICAL INDICATOR (Applies to all streams class | ifications) | | PHYSICAL INDICATOR (Applies to all streams | classifications) | PHYSICAL INDICATOR (Applies to all stream | s classifications) |
| JSEPA 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) | |
| . Epifaunal Substrate/Available Cover | 0-20 | 0 | Epifaunal Substrate/Available Cover | 0-20 | | | | -20 | | | 0-20 | Epifaunal Substrate/Available Cover | 0-20 |
| 2. Embeddedness 3. Velocity/ Depth Regime | 0-20 0-20 | 3 | Embeddedness Velocity/ Depth Regime | 0-20 | | | | -20 -20 | | Embeddedness Velocity/ Depth Regime | 0-20 0-20 | Embeddedness Velocity/ Depth Regime | 0-20 |
| I. Sediment Deposition | 0-20 | 12 | Velocity/ Depth Regime Sediment Deposition | 0-20 | | | | -20 | | Velocity/ Depth Regime Sediment Deposition | 0-20 | Velocity Depth Regime Sediment Deposition | 0-20 |
| 5. Channel Flow Status | 0-20 | 0 | 5. Channel Flow Status | 0-20 | | | | -20 | | 5. Channel Flow Status | 0-20 | 5. Channel Flow Status | 0-20 |
| S. Channel Alteration | 0-20 0-1 | 5 | 6. Channel Alteration | 0-20 | | | | -20 | -1 | 6. Channel Alteration | 0-20 | 6. Channel Alteration | 0-20 |
| . Frequency of Riffles (or bends) | 0-20 | 0 | 7. Frequency of Riffles (or bends) | 0-20 | | | 7. Frequency of Riffles (or bends) | -20 | | 7. Frequency of Riffles (or bends) | 0-20 | 7. Frequency of Riffles (or bends) | 0-20 |
| B. Bank Stability (LB & RB) | 0-20 | 12 | 8. Bank Stability (LB & RB) | 0-20 | | | | -20 | | 8. Bank Stability (LB & RB) | 0-20 | 8. Bank Stability (LB & RB) | 0-20 |
| Vegetative Protection (LB & RB) | 0-20 | 11 | Vegetative Protection (LB & RB) | 0-20 | | | Vegetative Protection (LB & RB) | -20 | | Vegetative Protection (LB & RB) | 0-20 | Vegetative Protection (LB & RB) | 0-20 |
| Riparian Vegetative Zone Width (LB & RB) | 0-20 | 11 | 10. Riparian Vegetative Zone Width (LB & RB) | 0-20 | | | | -20 | | 10. Riparian Vegetative Zone Width (LB & RB) | 0-20 | Riparian Vegetative Zone Width (LB & RB) | 0-20 |
| Total RBP Score | Marginal | 54 | Total RBP Score | Poor | 0 | | Total RBP Score | Poor | 0 | Total RBP Score | Poor 0 | Total RBP Score | Poor 0 |
| Sub-Total CHEMICAL INDICATOR (Applies to Intermittent | | 0.45 | Sub-Total | | 0 | | Sub-Total CHEMICAL INDICATOR (Applies to Intermittent and | D | 0 | Sub-Total CHEMICAL INDICATOR (Applies to Intermittent | 0 | Sub-Total | 0 |
| | and Perennial Str | eams) | CHEMICAL INDICATOR (Applies to Intermitter | | eams) | | · · · · | Perenniai | Streams) | | • | CHEMICAL INDICATOR (Applies to Intermitte | · |
| WDEP Water Quality Indicators (General) Specific Conductivity | | | WVDEP Water Quality Indicators (General Specific Conductivity | | | | WVDEP Water Quality Indicators (General) Specific Conductivity | | | WVDEP Water Quality Indicators (General) Specific Conductivity | | WVDEP Water Quality Indicators (General Specific Conductivity | 1) |
| specific Conductivity | | | Specific Conductivity | | | | | | | Specific Conductivity | | Specific Conductivity | |
| 100-199 - 85 points | 0-90 | | | 0-90 | | | | -90 | | | 0-90 | | 0-90 |
| Н | | | рН | | | | рН | | | pH | | рН | |
| | 0-80 | | | 5-90 | | | 5 | -90 | -1 5.6 | | 5-90 | | 5-90 0-1 |
| 5.6-5.9 = 45 points | | | | | | | | | | | | | |
| 00 | | | ро | | | | DO | | | DO | | БО | |
| | 10-30 | | | 10-30 | | | 11 |)-30 | | | 10-30 | | 10-30 |
| Sub-Total | | | Sub-Total | | 0 | | Sub-Total | | 0 | Sub-Total | 0 | Sub-Total | 0 |
| BIOLOGICAL INDICATOR (Applies to Intermitte | ent and Perennial S | Streams) | BIOLOGICAL INDICATOR (Applies to Intermit | tent and Perennial S | Streams) | | BIOLOGICAL INDICATOR (Applies to Intermittent | and Pere | ennial Streams) | BIOLOGICAL INDICATOR (Applies to Intermi | ittent and Perennial Streams) | BIOLOGICAL INDICATOR (Applies to Interr | mittent and Perennial Streams) |
| WV Stream Condition Index (WVSCI) | | | WV Stream Condition Index (WVSCI) | | | | WV Stream Condition Index (WVSCI) | 1 | | 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 | ı | 0 | Sub-Total | | 0 | | Sub-Total | | 0 | Sub-Total | 0 | Sub-Total | 0 |
| | | | | | | | | | | | | | |
| PART II - Index and Un | it Score | | PART II - Index and | Unit Score | | | PART II - Index and Unit | Score | | PART II - Index and Un | nit Score | PART II - Index and I | Unit Score |
| | | | | | | | | | | | | | |
| | | | | T = | | | | | | | | | |
| Index | Linear Feet | Unit Score | Index | Linear Feet | Unit Score | | Index L | inear Fe | et Unit Score | Index | Linear Feet Unit Score | Index | Linear Feet Unit Score |
| 0.519 | 125 | 64.89583333 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 0 | 0 | 0 0 |

| | | (See instruction p | | Impact Factors It values for MITIGATIO | N BANKING and II | LF) | | | |
|---|-----------------------------------|--|---------------------|---|-------------------|---|---------------------------|--------------------------|-----------|
| Temn | oral Loss-Construction | · · · · · · · · · · · · · · · · · · · | | | | Long | -term Protection | | |
| *Note: Reflects duration of aquatic functional loss | | ct (debit) and completion of compensatory | | | % Add. Mitigati | on and Monitoring Period | | -Term Protection (Years) | |
| • | mitigation (credit). | | | | | | | | |
| | | | | | | | | | |
| Years | | 0 | | | | | | | |
| Sub-Total | | 0 | | | | | | | |
| Tor | mporal Loss-Maturity | | | | 0 + 5/ | 10 Year Monitoring | | 101 | |
| *Note: Period between completion of compensator | | e time required for maturity, as it relates to | | | Sub-Total | To Teal Worldoning | | 0 | |
| function (i.e. maturity of tree stratum to provide | | | | | - | | | | |
| | corridor). | | | | | PART IV - Index | to Unit Score Cor | nversion | |
| | | | | | Final Index Score | Linear Feet | Unit Score | ILF Costs | |
| % Add. Mitigation | | Temporal Loss-Maturity (Years) | | | (Debit) | | (Debit) | (Offsetting Debit | |
| | | | | | 0.519166667 | 125 | 64.89583333 | \$51,916.67 | |
| | | | | | 0.515100007 | 123 | 04.0330333 | ψ51,510.01 | |
| | | | | | | | | | |
| 0% | | 0 | | | | | | | |
| Sub-Total | | 0 | | | | | | | |
| | | · · | | | | | | | |
| | | | | | | | | | |
| | | PART V | - Comparison of U | nit Scores and Projecte | d Balance | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| Final Unit Score (Debit) | | Mitigation Existing | | Mitigation Projected at | | Mitigation Projected at Ten | | Mitigation Projected At | |
| [No Net Loss Value] | 64.89583333 | Condition - Baseline | | Five Years | | Years | | Maturity | |
| - | | (Credit) | | Post Completion (Credit) | | Post Completion (Credit) | | (Credit) | |
| | | | | | | | | | |
| FINAL PROJECTED NET BALANCE | | | | | 0 | | 0 | | 0 |
| | | | | | | | | | |
| | | P | art VI - Mitigation | Considerations (Incentiv | ves) | | | | |
| | | | | | | | | | |
| | Extent of Stream Re | | | | | Extended | Upland Buffer Zone | e | |
| | | correct Restoration Levels (below) for your pr | oject | | *Note1: Referen | nce Instructional handout for the def | | | s (below) |
| ^Note2: P | Place an "X" in the appropriate | category (only select one). | | | | *Note ² : Enter the buffer width for | each channel side (Left | Bank and Right Bank) | |
| Restoration Level 1 | | | | | | *Note ³ : Select th | ne appropriate mitigation | n type | |
| | | | | 4 | | | | | |
| Restoration Level 2 | | | | | Buffer Width | | Left Bank | k | |
| Restoration Level 3 | | | | | | 0-50 | | None | |
| | | | | J | | 51-150 | | None | |
| | | | | | Buffer Width | 000 | Right Ban | | |
| | | | | _ | | 0-50 | | None | |
| Compensatory Mitigation Plan incorpo | | | | | | 51-150 | | None | |
| *Note: HUC 12-based watershed | approach required to obtain Strea | am Restoration incentive | No | | Average Buffer | 0 | | | |
| | | | | _ | Width/Side | | | | |
| | | Impact | Mitigation Unit | | | | Stro | ight Preservation Ratio | |
| Site | | Unit Yield (Debit) | Yield (Credit) | | | | Stra | (v2.1, Sept 2015) | |
| | | Offic Field (Debit) | Tiela (Glealt) | | | | | (vz.1, ocpt zu13) | |
| S-QR34 | | 64.89583333 | #DIV/0! | | | Final Mitigation Unit Yield | | | |
| | | | - | J | | #DIV/0! | | | |
| | | | | | | 11011101 | | | |

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

To ensure accurate calculations, the <u>UPPERMOST STRATUM</u> 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-QR34 Sampling Date: 11/10/2016

Project Site Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR: SAR number:

Tree/Sapling Strata

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

| Function | Functional Capacity Index |
|------------------------|------------------------------|
| Hydrology | 0.50 |
| Biogeochemical Cycling | 0.54 |
| Habitat | 0.20 |

Variable Measure and Subindex Summary:

| Variable | Name | Average Measure | Subindex |
|--------------------------|---|--------------------|----------|
| V _{CCANOPY} | Percent canpoy over channel. | 23.00 | 0.14 |
| V _{EMBED} | Average embeddedness of channel. | 2.00 | 0.46 |
| V _{SUBSTRATE} | Median stream channel substrate particle size. | 0.08 | 0.04 |
| 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. | 7.11 | 0.70 |
| 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. | 3.60 | 1.00 |
| V _{DETRITUS} | Average percent cover of leaves, sticks, etc. | 19.38 | 0.24 |
| V _{HERB} | Average percent cover of herbaceous vegetation. | Not Used | Not Used |
| V _{WLUSE} | Weighted Average of Runoff Score for Catchment. | 0.93 | 0.98 |

Version 1-25-11

| | High-G | radient | Headwat | | | | entucky a alculator | | ern Wes | t Virginia | 3 |
|--------|----------------------|------------------------|-----------------------------|---------------|-------------|----------------|--|--------------------------|--------------------|-------------|---------|
| | Team: | C. Vileno, C | C. Stoliker | | | | | | M Northing: | 39.489083 | |
| Pro | oject Name: | | | | | | • | | _ | -80.520519 | |
| | Location: | | | | | | | - | _ | 11/10/2016 | |
| SA | AR Number: | | Reach | Length (ft): | 100 | Stream Ty | /pe: Ephei | meral Stream | _ | | • |
| | Top Strata: | Tre | e/Sapling St | rata | (determined | d from perce | ent calculate | d in V _{CCANOR} | _{>Y}) | | |
| Site a | and Timing: | Project Site | | | | • | Before Projec | ct | | | • |
| Sample | Variables | 1-4 in strea | m channel | | | | | | | | |
| 1 | V _{CCANOPY} | Average pe equidistant | rcent cover points along | g the stream | . Measure | only if tree/s | anopy. Measapling cover trata choice. | is at least 2 | | | 23.0 % |
| | List the per | | | nts at each p | oint below: | | | | | | |
| | 50 | 40 | 30 | 20 | 15 | 15 | 15 | 15 | 15 | 15 | |
| | | | | | | | | | | | |
| 2 | V_{EMBED} | along the st | tream. Sele | ct a particle | from the be | d. Before n | at no fewer t noving it, det | ermine the | percentage | of the | 2.0 |
| | | | | | | | y fine sedim | | | | |
| | | | | osed of bed | | | composed of | line sealme | ents, use a r | ating score | |
| | | | | | | | les (rescale | d from Platt | s Megahan | and | |
| | | Minshall 19 | 83) | | bble and bo | Juider partic | ies (rescale | u nom r latt | s, Meganan | , and | |
| | | Rating | Rating Des | | | | | | <u> </u> | ` | |
| | | 5 4 | | | | | buried by fin d, or buried b | | | .) | |
| | | 3 | | | | | ed, or buried be | | | | |
| | | 2 | | | | | ed, or buried | | | | |
| | | 1 | | | | | r buried by fi | | | al surface) | |
| | List the ration | ngs at each | point below | : | | | | | | | |
| | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | |
| | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | |
| | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 3 | | | | | | | it no fewer the d in V _{EMBED} . | | hly equidista | ant points | 0.08 in |
| | Enter partic | ele size in ind | ches to the i | nearest 0.1 i | nch at each | point below | / (bedrock sł | nould be co | unted as 99 | in, asphalt | |
| | | | | particles as | | | , | | , , | , , | |
| | 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 perce | nt of erodec | stream cha | nnel bank. | Enter the to | tal number o | of feet of ero | oded bank o | n each side | |
| | 223 | | al percentag | | | | re eroded, t | | | | 0 % |
| | | | Left Bank: | 0 | ft | | Right Bank: | 0 | ft | | |

| Sample | e Variables | 5-9 within t | he entire ri | parian/buff | er zone adj | acent to th | e stream ch | annel (25 f | eet from ea | ch bank). | |
|----------|--------------|---------------|--------------|---------------|--|---------------|--------------------------------|---------------|-------------|--------------|-------------|
| 5 | V_{LWD} | stream read | ch. Enter th | | om the entir ılated. | e 50'-wide I | ter and 36 in buffer and wi | ithin the cha | | | 0.0 |
| | | | | | | | oody stems: | | 0 | | T |
| 6 | V_{TDBH} | | | | ly if V _{CCANOP} tree DBHs i | | ng cover is a | t least 20%) | . Trees are | at least 4 | 7.1 |
| | | , | , | | | | n) within the | buffer on ea | ch side of | | |
| | | the stream | | ionio oi man | ridual fioco | at loadt 1 li | 1) William 1110 | 541101 011 00 | ion oldo ol | | _ |
| | | | Left Side | | | | | Right Side | | | I |
| | 7 | 4 | 8 | 8 | 4 | 12 | 5 | | | | |
| | 10 | 6 | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | 1 |
| | | | | | | | | | | | 1 |
| | | | | | | | | | | | |
| 7 | V_{SNAG} | | | | and 36" tall) t per 100 fee | | t of stream. Iculated. | Enter numb | er of snags | on each | 0.0 |
| | | | | | | | | | | | |
| 0 | W | Niverie en ef | Left Side: | | 0 | 4 . 4 : | Right Side: | | 0 | | |
| 8 | V_{SSD} | | | | | | nes dbh) per s on each sic | | | | Not Used |
| | | | | l be calculat | | u u | J 011 00011 010 | | Jan, and m | | |
| | | | Left Side: | | | | Right Side: | | | | |
| 9 | V_{SRICH} | | | | | | m reach. Ch ve species p | | | | 3.60 |
| | | | | | | | from these d | | Strata. Opc | .0103 | 3.00 |
| | | Grou | p 1 = 1.0 | | | | | Group | 2 (-1.0) | | <u> </u> |
| 7 | Acer rubru | ım | | Magnolia tı | ripetala | Ш | Ailanthus a | ltissima | | Lonicera ja | ponica |
| 7 | Acer sacci | harum | | Nyssa sylv | atica | | Albizia julib | orissin | | Lonicera ta | tarica |
| Ш | Aesculus f | flava | | Oxydendrun | n arboreum | | Alliaria peti | iolata | | Lotus corni | iculatus |
| Ш | Asimina tri | iloba | | Prunus ser | otina | | Alternanthe | era | | Lythrum sa | licaria |
| | Betula alleg | ghaniensis | 7 | Quercus al | lba | | philoxeroid | es | | Microstegiun | n vimineum |
| | Betula leni | ta | | Quercus co | occinea | | Aster tatari | cus | | Paulownia | tomentosa |
| \Box | Carya alba | 9 | \Box | Quercus in | nbricaria | Ш | Cerastium | fontanum | | Polygonum o | cuspidatum |
| | Carya glab | ora | | Quercus pi | rinus | | Coronilla va | aria | | Pueraria m | ontana |
| \sqcup | Carya ova | lis | | Quercus ru | ıbra | | Elaeagnus u | ımbellata | 4 | Rosa multit | flora |
| | Carya ova | ta | | Quercus ve | elutina | | Lespedeza | bicolor | | Sorghum h | alepense |
| | Cornus flo | rida | | Sassafras | albidum | | Lespedeza | cuneata | | Verbena br | rasiliensis |
| 4 | Fagus gra | ndifolia | | Tilia amerio | cana | | Ligustrum ol | otusifolium | | | |
| | Fraxinus a | | | Tsuga cana | adensis | | Ligustrum s | sinense | | | |
| 1 | Liriodendroi | n tulipifera | | Ulmus ame | | | | | | | |
| | Magnolia a | • | | | | | | | | | |
| | | | | | | | | | | | |
| | | 5 | Species in | Group 1 | | | | 1 | Species in | Group 2 | |

| _ | | 40.44 1/11 | | | | | | | | | |
|----|-----------------------------|--------------------|------------------|---------------|------------------------------|----------------|------|--------|-------------|--------------|-----------------------|
| | le Variables The four su | | | | | | | | one within | 25 feet fron | n each |
| 10 | V_{DETRITUS} | | | | sticks, or oth | | | | <4" diamete | er and <36" | 19.38 % |
| | | long are inc | | Side | nt cover of th | e detritai iay | | t Side | | 1 | |
| | | 20 | 30 | 40 | 30 | 20 | 15 | 0 | 0 | | |
| | ., | | | | | | | | 200() | | |
| 11 | V_{HERB} | | | | aceous vege oh and 36" ta | | | | | | Netherd |
| | | vegetation | percentages | | h 200% are a | | | | | | Not Used |
| | | each subpl | | Side | | | Righ | t Side | | 1 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | le Variable 1 | | | | | | | | | | |
| 12 | V _{WLUSE} | Weighted A | verage of R | Runoff Score | e for watersh | ied: | | | | | 0.93 |
| | | | | | | | | | Runoff | % in Catch | Running |
| | | | Land | Use (Choos | se From Dro | p List) | | | Score | ment | Percent (not >100) |
| | Forest and r | native range (> | 75% ground | cover) | | | | - | 1 | 90 | 90 |
| | Open space | (pasture, lawr | is, parks, etc.) | , grass cover | >75% | | | - | 0.3 | 10 | 100 |
| | | | | | | | | • | | | |
| | | | | | | | | • | | | |
| | | | | | | | | • | | | |
| | | | | | | | | • | | | |
| | • | | | | | | | • | | | |
| | - | | | | | | | • | | | |
| | Su | ımmary | | | | | No | otes: | | | |
| \ | /ariable | Value | VSI | | | | | | | | |
| V | CCANOPY | 23 % | 0.14 | | | | | | | | |
| V | EMBED | 2.0 | 0.46 | | | | | | | | |
| V, | SUBSTRATE | 0.08 in | 0.04 | | | | | | | | |
| | BERO | 0 % | 1.00 | | | | | | | | |
| | _WD | 0.0 | 0.00 | | | | | | | | |
| | говн | 7.1 | 0.70 | | | | | | | | |
| | SNAG | 0.0 | 0.10 | | | | | | | | |
| | | | | | | | | | | | |
| | SSD | Not Used | Not Used | | | | | | | | |
| | SRICH | 3.60 | 1.00 0.24 | | | | | | | | |
| | DETRITUS HERB | 19.4 % Not Used | 0.24 Not Used | | | | | | | | |
| | NLUSE | 0.93 | 0.98 | | | | | | | | |
| ٧, | NLUSE | 0.93 | 0.96 | | | | | | | | |

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

| STREAM NAME S-QR34 | LOCATION Wetzel, Cour | nty | | | |
|---|---|---------------------------|--|--|--|
| STATION # RIVERMILE | STREAM CLASS Ephemeral | | | | |
| Lat <u>39.489083</u> Long <u>-80.520519</u> | RIVER BASIN Headwaters South Fork Fishing Creek | | | | |
| STORET# | AGENCY Tetra Tech | | | | |
| INVESTIGATORS C. Vileno, C. Stoliker | | | | | |
| FORM COMPLETED BY C. Vileno | DATE 11/10/2016 TIME 3:30pm | REASON FOR SURVEY SWVM | | | |

| | Habitat | | Condition | ı Category | | |
|--|---|---|---|---|---|--|
| | Parameter | 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 0 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | |
| n sampling reach | 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. | |
| ted in | SCORE 3 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | |
| Parameters to be evaluated in sampling reach | 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). | |
| ıram | SCORE 0 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | |
| P _k | 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 12 | 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 | | Condition | n Category | | | |
|--|--|--|--|--|---|--|--|
| | Parameter Parameter | 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} 5 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| oling reach | 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. | | |
| samp | SCORE 0 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| Parameters to be evaluated broader than sampling reach | 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. | | |
| e eva | SCORE 6 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |
| to be | SCORE 6 (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |
| Parameters | 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 8 (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 8 (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 54

No / low flow at time of survey. Unable to sample water quality or $\ensuremath{\mathbf{WVSCI}}$.



Photograph Direction SW

Comments:

| STREAM ID S-J56 | STREAM NAME Manion Run |
|--|-------------------------------|
| LAT 39.464274 LONG -80.502218 | DATE 05/31/2015 |
| PROJECT NAME MVP | CLIENT MVP |
| INVESTIGATORS Pete Johnson, Chris Weber, | Nate K |
| FLOW REGIME Perennial — Intermittent — Ephemeral — | WATER TYPE TNW — RPW ✓ NRPW — |

| Perenniai 🚣 | _ intermitte | nt <u> Ephem</u> | eral TNW | RPW – | NRPW | | |
|------------------------|--------------|---------------------------|------------------------------------|-------------------|--|-----------------------------------|--|
| | | | _ | | | | |
| | | | Measurements | | Stream ErosionNone ✓ Moderate | Незуу | |
| | | · | k Width: 10.0 ft | | NoneNoderate | Tleavy | |
| | | Top of Ban | ŭ | , , | Artificial, Modified or Channelized | | |
| | | LB <u>4.0</u> | | <u>ft</u> | Yes No | | |
| CHANNEL FE | ATURES | · | th: 2.00 in | | Dam PresentYes _ | ✓ No | |
| | | Water Widt | th: 5.0 ft | | | _ | |
| | | High Water | Mark: <u>3.0 ft</u> | | Sinuosity Low | Medium High | |
| | | Flow Direc | tion: SE | | Gradient | | |
| | | | | | | Severe (10 ft/100 ft) | |
| | | Water Pres | sent | | Proportion of Reach Repre | , | |
| | | | r, stream bed dry | | Morphology Types | - | |
| | | Stream | | | Riffle 70 % Run 15 | % | |
| FLOW | | Standin | • | | Pool 15 % | | |
| CHARACTERI | ISTICS | <u>✓</u> Flowing | water | | Turbidity | | |
| | | Velocity | | | <u>✓</u> ClearSlightly | | |
| | | | <u>✓</u> Moderate | | OpaqueStainedOther | | |
| | | Slow | | | | | |
| INOR | | STRATE CO add up to 10 | MPONENTS 0%) | _ | RGANIC SUBSTRATE CON does not necessarily add u | | |
| Substrate Type | Diame | ter | % Composition in Sampling Reach | Substrate Type | Characteristic | % Composition in Sampling Area | |
| Bedrock | | | 15 | Detritue | sticks, wood, coarse | | |
| Boulder | > 256 ı | mm (10") | 20 | Detritus | plant materials (CPOM) | 20 | |
| Cobble | 64-256 m | m (2.5"-10") | 35 | Muck-Mud | black, very fine organic | 40 | |
| Gravel | 2-64 mm | (0.1"-2.5") | 10 | IVIUCK-IVIUU | (FPOM) | 10 | |
| Sand | 0.06-2n | nm (gritty) | 15 | | | | |
| Silt | 0.004-0 | 0.06 mm | 5 | Marl | grey, shell fragments | | |
| Clay | < 0.004 r | mm (slick) | | | | | |
| | | Predomina ✓ Forest | ant Surrounding Lan Commer | | Indicate the dominant type ✓ Trees Shrub | | |
| | | Field/P | | | Grasses Herba | | |
| | | Agricul | | | _ | | |
| WATERSHED FEATURES | | Other: | | | Floodplain Width Wide > 30ft Mode | rate 15-30ft | |
| | | Canopy Co | ovor | | Narrow <16ft | | |
| | | Partly of | ppenPartly sh | aded | | | |
| | | Shaded | Open | | Wetland PresentYes Wetland ID | <u>✓</u> No | |
| | | Indicate th | e dominant type and | d record the o | dominant species present | | |
| AQUATIC VE | GETATION | Rooted | l emergent | Rooted subme | ergentRooted float | tingFree floating | |
| | | Floatin | g algae | Attached alga | е | | |
| | | _ | | | | | |
| | | | | | | | |
| MACDOINVE | TEDDATES | | | | | | |
| MACROINVER OR OTHER | KIEBKAIES | | | | | | |
| WILDLIFE OBSERVED/C | THER | | | | | | |
| OBSERVATIO NOTES | | | | | | | |
| .10123 | | | | | | | |
| | | | | | | | |

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

| USACE FILE NO./ Project Name: (v2.1, Sept 2015) | | Moun | | y Pipeline Project M v2.1 | | COORDINATES: cimal Degrees) | Lat. | 39.463899 | Lon. | -80.502594 | | WEATHER: | WEATHER: Sunny, 70 | | DAT | E: | Septembe | r 1, 2016 |
|---|-----------------------|---------------|----------|---|--|---|------|---|---------------------------------------|--|------|--|---------------------|--------------------|---|--------------------------|-----------------------|------------|
| IMPACT STREAM/SITE ID (watershed size {acreage}, | | | | | on Run; 318ac | on Run; 318ac MITIGATION STREAM CLASS./SITE ID AND SITE DESCRI (watershed size {acreage}, unaltered or impairments) on: Mitigation Bank | | | : | | | | Comm | ents: | | | | |
| STREAM IMPACT LENGTH: | 41 | FORM (| | RESTORATION (Levels I-III) | | OORDINATES: cimal Degrees) | Lat. | | Lon. | | | PRECIPITATION PAST 48 HRS: | | | Mitigation | Length: | | |
| Column No. 1- Impact Existing | g Condition (Debi | it) | | Column No. 2- Mitigation Existing C | Condition - Base | line (Credit) | | Column No. 3- Mitigation Pr Post Completio | | Years | | Column No. 4- Mitigation Pro Post Completion | | ears | Column No. 5 | 5- Mitigation Project | ed at Maturity (Cr | redit) |
| Stream Classification: | Peren | nnial | | Stream Classification: | Pe | rennial | | Stream Classification: | Р | erennial | Str | ream Classification: | Pere | ennial | Stream Classification: | | Peren | inial |
| Percent Stream Channel Slo | оре | 2 | | Percent Stream Channel Sl | оре | | | Percent Stream Channel S | оре | 0 | | Percent Stream Channel SI | оре | 0 | Percent | Stream Channel S | ope | 0 |
| HGM Score (attach da | ata forms): | | | HGM Score (attach | data forms): | | | HGM Score (attach | data forms): | | | HGM Score (attach d | ata forms): | | НО | M Score (attach d | ata forms): | |
| | | Average | | | | Average | | | | Average | | | | Average | | | · · · · · · · · · | Average |
| Hydrology Biogeochemical Cycling | | 0 | | Hydrology Biogeochemical Cycling | | 0 | | Hydrology Biogeochemical Cycling | | 0 | | rdrology ogeochemical Cycling | | 0 | Hydrology Biogeochemical Cycli | ng | | 0 |
| PART I - Physical, Chemical and | Biological Indica | ators | | Habitat PART I - Physical, Chemical ar | d Biological Ind | icators | | Habitat PART I - Physical, Chemical a | nd Biological In | dicators | На | PART I - Physical, Chemical and | Biological India | cators | Habitat PART I - Phy | sical, Chemical and | Biological Indica | ators |
| | Points Scale Range | Site Score | ŀ | | 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 | s classifications) | | Ī | PHYSICAL INDICATOR (Applies to all streams | classifications) | | | PHYSICAL INDICATOR (Applies to all stream | | | PH | HYSICAL INDICATOR (Applies to all stream | s classifications) | | PHYSICAL INDICATOR | | | |
| USEPA RBP (High Gradient Data Sheet) | | | | USEPA RBP (High Gradient Data Sheet) | | | | USEPA RBP (High Gradient Data Sheet) | | | | SEPA RBP (High Gradient Data Sheet) | | | USEPA RBP (High Gra | | | |
| Epifaunal Substrate/Available Cover Embaddedness | 0-20 | 16 | 1 | Epifaunal Substrate/Available Cover Embeddedness | 0-20 | | | Epifaunal Substrate/Available Cover Embaddedness | 0-20 | | | Epifaunal Substrate/Available Cover | 0-20 | | Epifaunal Substrate/ Embaddadaga | Available Cover | 0-20 | |
| Embeddedness Velocity/ Depth Regime | 0-20 | 13 12 | 1 | 2. Embeddedness 3. Velocity/ Depth Regime | 0-20 | | | Embeddedness Velocity/ Depth Regime | 0-20 | | | Embeddedness Velocity/ Depth Regime | 0-20 0-20 | | Embeddedness Velocity/ Depth Regir | mo. | 0-20 0-20 | |
| Velocity Depth Regime Sediment Deposition | 0-20 | 10 | 1 | 4. Sediment Deposition | 0-20 | | | Velocity Depth Regime Sediment Deposition | 0-20 | | | Sediment Deposition | 0-20 | | Velocity/ Depth Regil Sediment Deposition | | 0-20 | |
| 5. Channel Flow Status | 0-20 | 6 | | 5. Channel Flow Status | 0-20 | | | 5. Channel Flow Status | 0-20 | | | Channel Flow Status | 0-20 | | Channel Flow Status | | 0-20 | |
| Channel Alteration | 0-20 0-1 | 18 | Ī | 6. Channel Alteration | 0-20 | | | Channel Alteration | 0-20 | | 6. 0 | Channel Alteration | 0-20 | | Channel Alteration | | 0-20 | |
| 7. Frequency of Riffles (or bends) | 0-20 | 18 | | 7. Frequency of Riffles (or bends) | 0-20 | | | 7. Frequency of Riffles (or bends) | 0-20 | | 7. I | Frequency of Riffles (or bends) | 0-20 | | 7. Frequency of Riffles | (or bends) | 0-20 | |
| Bank Stability (LB & RB) | 0-20 | 11 | | 8. Bank Stability (LB & RB) | 0-20 | | | 8. Bank Stability (LB & RB) | 0-20 | | | Bank Stability (LB & RB) | 0-20 | | Bank Stability (LB & I | | 0-20 | |
| Vegetative Protection (LB & RB) | 0-20 | 14 | 9 | 9. Vegetative Protection (LB & RB) | 0-20 | | | 9. Vegetative Protection (LB & RB) | 0-20 | | 9. \ | Vegetative Protection (LB & RB) | 0-20 | | 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 | | Riparian Vegetative Z | one Width (LB & RB) | 0-20 | |
| Total RBP Score | Suboptimal | 130 | - | Total RBP Score | Poor | 0 | | Total RBP Score | Poor | 0 | | otal RBP Score | Poor | 0 | Total RBP Score | | Poor | 0 |
| Sub-Total CHEMICAL INDICATOR (Applies to Intermitter | nt and Perennial Stre | 0.65 eams) | | Sub-Total CHEMICAL INDICATOR (Applies to Intermitter | nt and Perennial Str | eams) | | Sub-Total CHEMICAL INDICATOR (Applies to Intermitte | nt and Perennial S | treams) | | ub-Total HEMICAL INDICATOR (Applies to Intermitte | ent and Perennial S | 0 Streams) | Sub-Total CHEMICAL INDICATO | R (Applies to Intermitte | nt and Perennial Stre | eams) |
| WVDEP Water Quality Indicators (General | | , | , | WVDEP Water Quality Indicators (General | 1 | , | | WVDEP Water Quality Indicators (Genera |) | • | | VDEP Water Quality Indicators (Genera | | , | WVDEP Water Quality | Indicators (General |) | , |
| Specific Conductivity | | | | Specific Conductivity | | | | Specific Conductivity | | | | pecific Conductivity | ., | | Specific Conductivity | | | |
| | 0-90 | 0.164 | | | 0-90 | | | | 0-90 | | | | 0-90 | | | | 0-90 | |
| <=99 - 90 points | 0.00 | 0.104 | | | 0.00 | | | | 0 00 | | | | 0 00 | | | | | |
| рН | 2.1 | | | pH | 0-1 | | | рН | 0-1 | | рН | | | | рН | | | |
| 6.0-8.0 = 80 points | 0-80 | 7.42 | | | 5-90 | | | | 5-90 | 5.6 | | | 5-90 | | | | 5-90 | |
| DO | 10-30 | 76.8 | <u> </u> | DO | 10-30 | | | DO | 10-30 | | DC | 0 | 10-30 | | DO | | 10-30 | |
| >5.0 = 30 points Sub-Total | 1 | 1 | 1 | Sub-Total | | 0 | | Sub-Total | | 0 | Sul | ib-Total | | 0 | Sub-Total | | | 0 |
| BIOLOGICAL INDICATOR (Applies to Intermit | ttent and Perennial S | Streams) | | BIOLOGICAL INDICATOR (Applies to Intermit | tent and Perennial | Streams) | | BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams) BIOLOGICAL INDICA | | BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams) | | BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Stream | | BIOLOGICAL INDICAT | OR (Applies to Intern | nittent and Perennia | al Streams) | |
| WV Stream Condition Index (WVSCI) | | | 1 | WV Stream Condition Index (WVSCI) | | | | WV Stream Condition Index (WVSCI) | | | w\ | V Stream Condition Index (WVSCI) | <u> </u> | | WV Stream Condition | Index (WVSCI) | | |
| Good | 0-100 0-1 | 70.5 | | | 0-100 0-1 | | | | 0-100 0-1 | | | | 0-100 0-1 | | | | 0-100 0-1 | |
| Sub-Total | | 0.705 | 3 | Sub-Total | - N | 0 | | Sub-Total | · · · · · · · · · · · · · · · · · · · | 0 | Sul | ıb-Total | | 0 | Sub-Total | | | 0 |
| PART II - Index and U | Init Score | | Г | PART II - Index and | Unit Score | | Ī | PART II - Index and | I Unit Score | | | PART II - Index and U | Jnit Score | | P | ART II - Index and U | Jnit Score | |
| | | | | | | | | | | | | | | | | | | |
| Index | Linear Feet | Unit Score | ľ | Index | Linear Feet | Unit Score | | Index | Linear Feet | Unit Score | | Index | Linear Feet | Unit Score | Ind | ex | Linear Feet | Unit Score |
| 0.785 | 41 | 32.185 | ľ | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | | 0 | 0 |

| | | (See instruction page | | Impact Factors It values for MITIGATIO | N BANKING and I | LF) | | | |
|---|--------------------|--|-----------------------------------|---|------------------------------|---|---------------------------|--------------------------|------------|
| Temporal Loss-Co | nstruction | · · · · · · · · · · · · · · · · · · · | | | | Long | -term Protection | | |
| *Note: Reflects duration of aquatic functional loss between the til | | ct (debit) and completion of compensatory | | | % Add. Mitigati | ion and Monitoring Period | | -Term Protection (Years) | |
| mitigation (credit). | | | | | | | | | |
| | | | | | | | | | |
| Years | | 0 | | | | | | | |
| Sub-Total | | U | | | | | | | |
| Temporal Loss- | Maturity | | | | 0 + 5/ | 10 Year Monitoring | | 101 | |
| *Note: Period between completion of compensatory mitigation me | | e time required for maturity, as it relates to | | | Sub-Total | To real Monitoring | | 0 | |
| function (i.e. maturity of tree stratum to provide organic matte | | | | | | | | | |
| corridor). | | | | | | PART IV - Index | to Unit Score Cor | nversion | |
| | | | | | Final Index Score | Linear Feet | Unit Score | ILF Costs | |
| % Add. Mitigation | | Temporal Loss-Maturity (Years) | | | (Debit) | 7.7 | (Debit) | (Offsetting Debit | |
| · · | | . , | | | 0.785 | 41 | 32.185 | \$25,748.00 | |
| | | | | | 0.703 | 71 | 32.103 | \$23,740.00 | |
| | | | | | | | | | |
| 00/ | | 0 | | | | | | | |
| 0% Sub-Total | | 0 | | | | | | | |
| Sub-1 otal | | V | | | | | | | |
| | | | | | | | | | |
| | | PART V | - Comparison of U | nit Scores and Projecte | d Balance | | | | |
| | | | | • | | | | | |
| | | | | | | | | | |
| Final Unit Score (Debit) | | Mitigation Existing | | Mitigation Projected at | | Mitigation Projected at Ten | | Mitigation Projected At | |
| [No Net Loss Value] 32. | 185 | Condition - Baseline | | Five Years | | Years | | Maturity | |
| [NO Net Loss Value] | | (Credit) | | Post Completion (Credit) | | Post Completion (Credit) | | (Credit) | |
| | | | | | | | | | |
| FINAL PROJECTED NET BALANCE | | | | | | | • | | • |
| | | | | | 0 | | 0 | | 0 |
| | | D | Part VI - Mitigation | Considerations (Incentiv | voc) | | | | |
| | | _ | art vi - Willigation | Considerations (incention | ves) | | | | |
| | | | | • | T | | | | |
| Extent of | of Stream Re | estoration | | | | Extended | Upland Buffer Zon | a | |
| *Note1: Reference the Instructional handout to | | | oject | | *Note ¹ · Referen | nce Instructional handout for the def | - | | s (below) |
| *Note2: Place an "X" in t | he appropriate | category (only select one). | | | 11010 1 11010101 | *Note ² : Enter the buffer width for | | | C (201011) |
| Restoration Level 1 | | | | 1 | | | ne appropriate mitigation | | |
| - Nectoralion 20001 | | | | | | | | | |
| Restoration Level 2 | | | | | D (()A() () | | Left Banl | k | |
| | | | | 4 | Buffer Width | | | | |
| Restoration Level 3 | | | | | | 0-50 | | None | |
| - | | | | . | | 51-150 | | None | |
| | | | | | Buffer Width | | Right Ban | | |
| | | | | _ | | 0-50 | | None | |
| Compensatory Mitigation Plan incorporates HUC 12 | | | | | | 51-150 | | None | |
| *Note: HUC 12-based watershed approach require | d to obtain Strea | am Restoration incentive | No | | Average Buffer | 0 | | | |
| | | | | | Width/Side | | | | |
| | | lune and | Mitigation Unit | | | Ī | Ctar | ight Drocometics Deti- | |
| Site | | Impact | Mitigation Unit Yield (Credit) | | | | Stra | hight Preservation Ratio | |
| | Unit Yield (Debit) | | | | | | | (v2.1, Sept 2015) | |
| | | ` ' | | | | | | | |
| 0.170 | | | #PD1/101 | | | P1 1 841/2 | | | |
| S-J56 | | 32.185 | #DIV/0! | | | Final Mitigation Unit Yield | | | |

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

| STREAM NAME S-J56 | LOCATION Wetzel County, WV | | | | |
|---|------------------------------|-------------------------------------|--|--|--|
| STATION # RIVERMILE | STREAM CLASS Perennial | | | | |
| Lat <u>39.463899</u> Long <u>-80.502594</u> | RIVER BASIN Headwater | s South Fork Fishing Creek | | | |
| STORET# | AGENCY Tetra Tech | | | | |
| INVESTIGATORS C. Vileno, J. McGuirk, J. | Bittner | | | | |
| FORM COMPLETED BY J. McGuirk | DATE 09/01/2016 TIME 1:00 | REASON FOR SURVEY Proposed pipeline | | | |

| | Habitat | | Condition | ı Category | | |
|--|---|---|---|---|---|--|
| | Parameter | 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 | |
| ı sampling reach | 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. | |
| ted in | SCORE 13 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | |
| Parameters to be evaluated in sampling reach | 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). | |
| aram | SCORE 12 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | |
| P ₂ | 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 6 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | |

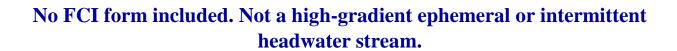
HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

| | Habitat | | Condition | Category | | | |
|--|--|--|--|--|---|--|--|
| | Parameter Parameter | 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} 18 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| ling reach | 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. | | |
| samp | SCORE 18 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| Parameters to be evaluated broader than sampling reach | 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. | | |
| e eva | SCORE 5 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |
| to b | SCORE 6 (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |
| Parameters | 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 2 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |
| | SCORE 10 (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |

Total Score 130

| Insects | Count | Tolerance | TV | Insects | Count | Tolerance | TV | Non-Insects | Count | Tolerance | TV | 7 | |
|-------------------|---------------|--------------|-----|------------------|-------|-----------|----|-----------------|---------------|-----------|--------------|--------------------|-------|
| Ephemeroptera | | • | 11 | Odonata | • | • | 6 | Crustacea | • | • | 3 | | |
| Ameletidae | | 2 | 0 | Aeshnidae | | 3 | 0 | Asellidae | | 7 | 0 | 1 | |
| Baetidae | 1 | 4 | 4 | Calopterygidae | | 6 | 0 | Cambaridae | 3 | 5 | 15 | | |
| Beatiscidae | | 4 | 0 | Coenagrionidae | | 7 | 0 | Gammaridae | | 5 | 0 | | |
| Caenidae | | 5 | 0 | Cordulegastridae | | 3 | 0 | Palaemonidae | | 5 | 0 | | |
| Ephemerellidae | | 3 | 0 | Gomphidae | 6 | 5 | 30 | Annelida | • | • | 0 | | |
| Ephemeridae | | 5 | 0 | Lestidae | | 7 | 0 | Hirudinea | | 10 | 0 | | |
| Heptageniidae | 6 | 3 | 18 | Libellulidae | | 7 | 0 | Nematoda | | 10 | 0 | | |
| Isonychiidae | | 3 | 0 | Coleoptera | • | • | 1 | Nematomorpha | | 10 | 0 | | |
| Leptophlebiidae | 4 | 4 | 16 | Chrysomelidae | | 7 | 0 | Oligochaeta | | 10 | 0 | | |
| Potamanthidae | | 5 | 0 | Dryopidae | | 5 | 0 | Turbellaria | | | 0 | | |
| Siphlonuridae | | 3 | 0 | Dytiscidae | | 6 | 0 | Turbellaria | | 7 | 0 | | |
| Tricorythidae | | 5 | 0 | Elmidae | | 4 | 0 | Bivalvia | | | 0 | | |
| Plecoptera | | | 3 | Gyrinidae | | 5 | 0 | Corbiculidae | | 6 | 0 | | |
| Capniidae | | 2 | 0 | Haliplidae | | 7 | 0 | Sphaeriidae | | 5 | 0 | | |
| Chloroperlidae | | 2 | 0 | Hydrophilidae | | 7 | 0 | Unionidae | | 4 | 0 | | |
| Leuctridae | 2 | 2 | 4 | Psephenidae | 1 | 3 | 3 | Gastropoda | | | 0 | | |
| Nemouridae | | 2 | 0 | Ptilodactylidae | | 5 | 0 | Ancylidae | Ancylidae 7 | | 0 | | |
| Peltoperlidae | | 1 | 0 | Hemiptera | | • | 0 | Hydrobiidae 4 | | 0 | | | |
| Perlidae | 1 | 1 | 1 | Belostomatidae | | 8 | 0 | Physidae 7 | | 0 | | | |
| Perlodidae | | 1 | 0 | Corixidae | | 8 | 0 | Planorbidae | | 5 | 0 | | |
| Pteronarcyidae | | 1 | 0 | Gerridae | | 10 | 0 | Pleuroceridae | | 5 | 0 | | |
| Taeniopterygidae | | 2 | 0 | Hydrometridae | | 8 | 0 | Viviparidae | | 5 | 0 | | |
| Trichoptera | | | 0 | Nepidae | | 8 | 0 | Miscellaneous | | | 0 | | |
| Brachycentridae | | 2 | 0 | Notonectidae | | 8 | 0 | Collembola | | 6 | 0 | | |
| Glossosomatidae | | 2 | 0 | Megaloptera | | | 0 | Lepidoptera | | 5 | 0 | | |
| Helicopsychidae | | 3 | 0 | Corydalidae | | 3 | 0 | Neuroptera | | 5 | 0 | | |
| Hydropsychidae | | 5 | 0 | Sialidae | | 6 | 0 | Hydrachnidae | | 6 | 0 | | |
| Hydroptilidae | | 3 | 0 | Diptera | • | • | 2 | Totals | Total r | number | 26 | | |
| Lepidostomatidae | | 3 | 0 | Athericidae | | 3 | 0 | Totals | Total f | amilies | 9 | | |
| Leptoceridae | | 3 | 0 | Blephariceridae | | 2 | 0 | | • | Metric o | calculations | • | |
| Limnephilidae | | 4 | 0 | Ceratopogonidae | | 8 | 0 | | Richnes | SS | | Additional metri | ics |
| Molannidae | | 3 | 0 | Chironomidae | | 9 | 0 | Total Taxa | | 9 | 40.9 | Ephemeroptera Taxa | 3 |
| Philopotamidae | | 4 | 0 | Culicidae | | 10 | 0 | EPT Taxa | | 5 | 38.5 | Plecoptera Taxa | 2 |
| Phryganeidae | | 4 | 0 | Dixidae | | 6 | 0 | | Toleran | ce | | Trichoptera Taxa | 0 |
| Polycentropodidae | | 5 | 0 | Empididae | | 7 | 0 | Biotic Index | | 3.88 | 87.4 | Long-lived Taxa | 5 |
| Psychomiidae | | 3 | 0 | Psychodidae | | 8 | 0 | % Tolerant | | 0.0 | 100.0 | Odonata Taxa | 1 |
| Rhyacophilidae | | 3 | 0 | Ptychopteridae | | 8 | 0 | | Composit | ion | | Diptera Taxa | 1 |
| Uenoidae | | 2 | 0 | Simuliidae | | 6 | 0 | % EPT Abundance | | 53.8 | 59.8 | COET Taxa | 5 |
| | | erance Value | 101 | Stratiomyidae | | 10 | 0 | % Dominance | | 23.1 | 96.2 | % Sensitive | 38.5 |
| | rginia Save O | | | Syrphidae | | 10 | 0 | % Net-spinners | | 0.0 | NA | % Chironomidae | 0.0 |
| 601 57th Stre | | | 304 | Tabanidae | | 7 | 0 | Stream (| Condition Ind | ex | 70.5 | % Clingers | 53.8 |
| http:// | www.dep.w | v.gov/sos | | Tipulidae | 2 | 5 | 10 | Integrity Ra | ating | Subo | ptimal | More diversity mea | sures |

<u>Note</u>: 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.





Photograph Direction South

Comments:

| STREAM ID S-J59 | STREAM NAME UNT to Manion Run |
|--|-------------------------------|
| LAT 39.462645 LONG -80.504754 | DATE 05/31/2015 |
| PROJECT NAME MVP | CLIENT MVP |
| INVESTIGATORS Pete Johnson, Chris Weber, | Nate K |
| FLOW REGIME Perennial — Intermittent ✓ Ephemeral — | WATER TYPE TNW — RPW ✓ NRPW — |

| Perenniai – | | nt <u> </u> | erai rivvv | RPW — | NRPW — | | |
|------------------------|-----------|---------------|--|---------------------------------|---------------------------------------|--|--|
| | | F-4'4- B | | | Ota | | |
| | | | /leasurements k Width: <u>3.0 ft</u> | | Stream ErosionNone ✓ Moderate | Heavy | |
| CHANNEL FEATURES | | - | | | Woderate | | |
| | | Top of Ban | ŭ | . . | Artificial, Modified or Char | nnelized | |
| | | LB <u>1.0</u> | | <u>ft</u> | Yes No | | |
| | | Water Dep | th: <u>1.00 in</u> | | Dam PresentYes _ | ∠ No. | |
| | | Water Widt | h: 6.0 in | | Daili Fleseill 165 _ | <u>/ </u> | |
| | | High Water | Mark: <u>6.0 in</u> | | Sinuosity Low | Medium High | |
| | | Flow Direct | tion: S | | Gradient | | |
| | | | | | | ✓ Severe | |
| | | | | | (0.5/100 ft (2 ft/100 ft) | (10 ft/100 ft) | |
| | | Water Pres | | | Proportion of Reach Repre | esented by Stream | |
| | | | r, stream bed dry bed moist | | Morphology Types Riffle 15 % Run 40 | % | |
| | | ✓ Standin | | | Pool 45 % | 70 | |
| FLOW CHARACTER | ISTICS | Flowing | | | | | |
| OHARAGIER | 01100 | | | | Turbidity | turbid Turbid | |
| | | Velocity | ✓ Madarata | | ✓ Clear — Slightly — Opaque — Stained | | |
| | | Fast Slow | <u>✓</u> Moderate | | Other | | |
| INOR | CANIC CUR | STRATE CO | MDONENTS | _ | RGANIC SUBSTRATE CON | IDONENTS | |
| INOR | | add up to 10 | | | does not necessarily add u | | |
| Substrate | Diama | | % Composition in | Substrate | | % Composition in | |
| Type | Diame | eter | Sampling Reach | Type | Characteristic | Sampling Area | |
| Bedrock | | | 5 | Detritus | sticks, wood, coarse | | |
| Boulder | | mm (10") | 40 | | plant materials (CPOM) | 40 | |
| Cobble | 64-256 m | m (2.5"-10") | 30 | Muck-Mud | black, very fine organic | 0 | |
| Gravel | 2-64 mm | n (0.1"-2.5") | 10 | | (FPOM) | U | |
| Sand | 0.06-2n | nm (gritty) | 10 | | | | |
| Silt | 0.004-0 | 0.06 mm | 5 | Marl | grey, shell fragments | | |
| Clay | < 0.004 | mm (slick) | 0 | | | | |
| | | | ant Surrounding Lan | | Indicate the dominant type | (Check one) | |
| | | Field/P | Commer asture Industrial | | ✓ Trees ✓ Shrub — Grasses — Herba | S | |
| | | — Agricul | | | Orassesrierba | ceous | |
| WATERSHED | | Other: | | | Floodplain Width | 45 006 | |
| FEATURES | | | | | Wide > 30ftMode | rate 15-30Tt | |
| | | Canopy Co | over open Partly sh | adad | Narrow Tolt | | |
| | | ✓ Shaded | | aueu | Wetland PresentYes | <u>✓</u> No | |
| | | | | | Wetland ID | | |
| A OU A TIC VE | SETATION | | | d record the or Rooted subme | dominant species present | ting Free floating | |
| AQUATIC VE | SEIATION | | | Attached alga | <u> </u> | ingi ree lloating | |
| | | | | , maonoa anga | | | |
| | | | | | | | |
| | | | | | | | |
| MACROINVER | TERRATES | | | | | | |
| OR OTHER | | | | | | | |
| WILDLIFE OBSERVED/C | | | | | | | |
| OBSERVATION NOTES | NS AND | | | | | | |
| | | | | | | | |
| | | | | | | | |

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

| USACE FILE NO./ Project Name: (v2.1, Sept 2015) | | | y Pipeline Project IMPACT COORDINATES: (in Decimal Degrees) | | 39.462705 L | .on. | -80.504726 | WEATHER: | Rain, 75° | DATE: | September 1, 2016 |
|--|--|--|--|------|---|--|---------------------------|---|--|--|--|
| IMPACT STREAM/SITE ID AND S (watershed size {acreage}, unaltered) | | S-J59; UNT to M | | | MITIGATION STREAM CLASS./SIT (watershed size {acreage}, u | | | | | Comments: | Low water flow at time of survey. Unable to sample water quality |
| STREAM IMPACT LENGTH: | 7 FORM OF MITIGATION: | RESTORATION (Levels I-III) | MIT COORDINATES: (in Decimal Degrees) | Lat. | L | .on. | | PRECIPITATION PAST 48 HRS: | 0.50" | Mitigation Length: | |
| Column No. 1- Impact Existing Condi | ition (Debit) | Column No. 2- Mitigation Existing Co | ondition - Baseline (Credit) | | Column No. 3- Mitigation Proje Post Completion (0 | | ve Years | Column No. 4- Mitigation Project Post Completion (C | | Column No. 5- Mitigation Projec | ted at Maturity (Credit) |
| Stream Classification: | Intermittent | Stream Classification: | Intermittent | | Stream Classification: | | Intermittent | Stream Classification: | Intermittent | Stream Classification: | Intermittent |
| Percent Stream Channel Slope | 4 | Percent Stream Channel Slop | oe e | | Percent Stream Channel Slope | Ð | 0 | Percent Stream Channel Slo | pe 0 | Percent Stream Channel S | lope 0 |
| HGM Score (attach data for | ns): | HGM Score (attach d | ata forms): | | HGM Score (attach da | ta forms) | : | HGM Score (attach dat | a forms): | HGM Score (attach o | lata forms): |
| Biogeochemical Cycling (| 0.603 0.77 0.41 | Hydrology Biogeochemical Cycling Habitat PART I - Physical, Chemical and | 0 | | Hydrology Biogeochemical Cycling Habitat PART I - Physical, Chemical and I | | 0 | Hydrology Biogeochemical Cycling Habitat PART I - Physical, Chemical and B | 0 | Hydrology Biogeochemical Cycling Habitat PART I - Physical, Chemical and | 0 |
| Points Sc. | ale Range Site Score | | Points Scale Range Site Score | | | oints Scale R | ange Site Score | | Points Scale Range Site Score | | Points Scale Range Site Score |
| PHYSICAL INDICATOR (Applies to all streams classific | cations) | PHYSICAL INDICATOR (Applies to all streams of | lassifications) | | PHYSICAL INDICATOR (Applies to all streams cla | ssifications | | PHYSICAL INDICATOR (Applies to all streams of | classifications) | PHYSICAL INDICATOR (Applies to all stream | |
| USEPA RBP (High Gradient Data Sheet) 1. Epifaunal Substrate/Available Cover 0-20 2. Embeddedness 0-20 3. Velocity/ Depth Regime 0-20 4. Sediment Deposition 0-20 6. Channel Flow Status 0-20 6. Channel Alteration 0-20 7. Frequency of Riffles (or bends) 0-20 8. Bank Stability (LB & RB) 0-20 9. Vegetative Protection (LB & RB) 0-20 10. Riparian Vegetative Zone Width (LB & RB) 0-20 Total RBP Score Mc Sub-Total CHEMICAL INDICATOR (Applies to Intermittent and Pound of the Conductivity Specific Conductivity | 0-1 10 0 17 1 1 16 0 12 15 12 15 12 17 15 12 17 17 15 17 17 17 17 17 17 17 17 17 17 17 17 17 | USEPA RBP (High Gradient Data Sheet) 1. Epifaunal Substrate/Available Cover 2. Embeddedness 3. Velocity/ Depth Regime 4. Sediment Deposition 5. Channel Flow Status 6. Channel Alteration 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) 9. Vegetative Protection (LB & RB) 10. Riparian Vegetative Zone Width (LB & RB) Total RBP Score Sub-Total CHEMICAL INDICATOR (Applies to Intermittent WVDEP Water Quality Indicators (General) Specific Conductivity | 0-20 | | 2. Embeddedness 3. Velocity/ Depth Regime 4. Sediment Deposition 5. Channel Flow Status 6. Channel Alteration 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) 9. Vegetative Protection (LB & RB) | 0-20 0-20 0-20 0-20 0-20 0-20 0-20 0-20 | 0 0 0 I Streams) | USEPA RBP (High Gradient Data Sheet) 1. Epifaunal Substrate/Available Cover 2. Embeddedness 3. Velocity/ Depth Regime 4. Sediment Deposition 5. Channel Flow Status 6. Channel Alteration 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) 9. Vegetative Protection (LB & RB) 10. Riparian Vegetative Zone Width (LB & RB) Total RBP Score Sub-Total CHEMICAL INDICATOR (Applies to Intermittent WVDEP Water Quality Indicators (General) Specific Conductivity | 0-20 0-30 0-40 | USEPA RBP (High Gradient Data Sheet) 1. Epifaunal Substrate/Available Cover 2. Embeddedness 3. Velocity/ Depth Regime 4. Sediment Deposition 5. Channel Flow Status 6. Channel Alteration 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) 9. Vegetative Protection (LB & RB) 10. Riparian Vegetative Zone Width (LB & RB) Total RBP Score Sub-Total CHEMICAL INDICATOR (Applies to Intermitte WYDEP Water Quality Indicators (General Specific Conductivity | |
| 100-199 - 85 points PH 5.6-5.9 = 45 points DO 10-30 Sub-Total BIOLOGICAL INDICATOR (Applies to Intermittent and | 0-1 | pH DO Sub-Total BIOLOGICAL INDICATOR (Applies to Intermitte | 0-90 0-1 5-90 0-1 10-30 0 0 ont and Perennial Streams) | | рН | 0-90 5-90 10-30 | 0 ennial Streams) | pH DO Sub-Total BIOLOGICAL INDICATOR (Applies to Intermi | 0-90 0-1 10-30 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | pH DO Sub-Total BIOLOGICAL INDICATOR (Applies to Inter | 0-90 0-1 5-90 0-1 10-30 0 |
| WV Stream Condition Index (WVSCI) | r eleminal Streams) | WV Stream Condition Index (WVSCI) | and Petermial Streams) | | WV Stream Condition Index (WVSCI) | ent and rei | enniai Streams) | WV Stream Condition Index (WVSCI) | tterit and Perennial Streams) | WV Stream Condition Index (WVSCI) | intent and Perennal Streams) |
| Good 0-100 Sub-Total | 0 0-1 73.9 0.739 | Sub-Total | 0-100 0-1 0 | | Sub-Total | 0-100 | 0-1 | Sub-Total | 0-100 0-1 0 | Sub-Total | 0-100 0-1 |
| PART II - Index and Unit Sco | re | PART II - Index and U | Jnit Score | | PART II - Index and Ur | nit Score | | PART II - Index and Un | it Score | PART II - Index and | Jnit Score |
| Index Line | ar Feet Unit Score | Index | Linear Feet Unit Score | | Index | Linear Fe | et Unit Score | Index | Linear Feet Unit Score | Index | Linear Feet Unit Score |
| 0.637 | 7 4.461333333 | 0 | 0 0 | | 0 | 0 | 0 | 0 | 0 0 | 0 | 0 0 |

| | | (See instruction page | | Impact Factors It values for MITIGATIO | N BANKING and I | LF) | | | |
|---|------------------------------------|---|------------------------|---|-------------------|---|---------------------------|--------------------------|-----------|
| Temp | oral Loss-Construction | | | | | Long | -term Protection | | |
| *Note: Reflects duration of aquatic functional loss | between the time of an impac | ct (debit) and completion of compensatory | | | % Add. Mitigati | on and Monitoring Period | | -Term Protection (Years) | |
| | mitigation (credit). | | | | | | | | |
| Voore | | 0 | | | | | | | |
| Years Sub-Total | | 0 | | | | | | | |
| Oub Total | | · · | | | | | | | |
| Ter | mporal Loss-Maturity | | | | 0 + 5/ | 10 Year Monitoring | | 101 | |
| *Note: Period between completion of compensator | | | | | Sub-Total | | | 0 | |
| function (i.e. maturity of tree stratum to provide | | vithin riparian stream or wetland buffer | | | | DADT N/ 1 1 | | • | |
| | corridor). | | | | | | to Unit Score Cor | | |
| 0/ A 11 A4/ | | Towns all and Mark Mark Market | | | Final Index Score | Linear Feet | Unit Score | ILF Costs | |
| % Add. Mitigation | | Temporal Loss-Maturity (Years) | | | (Debit) | | (Debit) | (Offsetting Debit | |
| | | | | | 0.637333333 | 7 | 4.461333333 | \$3,569.07 | |
| | | | | | | | | | |
| | | | | | | | | | |
| 0% | | 0 | | | | | | | |
| Sub-Total | | 0 | | | | | | | |
| | | | | | | | | | |
| | | PART V | - Comparison of U | nit Scores and Projecte | ed Balance | | | | |
| | | ., | | | | | | | |
| | | | | | | | | | |
| Final Unit Score (Debit) | | Mitigation Existing | | Mitigation Projected at | | Mitigation Projected at Ten | | Mitigation Projected At | |
| [No Net Loss Value] | 4.461333333 | Condition - Baseline | | Five Years | | Years | | Maturity | |
| [NO Net 2005 Value] | | (Credit) | | Post Completion (Credit) |) | Post Completion (Credit) | | (Credit) | |
| | | | | | | | | | |
| FINAL PROJECTED NET BALANCE | | | | | 0 | | 0 | | 0 |
| | | | | | U | | 0 | | U |
| | | P | art VI - Mitigation (| Considerations (Incenti | ves) | | | | |
| | | | and the initial gamen. | (| , | | | | |
| | Fortage of Ottown Do | at a matter | | | | | | | |
| | Extent of Stream Re | | | | | Extended | Upland Buffer Zone | е | |
| | Place an "X" in the appropriate of | orrect Restoration Levels (below) for your processory (only select one) | oject | | *Note1: Referen | nce Instructional handout for the def | | | s (below) |
| 110102.1 | I | satisfiery (only coloci only). | | | | *Note ² : Enter the buffer width for | | | |
| Restoration Level 1 | | | | | | *Note ³ : Select th | ne appropriate mitigation | n type | |
| | | | | + | | | | | |
| Restoration Level 2 | | | | | Buffer Width | | Left Bank | k | |
| Restoration Level 3 | | | | | | 0.50 | | N | |
| | | | | J | | 0-50 51-150 | | None | |
| | | | | | Buffer Width | 51-150 | Right Ban | None | |
| | | | | | Dano: Tridai | 0-50 | Right Ball | None | |
| Compensatory Mitigation Plan incorpo | orates HUC 12-based water | rshed approach? (Yes or No) | | 1 | | 51-150 | | None | |
| *Note: HUC 12-based watershed | | | No | | Average Buffer | 0 | | | |
| | | | Width/Side | U | | | | | |
| | | | | | | j | | | |
| Site | | Impact | Mitigation Unit | | | | Stra | hight Preservation Ratio | |
| | | Unit Yield (Debit) | Yield (Credit) | | | | | (v2.1, Sept 2015) | |
| 0.45 | | 4.40460000 | #PD1//01 | 1 | | | | | |
| S-J59 | | 4.461333333 | #DIV/0! | | | Final Mitigation Unit Yield | | | |
| | | | | 4 | | #DIV/0! | | | |

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

To ensure accurate calculations, the <u>UPPERMOST STRATUM</u> 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: Wetzel County **Sampling Date:** 09/01/2016

Project Site Before Project

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR: SAR number:

Tree/Sapling Strata

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

| Function | Functional Capacity Index |
|------------------------|------------------------------|
| Hydrology | 0.63 |
| Biogeochemical Cycling | 0.77 |
| Habitat | 0.41 |

Variable Measure and Subindex Summary:

| Variable | Name | Average Measure | Subindex |
|------------------------|---|--------------------|----------|
| V _{CCANOPY} | Percent canpoy over channel. | 43.00 | 0.40 |
| V _{EMBED} | Average embeddedness of channel. | 2.97 | 0.81 |
| V _{SUBSTRATE} | Median stream channel substrate particle size. | 0.40 | 0.20 |
| V _{BERO} | Total percent of eroded stream channel bank. | 20.00 | 0.97 |
| V _{LWD} | Number of down woody stems per 100 feet of stream. | 6.00 | 0.75 |
| V _{TDBH} | Average dbh of trees. | 22.00 | 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. | 0.00 | 0.00 |
| V _{DETRITUS} | Average percent cover of leaves, sticks, etc. | 25.00 | 0.30 |
| V _{HERB} | Average percent cover of herbaceous vegetation. | Not Used | Not Used |
| V _{WLUSE} | Weighted Average of Runoff Score for Catchment. | 0.75 | 0.79 |

| | High-G | Gradient | Headwat | | | | entucky a alculator | | ern Wes | t Virginia | a | | | |
|--|--------------------|---|---------------|---------------|--------------|-------------|--|----------------|----------------|--------------|---------|--|--|--|
| | Team: | C. Vileno, J | l. McGuirk. | | | | | | M Northing: | 39.462705 | | | | |
| Pro | oject Name: | | ,,, | | | | • | | _ | -80.504726 | | | | |
| | - | Wetzel Cou | inty | | | | • | _ | _ | 09/01/2016 | | | | |
| SA | R Number: | | | Length (ft): | 100 | Stream Ty | /pe: Inter | mittent Strear | m | | - | | | |
| | Top Strata: | Tree/Sapling Strata (determined from percent calculated in V _{CCANOPY}) | | | | | | | | | | | | |
| Site | and Timing: | d Timing: Project Site ■ Before Project ■ ■ Before Project | | | | | | | | | | | | |
| Sample | Variables • | 1-4 in strea | m channel | | | | | | | | | | | |
| 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.) | | | | | | | | | | | | | | |
| | List the per | cent cover n | | nts at each p | oint below: | | | | | | ì | | | |
| | 85 | 80 | 70 | 0 | 10 | 50 | 85 | 20 | 20 | 10 | | | | |
| | | | | | | | | | | | | | | |
| 2 | V_{EMBED} | along the st | tream. Sele | ct a particle | from the be | d. Before n | at no fewer to noving it, de | termine the | percentage | of the | 3.0 | | | |
| | | | | | | | y fine sedim composed of | | | | | | | |
| | | | - | | drock, use a | | | iiie seuiiiie | erits, use a i | alling score | | | | |
| | | | | | | | | d from Platt | s. Megahan | and | | | | |
| | | Embeddedness rating for gravel, cobble and boulder particles (rescaled from Platts, Megahan, and Minshall 1983) | | | | | | | | | | | | |
| | | Rating Description 5 <5 percent of surface covered, surrounded, or buried by fine sediment (or bedrock) | | | | | | | | | | | | |
| | | 5 4 | | | | | d, or buried by | | |) | | | | |
| | | 3 | | | | | ed, or buried | | | | | | | |
| | | 2 | | | | | ed, or buried | | | | | | | |
| | | 1 | | | | | r buried by f | | | al surface) | | | | |
| | List the ration | ngs at each | point below | : | | | | | | | | | | |
| | 3 | 2 | 4 | 3 | 3 | 3 | 4 | 2 | 3 | 2 | | | | |
| | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 4 | | | | |
| | 4 | 3 | 2 | 3 | 4 | 4 | 3 | 2 | 2 | 3 | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| 3 | | | | | | | it no fewer thed in V _{EMBED} | | hly equidista | ant points | 0.40 in | | | |
| | Enter partic | le size in ind | ches to the r | nearest 0.1 | inch at each | point below | / (bedrock sl | nould be co | unted as 99 | in, asphalt | | | | |
| | | as 0.0 in, sa | | | | | , | | | • | | | | |
| | 8.00 | 4.00 | 0.50 | 0.10 | 0.20 | 5.00 | 11.00 | 10.00 | 5.00 | 0.30 | | | | |
| | 0.25 | 0.50 | 6.00 | 0.25 | 0.08 | 10.00 | 15.00 | 0.08 | 4.00 | 0.25 | | | | |
| | 3.00 | 3.00 | 0.25 | 0.08 | 0.08 | 0.08 | 7.00 | 0.25 | 0.08 | 0.08 | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| 4 | V_{BERO} | | | | | | tal number or re eroded, t | | | | 20 % | | | |
| | | up to 200% | | | | | , | | | | | | | |
| | | | Left Bank: | 5 | ft | | Right Bank: | 15 | 5 ft | <u> </u> | | | | |

| Sample | e Variables | 5-9 within t | he entire ri | parian/buff | er zone adj | acent to th | e stream ch | annel (25 f | eet from ea | ch bank). | |
|--------|-------------------|--------------|--------------|---------------|--|---------------|------------------------------|--------------|--------------|--------------|------------|
| 5 | V_{LWD} | stream read | ch. Enter th | | om the entir | | er and 36 incouffer and wi | | | | 6.0 |
| | | • | | | Number of | | oody stems: | | 6 | | |
| 6 | V_{TDBH} | - | | | ly if V _{CCANOP} tree DBHs i | | ng cover is at | t least 20%) |). Trees are | at least 4 | 22.0 |
| | | List the dbh | n measurem | ents of indiv | vidual trees | at least 4 ir | n) within the | buffer on ea | ach side of | | |
| | | the stream | below: | | | | | | | | • |
| | | _ | Left Side | | | | | Right Side | | | l . |
| | 40 | 6 | | | | 20 | | | | | |
| | | | | | | | | | | | ł |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 7 | V | Number of | onogo (ot la | oot 4" dbb c | and 26" tall) | or 100 foo | t of otroom | Enter numb | or of onogo | an aaah | |
| 7 | V_{SNAG} | | | | t per 100 fee | | t of stream. culated. | Enter numb | er of snags | on eacn | 0.0 |
| | | | Left Side: | | 0 | | Right Side: | | 0 | | |
| 8 | V_{SSD} | | | , | • | • | es dbh) per s on each sic | | • | • | Not Used |
| | | | f stream wi | ll be calcula | | | | | | | |
| 9 | \/ | Dinarian | Left Side: | | 22 par 100 f | ant of otrop | Right Side: m reach. Ch | and all and | oioo propont | from | |
| 9 | V_{SRICH} | | | | | | ve species p | | | | 0.00 |
| | | | | | | | rom these d | | · | | |
| | | Grou | p 1 = 1.0 | | | | | Group | 2 (-1.0) | | |
| | Acer rubru | ım | | Magnolia t | ripetala | Ш | Ailanthus a | Itissima | Ш | Lonicera ja | ponica |
| | Acer sacci | harum | | Nyssa sylv | ratica | | Albizia julib | orissin | 1 | Lonicera ta | ıtarica |
| | Aesculus | flava | | Oxydendrun | n arboreum | Ш | Alliaria peti | olata | | Lotus corni | iculatus |
| Ш | Asimina tr | iloba | | Prunus ser | rotina | | Alternanthe | era | | Lythrum sa | licaria |
| | Betula alle | ghaniensis | | Quercus a | lba | | philoxeroid | es | 7 | Microstegiun | n vimineum |
| Ш | Betula len | ta | | Quercus co | occinea | Ш | Aster tatari | cus | | Paulownia | tomentosa |
| Ш | Carya alba | 9 | | Quercus in | nbricaria | | Cerastium | fontanum | | Polygonum d | cuspidatum |
| | Carya glal | bra | | Quercus p | rinus | | Coronilla va | aria | | Pueraria m | ontana |
| | Carya ova | | | Quercus ru | ıbra | Ш | Elaeagnus u | mbellata | ./ | Rosa multii | flora |
| Ш | Carya ova | ta | Ш | Quercus ve | elutina | Ш | Lespedeza | bicolor | Ш | Sorghum h | alepense |
| | Cornus florida | | Sassafras | albidum | | Lespedeza | | | Verbena br | • | |
| V | Fagus grandifolia | | | | Ligustrum ob | | | | | | |
| | Fraxinus a | | _ | Tsuga can | | _ | Ligustrum s | | | | |
| 7 | Liriodendro | | | Ulmus ame | | | | | | | |
| | | - | | Jiiius ailie | Jilouria | | | | | | |
| Ш | Magnolia a | acummala | | | | | | | | | |
| | | 2 | Species in | Group 1 | | | | 3 | Species in | Group 2 | |

| | e Variables | | | | | | | | one within | 25 feet fron | n each |
|------------------|--------------------|----------------|------------------|---------------|------------------------------|------------|------|--------|-----------------|---------------------|----------------------------------|
| bank . 10 | The four sul | • | | | equidistant | | | | -4" diamete | r and <36" | |
| 10 | * DETRITUS | | | | t cover of the | | | | C+ Glamoto | Tana 400 | 25.00 % |
| | | | Left | | | Right Side | | | Ī | | |
| | | 30 | 10 | 15 | 50 | 10 | 15 | 30 | 40 | | |
| 11 | V_{HERB} | | | | aceous vege | | | | | | |
| | | | | | h and 36" ta n 200% are a | | | | | | Not Used |
| | | each subplo | ot. | 9.00 | 1 | | | | | | |
| | | | Left | Side | | | Righ | t Side | | | |
| | | | | | | | | | | - | |
| Sampl | e Variable 1 | 2 within the | entire cate | chment of t | he stream. | | | | | | |
| 12 | V_{WLUSE} | Weighted A | verage of R | Runoff Score | for watersh | ed: | | | | | 0.75 |
| | | | Land | Use (Choos | se From Dro | p List) | | | Runoff Score | % in Catch- ment | Running Percent (not >100) |
| | Gravel | | | | | | | - | 0 | 10 | 10 |
| | Forest and n | ative range (> | 75% ground | cover) | | | | • | 1 | 60 | 70 |
| | Open space | (pasture, lawn | s, parks, etc.), | , grass cover | <50% | | | - | 0.1 | 10 | 80 |
| | Forest and n | ative range (5 | 0% to 75% gr | round cover) | | | | V | 0.7 | 20 | 100 |
| | | | | | | | | • | | | |
| | | | | | | | | • | | | |
| | - | | | | | | | • | | | |
| | - | | | | | | | • | | | |
| | Su | mmary | | | | | No | tes: | | | |
| ٧ | 'ariable | Value | VSI | | | | | | | | |
| Vo | CANOPY | 43 % | 0.40 | | | | | | | | |
| VE | MBED | 3.0 | 0.81 | | | | | | | | |
| Vs | SUBSTRATE | 0.40 in | 0.20 | | | | | | | | |
| V _B | BERO | 20 % | 0.97 | | | | | | | | |
| V _L | .wD | 6.0 | 0.75 | | | | | | | | |
| | ТВН | 22.0 | 1.00 | | | | | | | | |
| | SNAG | 0.0 | 0.10 | | | | | | | | |
| | SSD | Not Used | Not Used | | | | | | | | |
| | RICH | 0.00 | 0.00 | | | | | | | | |
| | ETRITUS | 25.0 % | 0.30 | | | | | | | | |
| | IERB | Not Used | Not Used | | | | | | | | |
| V _v | VLUSE | 0.75 | 0.79 | | | | | | | | |

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

| STREAM NAME S-J59 | LOCATION Wetzel County, WV | | | | | | |
|---|----------------------------|----------------------------|--|--|--|--|--|
| STATION # RIVERMILE | STREAM CLASS Intermitte | STREAM CLASS Intermittent | | | | | |
| Lat <u>39.462705</u> Long <u>-80.504726</u> | RIVER BASIN Headwater | s South Fork Fishing Creek | | | | | |
| STORET# | AGENCY Tetra Tech | AGENCY Tetra Tech | | | | | |
| INVESTIGATORS C. Vileno, J. McGuirk, J. | Bittner | | | | | | |
| FORM COMPLETED BY | DATE 09/01/2016 | REASON FOR SURVEY | | | | | |
| J. Bittner | ^{TIME} 12:45 | Proposed pipeline | | | | | |

| | Habitat | | Condition | ı Category | | | |
|--|---|---|---|---|---|--|--|
| | Parameter | 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 12 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| sampling reach | 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. | | |
| ted in | SCORE 10 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| Parameters to be evaluated in sampling reach | 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). | | |
| ıram | SCORE 0 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| Pa | 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 17 | 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. | channel and mostly | | |
| | SCORE 1 | 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 | Condition Category | | | | | | | | | | | | |
|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|
| | Parameter | 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 | | | | | | | | | |
| ling reach | 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. | | | | | | | | | |
| samp | SCORE 0 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | | | | | | | | |
| Parameters to be evaluated broader than sampling reach | 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. | | | | | | | | | |
| e eva | SCORE 6 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | | | | | | | | |
| to b | SCORE 6 (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | | | | | | | | |
| Parameters | 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 8 (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 95

| Insects | Count | Tolerance | TV | Insects | Count | Tolerance | TV | Non-Insects | Count | Tolerance | TV | | |
|-------------------|---------------|--------------|-----|------------------|-------|-----------|----|-----------------|---------------|-----------|--------------|--------------------|-------|
| Ephemeroptera | | | 7 | Odonata | | | 0 | Crustacea | • | | 0 | | |
| Ameletidae | | 2 | 0 | Aeshnidae | | 3 | 0 | Asellidae | | 7 | 0 | | |
| Baetidae | | 4 | 0 | Calopterygidae | | 6 | 0 | Cambaridae | | 5 | 0 | | |
| Beatiscidae | | 4 | 0 | Coenagrionidae | | 7 | 0 | Gammaridae | | 5 | 0 | | |
| Caenidae | | 5 | 0 | Cordulegastridae | | 3 | 0 | Palaemonidae | | 5 | 0 | | |
| Ephemerellidae | | 3 | 0 | Gomphidae | | 5 | 0 | Annelida | | • | 0 | | |
| Ephemeridae | | 5 | 0 | Lestidae | | 7 | 0 | Hirudinea | | 10 | 0 | | |
| Heptageniidae | 1 | 3 | 3 | Libellulidae | | 7 | 0 | Nematoda | | 10 | 0 | | |
| Isonychiidae | | 3 | 0 | Coleoptera | | | 0 | Nematomorpha | | 10 | 0 | | |
| Leptophlebiidae | 6 | 4 | 24 | Chrysomelidae | | 7 | 0 | Oligochaeta | | 10 | 0 | | |
| Potamanthidae | | 5 | 0 | Dryopidae | | 5 | 0 | Turbellaria | | • | 0 | | |
| Siphlonuridae | | 3 | 0 | Dytiscidae | | 6 | 0 | Turbellaria | | 7 | 0 | | |
| Tricorythidae | | 5 | 0 | Elmidae | | 4 | 0 | Bivalvia | | • | 0 | | |
| Plecoptera | | | 13 | Gyrinidae | | 5 | 0 | Corbiculidae | | 6 | 0 | | |
| Capniidae | | 2 | 0 | Haliplidae | | 7 | 0 | Sphaeriidae | | 5 | 0 | | |
| Chloroperlidae | | 2 | 0 | Hydrophilidae | | 7 | 0 | Unionidae | | 4 | 0 | | |
| Leuctridae | | 2 | 0 | Psephenidae | | 3 | 0 | Gastropoda | • | | 0 | | |
| Nemouridae | | 2 | 0 | Ptilodactylidae | | 5 | 0 | Ancylidae | | 7 | 0 | | |
| Peltoperlidae | 4 | 1 | 4 | Hemiptera | | | 0 | Hydrobiidae | | 4 | 0 | | |
| Perlidae | 8 | 1 | 8 | Belostomatidae | | 8 | 0 | Physidae | | 7 | 0 | | |
| Perlodidae | 1 | 1 | 1 | Corixidae | | 8 | 0 | Planorbidae | | 5 | 0 | | |
| Pteronarcyidae | | 1 | 0 | Gerridae | | 10 | 0 | Pleuroceridae | | 5 | 0 | | |
| Taeniopterygidae | | 2 | 0 | Hydrometridae | | 8 | 0 | Viviparidae | | 5 | 0 | | |
| Trichoptera | | | 0 | Nepidae | | 8 | 0 | Miscellaneous | | • | 0 | | |
| Brachycentridae | | 2 | 0 | Notonectidae | | 8 | 0 | Collembola | | 6 | 0 | | |
| Glossosomatidae | | 2 | 0 | Megaloptera | | | 1 | Lepidoptera | | 5 | 0 | | |
| Helicopsychidae | | 3 | 0 | Corydalidae | | 3 | 0 | Neuroptera | | 5 | 0 | | |
| Hydropsychidae | | 5 | 0 | Sialidae | 1 | 6 | 6 | Hydrachnidae | | 6 | 0 | | |
| Hydroptilidae | | 3 | 0 | Diptera | | • | 0 | T-4-1- | Total r | umber | 21 | | |
| Lepidostomatidae | | 3 | 0 | Athericidae | | 3 | 0 | Totals | Total f | amilies | 6 | | |
| Leptoceridae | | 3 | 0 | Blephariceridae | | 2 | 0 | | • | Metric o | calculations | * | |
| Limnephilidae | | 4 | 0 | Ceratopogonidae | | 8 | 0 | | Richnes | s | | Additional metri | ics |
| Molannidae | | 3 | 0 | Chironomidae | | 9 | 0 | Total Taxa | | 6 | 27.3 | Ephemeroptera Taxa | 2 |
| Philopotamidae | | 4 | 0 | Culicidae | | 10 | 0 | EPT Taxa | | 5 | 38.5 | Plecoptera Taxa | 3 |
| Phryganeidae | | 4 | 0 | Dixidae | | 6 | 0 | | Toleran | e | | Trichoptera Taxa | 0 |
| Polycentropodidae | | 5 | 0 | Empididae | | 7 | 0 | Biotic Index | | 2.19 | 100.0 | Long-lived Taxa | 3 |
| Psychomiidae | | 3 | 0 | Psychodidae | | 8 | 0 | % Tolerant | | 0.0 | 100.0 | Odonata Taxa | 0 |
| Rhyacophilidae | | 3 | 0 | Ptychopteridae | | 8 | 0 | | Composit | ion | • | Diptera Taxa | 0 |
| Uenoidae | | 2 | 0 | Simuliidae | | 6 | 0 | % EPT Abundance | | 95.2 | 100.0 | COET Taxa | 2 |
| | Total Tol | erance Value | 46 | Stratiomyidae | | 10 | 0 | % Dominance | | 38.1 | 77.4 | % Sensitive | 66.7 |
| West Vi | rginia Save O | ur Streams | | Syrphidae | | 10 | 0 | % Net-spinners | | 0.0 | NA | % Chironomidae | 0.0 |
| 601 57th Stre | | | 304 | Tabanidae | | 7 | 0 | Stream (| Condition Ind | ex | 73.9 | % Clingers | 95.2 |
| http:/ | /www.dep.w | v.gov/sos | | Tipulidae | | 5 | 0 | Integrity R | ating | Suboi | ptimal | More diversity mea | sures |

<u>Note</u>: 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 / low flow at time of surve | ey. Unable to sample water quality. | |
|--------------------------------|-------------------------------------|--|
| | | |
| | | |
| | | |
| | | |
| | | |

S-A110/S-K62



Comments:

| STREAM ID S-A110 / K6 2 (upstream) | STREAM NAME UNT to Laural Run | | | | |
|--|-------------------------------|--|--|--|--|
| LAT 39.201933 LONG -80.553215 | DATE 05/30/2015 | | | | |
| CLIENT MVP | PROJECT NAME MVP | | | | |
| INVESTIGATORS J. Hart, D. Santillo, J. Potrik | us | | | | |
| FLOW REGIME Perennial — Intermittent ✓ Ephemeral — | WATER TYPE TNW RPW ✓ NRPW | | | | |

| i erennai = | — ппенние | пс— приспи | | 1X1 VV — | | | |
|---------------------|----------------------------------|------------------------|--------------------------------|----------------|--|-------------------|--|
| | | Estimate N | /leasurements | | Stream Erosion | | |
| | | | k Width: 7.0 ft | | None _v Moderate Heavy | | |
| | | Top of Ban | | | | | |
| | | LB <u>1.5</u> | = | ft | Artificial, Modified or Char Yes ✓ No | nnelized | |
| | | | th: 0.50 in | <u></u> | Yes No | | |
| CHANNEL FE | ATURES | Water Widt | | | Dam PresentYes _ | <u>∠</u> No | |
| | | | Mark: 4.5 ft | | Sinuosity V Low | Medium High | |
| | | J | tion: South | | <i>,</i> | g | |
| | | riow Direc | 11011 | | Gradient Flat Moderate _ | ✓ Severe | |
| | | | | | | (10 ft/100 ft) | |
| | | Water Pres | | | Proportion of Reach Repre | esented by Stream | |
| | | | r, stream bed dry bed moist | | Morphology Types Riffle 20 % Run 55 | % | |
| | | ✓ Standing | | | Pool 25 % | ,- | |
| FLOW CHARACTER | ISTICS | Flowing | | | To and the later. | | |
| | | Velocity | | | Turbidity <u>✓</u> ClearSlightly | turbidTurbid | |
| | | Fast | Moderate | | OpaqueStained | | |
| | | ✓ Slow | | | Other | | |
| INOR | | STRATE CO | - | _ | RGANIC SUBSTRATE CON | | |
| Substrate | (Should a | add up to 10 | % Composition in | 1 | does not necessarily add u | % Composition in | |
| Type | Diame | ter | Sampling Reach | Type | Characteristic | Sampling Area | |
| Bedrock | | | 20 | Detritus | sticks, wood, coarse | 00 | |
| Boulder | | mm (10") | 10 | | plant materials (CPOM) | 20 | |
| Cobble | | m (2.5"-10") | 20 | Muck-Mud | black, very fine organic (FPOM) | | |
| Gravel | | 1 (0.1"-2.5") | 10 | | (ITOM) | | |
| Sand Silt | | nm (gritty) 0.06 mm | 15 | Marl | grey, shell fragments | | |
| Clay | | mm (slick) | 15 10 | Iviaii | grey, shell fragments | | |
| Olay | 0.001 | ` ' | ant Surrounding Lar | nduse | Indicate the dominant type | (Check one) | |
| | | ✓ Forest | Commer | | <u>✓</u> Trees Shrub | s | |
| | | — Field/P | | | GrassesHerba | iceous | |
| WATERSHED | | Agricult Other: | tural Residen | tiai | Floodplain Width | | |
| FEATURES | | | | | Wide > 30ft Mode Narrow <16ft Mode | rate 15-30ft | |
| | | Canopy Co | | adad | <u>v</u> Narrow < roll | | |
| | | Partly o | | | Wetland Present _v_Yes Wetland ID W-A23 | No | |
| | | Indicate th | e dominant type and | d record the d | lominant species present | | |
| AQUATIC VE | GETATION | | _ | Rooted subme | _ | tingFree floating | |
| | | Floating | g algae | Attached algae | e | | |
| | | Charmala | maitta at etm 1 | | stational Desired Control | dan no e d e d | |
| | | disperses in | J | ounawater cor | ntributions. Drains to culvert, | under road and | |
| MACROINVERTEBRATES | | ' | paotaro | | | | |
| OR OTHER | OR OTHER WILDLIFE OBSERVED/OTHER | | (62 | | | | |
| OBSERVED/C | | | | | | | |
| OBSERVATIO NOTES | UNA GNU | | | | | | |
| | | | | | | | |
| | | | | | | | |

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

| USACE FILE NO./ Project Name: (v2.1, Sept 2015) | | Moun | ntain Valley P SWVM | ipeline Project v2.1 | | COORDINATES: cimal Degrees) | Lat. | 39.201316 | Lon. | -80.553306 | WEATHER: | | Sunny, 70° | DATE: | June 1, 2016 |
|--|----------------------|--------------------|--|---|--------------------|--------------------------------|---|---|--------------------|--------------|--|--|------------|--|---|
| IMPACT STREAM/SITE ID AND SITE DESCRIPTION: (watershed size {acreage}, unaltered or impairments) | | | S-A110/K62; UNT to La Form of Mitigati | | | | MITIGATION STREAM CLASS. (watershed size {acreag | | | | | | Comments: | Low water flow at time of survey. Unable to sample water quality or WVSCI. | |
| STREAM IMPACT LENGTH: | 25 | FORM (MITIGATI | | RESTORATION (Levels I-III) | | OORDINATES: cimal Degrees) | Lat. | | Lon. | | PRECIPITATION PAST 48 HRS: | | 0 | Mitigation Length: | |
| Column No. 1- Impact Existin | g Condition (Del | bit) | | Column No. 2- Mitigation Existing (| Condition - Base | line (Credit) | | Column No. 3- Mitigation Pr Post Completio | | /ears | Column No. 4- Mitigation P Post Completic | | ears | Column No. 5- Mitigation Proje | cted at Maturity (Credit) |
| Stream Classification: | Intern | nittent | Str | eam Classification: | Inte | ermittent | | Stream Classification: | Inte | ermittent | Stream Classification: | Interr | mittent | Stream Classification: | Intermittent |
| Percent Stream Channel SI | ope | 4 | | Percent Stream Channel SI | lope | | | Percent Stream Channel S | оре | 0 | Percent Stream Channel | Slope | 0 | Percent Stream Channel | Slope 0 |
| HGM Score (attach d | lata forms): | | | HGM Score (attach | data forms): | | | HGM Score (attach | data forms): | | HGM Score (attack | n data forms): | | HGM Score (attach | data forms): |
| Hydrology Biogeochemical Cycling Habitat PART I - Physical, Chemical and | 0.49 0.36 0.08 | 0.31 | Bio | drology ogeochemical Cycling bitat PART I - Physical, Chemical at | | 0 | | Hydrology Biogeochemical Cycling Habitat PART I - Physical, Chemical a | | Average 0 | Hydrology Biogeochemical Cycling Habitat PART I - Physical, Chemical a | | 0 | Hydrology Biogeochemical Cycling Habitat PART I - Physical, Chemical an | 0 |
| | 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 stream | s classifications) | • | | YSICAL INDICATOR (Applies to all stream: | | • | | PHYSICAL INDICATOR (Applies to all stream | | • | PHYSICAL INDICATOR (Applies to all stre | | • | PHYSICAL INDICATOR (Applies to all stream | |
| USEPA RBP (High Gradient Data Sheet) 1. Epifaunal Substrate/Available Cover 2. Embeddedness 3. Velocity/ Depth Regime 4. Sediment Deposition 5. Channel Flow Status 6. Channel Flow Status 6. Channel Alteration 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) 9. Vegetative Protection (LB & RB) 10. Riparian Vegetative Zone Width (LB & RB) Total RBP Score Sub-Total CHEMICAL INDICATOR (Applies to Intermitte WYDEP Water Quality Indicators (Genera Specific Conductivity 100-199 - 85 points DO Sub-Total 5.6-5.9 = 45 points DO Sub-Total BIOLOGICAL INDICATOR (Applies to Intermited BIOLOGICAL INDICATOR (Applies BIOLOGICAL INDICATOR (Applies BIOLOGICAL INDICATOR (Applies BIOLOGICAL INDICATOR (A | 0-90 | | 1. E 2. E 3. V. 4. S 5. C 7. F 8. E 9. V 10. Tot Sut CH | EPA RBP (High Gradient Data Sheet) pifaunal Substrate/Available Cover imbeddedness /elocity/ Depth Regime Sediment Deposition Channel Flow Status Channel Alteration Frequency of Riffles (or bends) Bank Stability (LB & RB) /egetative Protection (LB & RB) Riparian Vegetative Zone Width (LB & RB) all RBP Score Do-Total EMICAL INDICATOR (Applies to Intermitte //DEP Water Quality Indicators (General ecific Conductivity | 5-90 | 0 | | USEPA RBP (High Gradient Data Sheet) 1. Epifaunal Substrate/Available Cover 2. Embeddedness 3. Velocity/ Depth Regime 4. Sediment Deposition 5. Channel Flow Status 6. Channel Alteration 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) 9. Vegetative Protection (LB & RB) 10. Riparian Vegetative Zone Width (LB & RB) Total RBP Score Sub-Total CHEMICAL INDICATOR (Applies to Intermitte WYDEP Water Quality Indicators (Genera Specific Conductivity PH DO Sub-Total BIOLOGICAL INDICATOR (Applies to Internite | 5-90 | 5.6 | USEPA RBP (High Gradient Data Shee 1. Epifaunal Substrate/Available Cover 2. Embeddedness 3. Velocity/ Depth Regime 4. Sediment Deposition 5. Channel Flow Status 6. Channel Riber (or bends) 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) 9. Vegetative Protection (LB & RB) 10. Riparian Vegetative Zone Width (LB & RE Total RBP Score Sub-Total CHEMICAL INDICATOR (Applies to Interm WVDEP Water Quality Indicators (Genes Specific Conductivity DO Sub-Total BIOLOGICAL INDICATOR (Applies to Interm | 0-20 | 0 | USEPA RBP (High Gradient Data Sheet) 1. Epifaunal Substrate/Available Cover 2. Embeddedness 3. Velocity/ Depth Regime 4. Sediment Deposition 5. Channel Flow Status 6. Channel Alteration 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) 9. Vegetative Protection (LB & RB) 10. Riparian Vegetative Zone Width (LB & RB) Total RBP Score Sub-Total CHEMICAL INDICATOR (Applies to Intermit WVDEP Water Quality Indicators (Gener Specific Conductivity DO Sub-Total BIOLOGICAL INDICATOR (Applies to Internit | 0-20 0-20 0-20 0-20 0-20 0-20 0-20 0-20 |
| WV Stream Condition Index (WVSCI) | | | wv | / Stream Condition Index (WVSCI) | 1 1 | | | WV Stream Condition Index (WVSCI) | | | WV Stream Condition Index (WVSCI) | | | WV Stream Condition Index (WVSCI) | |
| 0 Sub-Total | 0-100 0-1 | 0 | Sut | p-Total | 0-100 0-1 | 0 | | Sub-Total | 0-100 0-1 | 0 | Sub-Total | 0-100 0-1 | 0 | Sub-Total | 0-100 |
| PART II - Index and Unit Score | | | PART II - Index and | d Unit Score | | | PART II - Index and Unit Score | | PART II - Index an | d 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 |
| 0.396 | 25 | 9.90625 | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 0 |

| Temporal Loss Administry Victor Victor Temporal Loss Maturity Victor Temporal Loss Maturity Victor Temporal Loss Maturity Victor Victor Temporal Loss Maturity Victor Victor Temporal Loss Maturity Victor Vict | | | (See instruction p | | Impact Factors It values for MITIGATIO | N BANKING and IL | _F) | | | |
|--|--|------------------------------------|---|------------------------|---|------------------------------|---------------------------------------|----------------------------|--------------------------------|-----------|
| Miligation Considerations Day | | | | _ | | | Long | -term Protection | | |
| Comparison Condition Con | | between the time of an impac | ct (debit) and completion of compensatory | | | % Add. Mitigation | on and Monitoring Period | | -Term Protection (Years) | |
| Sub-Trial To Transport Loss Multiplication (Credit) Temporal Loss Maturity Water Providence or production of consequence or reliable to resource and reliable to the regions of resource and regions of the regio | Voors | ganaen (e. e any) | 0 | | | | | | | |
| Part V - Comparison of Unit Score (O-bas) Part V - Mitigation Projected at Ten | | | 0 | | | | | | | |
| Part V - Comparison of Unit Score (O-bas) Part V - Mitigation Projected at Ten | Te | mporal Loss-Maturity | | | | 0 + 5/1 | 0 Year Monitoring | | 101 | |
| PART V- Comparison of Unit Scores and Projected Balance PART V- Comparison of Unit Scores and Projected Balance PART V- Comparison of Unit Scores and Projected Balance PART V- Comparison of Unit Scores and Projected Balance PART V- Comparison of Unit Scores and Projected Balance PART V- Comparison of Unit Scores and Projected Balance PART V- Comparison of Unit Scores and Projected Balance PART V- Comparison of Unit Scores and Projected Balance PART V- Comparison of Unit Scores and Projected Balance PART V- Comparison of Unit Scores and Projected Balance PART V- Comparison of Unit Scores and Projected Balance PART V- Comparison of Unit Scores and Projected Balance PART V- Comparison of Unit Scores and Projected Balance PART V- Comparison of Unit Scores and Projected Balance Part V- Comparison of Unit Scores and Projected Balance Part V- Comparison of Unit Scores and Projected Balance Part V- Comparison of Unit Scores and Projected Balance Part V- Comparison of Unit Scores and Projected Balance Part V- Comparison of Unit Scores and Projected Balance Part V- Comparison of Unit Scores and Projected Balance Part V- Comparison of Unit Scores and Projected Balance Part V- Comparison of Unit Scores and Projected Balance Part V- Comparison of Unit Scores and Projected Balance Part V- Comparison of Unit Scores and Projected Balance Part V- Comparison of Unit Scores and Projected Balance Part V- Comparison of Unit Scores and Projected Balance Part V- Comparison of Unit Scores and Projected Balance Part V- Miligation Drojected Balance Part V- Mi | *Note: Period between completion of compensator | ry mitigation measures and the | | | | | · · · · · · · · · · · · · · · · · · · | | 0 | |
| Final Unit Score (Debit) (Final Midgation Projected at Tentral Considerations (Incentives) PART V- Comparison of Unit Scores and Projected Balance PART V- Comparison of Unit Scores and Projected Balance Part VI - Comparison of Unit Scores and Projected at Tentral Considerations (Incentives) Part VI - Mitigation Projected at Tentral Considerations (Incentives) Part VI - Mitigation Projected at Tentral Considerations (Incentives) Part VI - Mitigation Considerations (Incentives) Extend Stream Restoration Considerations (Incentives) Extended Upland Buffer Zone Note: Restoration Level 1 Restoration Level 3 Part VI - Mitigation Projected At Manual Projected At Ma | function (i.e. maturity of tree stratum to provide | | vithin riparian stream or wetland buffer | | | | PART IV - Index | to Unit Score Con | nversion | |
| PART V- Comparison of Unit Scores and Projected at Ten Five Years (Credit) [No Net Loss Value] 9.30625 Mitigation Existing Condition - Baseline (Credit) Part VI - Mitigation Considerations (incentives) Part VI - Miti | | | | | | Final Index Score | Linear Feet | Unit Score | ILF Costs | |
| PART V- Comparison of Unit Scores and Projected Balance Final Unit Score (Desit) 9.90625 Mitigation Existing Mitigation Projected at Five Years Post Completion (Credit) Part VI - Mitigation Projected at Five Years Post Completion (Credit) Part VI - Mitigation Projected at Five Years Post Completion (Credit) Part VI - Mitigation Considerations (Incentives) Final Projected at Five Years Post Completion (Credit) Part VI - Mitigation Considerations (Incentives) Final Projected at Five Years Post Completion (Credit) Part VI - Mitigation Considerations (Incentives) Final Projected at Ten Years Post Completion (Credit) Part VI - Mitigation Considerations (Incentives) Final Projected at Ten Years Post Completion (Credit) Part VI - Mitigation Considerations (Incentives) Final Projected at Ten Years Post Completion (Credit) Part VI - Mitigation Considerations (Incentives) Final Projected at Ten Years Post Completion (Credit) Part VI - Mitigation Considerations (Incentives) Final Projected at Ten Years Post Completion (Credit) Part VI - Mitigation Considerations (Incentives) Final Projected at Ten Years Post Completion (Credit) Part VI - Mitigation Considerations (Incentives) Final Projected at Ten Years Post Completion (Credit) Part VI - Mitigation Considerations (Incentives) Final Projected at Ten Years Post Completion (Credit) Part VI - Mitigation Considerations (Incentives) Final Projected at Ten Years Post Completion (Credit) Part VI - Mitigation Considerations (Incentives) Final Projected at Ten Years Post Completion (Credit) Part VI - Mitigation Consideration Considera | % Add. Mitigation | | Temporal Loss-Maturity (Years) | | | | . – | | | |
| PART V - Comparison of Unit Scores and Projected Balance Final Unit Score (Pebit) 9,90625 Mitigation Existing Condition - Baseline (Credit) Mitigation Projected at Five Years Post Completion (Credit) Post Completion (Credit) Post Completion (Credit) Post Completion (Credit) Credit) | | | | | | 0.39625 | 25 | 9.90625 | \$7,925.00 | |
| PART V - Comparison of Unit Scores and Projected Balance Final Unit Score (Pebit) 9,90625 Mitigation Existing Condition - Baseline (Credit) Mitigation Projected at Five Years Post Completion (Credit) Post Completion (Credit) Post Completion (Credit) Post Completion (Credit) Credit) | | | | | | | | | | |
| PART V- Comparison of Unit Scores and Projected Balance Final Unit Score (Debit) No Net Loss Value) 9.90626 Mitigation Existing Condition - Baseline (Credit) Part VI - Mitigation Projected at Ten Post Completion (Credit) Part VI - Mitigation Projected at Ten Post Completion (Credit) Part VI - Mitigation Considerations (Incentives) Part VI - Mitigation Considerations (Incentives) Extent of Stream Restoration Note: Reference the instructional handout to determine the correct Restoration Level Sublevy for your project Note: Reference instructional handout to determine the correct Restoration Level Sublevy for your project Note: Restoration Level 1 Restoration Level 2 Prestoration Level 3 Compensatory Mitigation Plan incorporates HUC 12-based watershed approach? (Yes or No) Note: Huck 12-based watershed approach? (Yes or No) Note: Hu | | | 0 | | | | | | | |
| Final Unit Score (Debit) 9.90625 Mitigation Existing Condition - Baseline (Credit) Mitigation Projected at Five Years Post Completion (Credit) Post Completion (Credit) Mitigation Projected at Ten Years Post Completion (Credit) Post Completion (Credit) | Sub-1 otal | | U | | | | | | | |
| Final Unit Score (Debit) 9.90625 Mitigation Existing Condition - Baseline (Credit) Mitigation Projected at Five Years Post Completion (Credit) Post Completion (Credit) Mitigation Projected at Ten Years Post Completion (Credit) Post Completion (Credit) | | | PART V | /- Comparison of II | nit Scores and Projecte | nd Balance | | | | |
| Final first class (Julie) [No ket Loss Value] 9,90625 Condition - Baseline (Credit) Post Completion (Credit) Extended Upland Buffer Zone "Note! Reference the Instructional handout to ethe Buffer Zone Mitigation Extents and Types (bolow) "Note! Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (bolow) "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional hand | | | I AIXI V | - Companson of C | - The occited and i rojecte | - Dalance | | | | |
| Final first class (Julie) [No ket Loss Value] 9,90625 Condition - Baseline (Credit) Post Completion (Credit) Extended Upland Buffer Zone "Note! Reference the Instructional handout to ethe Buffer Zone Mitigation Extents and Types (bolow) "Note! Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (bolow) "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional handout for the definitions of the Buffer Zone "Note! Reference Instructional hand | | | Mitigation Existing | | Mitigation Projected at | | Mitigation Projected at Ten | | Mitigation Projected At | |
| Part VI - Mitigation Considerations (incentives) Part VI - Mitigation Considerations (incentives) | | 9.90625 | | | | | | | | |
| Part VI - Mitigation Considerations (Incentives) Extent of Stream Restoration "Note!: Reference the Instructional handout to determine the correct Restoration Levels (below) for your project "Note!: Reference the Instructional handout to determine the correct Restoration Levels (below) for your project "Note!: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below) "Note!: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below) "Note!: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below) "Note!: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below) "Note!: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below) "Note!: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below) "Note!: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below) "Note!: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below) "Note!: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below) "Note!: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below) "Note!: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below) "Note!: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below) "Note!: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below) "Note!: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below) "Note!: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents an | [NO Net Loss Value] | | (Credit) | | Post Completion (Credit) | <mark>)</mark> | Post Completion (Credit) | | (Credit) | |
| 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 **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 **Note** Steel ** **Note** | FINAL PROJECTED NET BALANCE | | | | | 0 | | 0 | | 0 |
| 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 **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 **Note** Steel ** **Note** | | | | Oart VI Mitigation | Considerations (Incention | | | | | |
| *Note!: Reference the Instructional handout to determine the correct Restoration Levels (below) for your project *Note!: Reference Instructional handout to determine the propriet category (only select one). *Note!: Reference Instructional handout to determine the correct Restoration and Types (below) *Note!: Reference Instructional handout for the definitions of the Buffer Zone Mitigation Extents and Types (below) *Note!: Reference Instructional handout for the definitions of the Buffer Zone Mitigation type (below) *Note!: Reference Instructional handout for the definitions of the Buffer width for each channel side (Left Bank and Right Bank) *Note!: Reference Instructional handout for the definitions of the Buffer width for each channel side (Left Bank and Right Bank) *Note!: Reference Instructional handout for the definitions of the Buffer width for each channel side (Left Bank and Right Bank) *Note!: Reference Instructional handout for the definitions of the Buffer width for each channel side (Left Bank and Right Bank) *Note!: Reference Instructional handout for the definitions of the Buffer width for each channel side (Left Bank and Right Bank) *Note!: Reference Instructional handout for the definitions of the Buffer width for each channel side (Left Bank and Right Bank) *Note!: Reference Instructional handout for the definitions of the Buffer width for each channel side (Left Bank and Right Bank) *Note!: Reference Instructional handout for the definitions of the Buffer width for each channel side (Left Bank and Right Bank) *Note!: Reference Instructional handout for the definitions of the Buffer width for each channel side (Left Bank and Right Bank) *Note!: Reference Instructional handout for the definitions of the Buffer width for each channel side (Left Bank and Right Bank) *Note!: Reference Instructional handout for the definition of the Buffer width for each channel side (Left Bank and Right Bank) *Note!: Reference Instructional handout for each channel side (Left Bank and Right Bank) *Note!: Reference | | | | rart vi - Mitigation (| Considerations (incentiv | ves) | | | | |
| *Note: Reference his Instructional handout to determine the correct Restoration Level as and Types (below) *Note: Place an "X" in the appropriate category (only select one). Restoration Level 2 Restoration Level 3 Buffer Width Left Bank 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 Unit Yield (Debit) S-K62/ S-A110 9.99625 #DIV/0! | | Extent of Stream Re | estoration | | | | Extended | Unland Buffer Zone | 2 | |
| Restoration Level 1 Restoration Level 2 Restoration Level 3 Buffer Width O-50 None 10-50 None 10-50 None 10-51-150 None 10-50 None 10-51-150 None 10-50 None 10-50 None 10-51-150 None 10-50 None 10-50 None 10-51-150 None 10-50 None 10-50 None 10-50 None 10-50 None 10-51-150 None 10-50 None 10-51-150 None 10-51-15 | | | | oject | | *Note ¹ : Referen | ce Instructional handout for the def | initions of the Buffer Zon | ne Mitigation Extents and Type | s (below) |
| Restoration Level 2 Restoration Level 3 Buffer Width O-50 None 51-150 None Buffer Width Right Bank 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) Witigation Unit Yield (Credit) S-K62/ S-A110 9.90625 #DIV/0! | | | satisfies y (emy solution). | | | | | | | |
| 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 | | | | | - | | 11010 : 001001 :: | e appropriate imagation | ,,,,, | |
| 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) 9.90625 #DIV/0! Unit Yield (Debit) Witigation Unit Yield Witigation Unit Yield Final Mitigation Unit Yield Fina | Restoration Level 2 | | | | | Buffer Width | | Left Bank | (| |
| 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) 9.90625 Mitigation Unit Yield (Polit) #DIV/0! Buffer Width 0-50 None 51-150 None Average Buffer Width/Side 0 Straight Preservation Ratio (v2.1, Sept 2015) Final Mitigation Unit Yield | Restoration Level 3 | | | | | | 0-50 | | None | |
| 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-K62/ S-A110 9.90625 #DIV/0! | | | | | _ | Duffor Width | 51-150 | Dight Pan | | |
| No Site Impact Unit Yield (Debit) S-K62/ S-A110 No Average Buffer Width/Side O Straight Preservation Ratio (v2.1, Sept 2015) #DIV/0! Final Mitigation Unit Yield | | | | | _ | Bullet Width | | Right Ban | | |
| Site Impact Unit Yield (Debit) Yield (Credit) S-K62/ S-A110 Mitigation Unit Yield (Credit) #DIV/0! Width/Side Width/Side Width/Side Straight Preservation Ratio (v2.1, Sept 2015) Final Mitigation Unit Yield | | | | No | | Average Buffer | 51-150 | | None | |
| S-K62/ S-A110 Unit Yield (Debit) Yield (Credit) #DIV/0! Final Mitigation Unit Yield Final Mitigation Unit Yield | Note: not 12-based watersned | approach required to obtain Stream | am Restoration incentive | NO | | | 0 | | | |
| S-K62/ S-A110 Unit Yield (Debit) Yield (Credit) #DIV/0! Final Mitigation Unit Yield Final Mitigation Unit Yield | -11 | | Impact | Mitigation Unit | | | | Stra | ight Preservation Ratio | |
| | Site | | | | | | | | | |
| | S-K62/ S-A110 | | 9.90625 | #DIV/0! | 1 | | Final Mitigation Unit Yield | | | |
| | | | | | J | | #DIV/0! | | | |

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

To ensure accurate calculations, the <u>UPPERMOST STRATUM</u> 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-A110/K62 (Doddridge County, WV)

Sampling Date: 06/01/2016 Project Site Before Project

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR: SAR number:

Shrub/Herb Strata

Functional Results Summary: Enter Results in Section A of the Mitigation Sufficiency Calculator

| Function | Functional Capacity Index |
|------------------------|------------------------------|
| Hydrology | 0.49 |
| Biogeochemical Cycling | 0.36 |
| Habitat | 0.08 |

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. | 1.93 | 0.44 |
| 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. | 0.00 | 0.00 |
| V _{HERB} | | | 1.00 |
| V _{WLUSE} | Weighted Average of Runoff Score for Catchment. | 0.91 | 0.96 |

| | High-G | Gradient | Headwat | | | | ntucky a alculator | | ern Wes | t Virgini | a |
|--|------------------------|-----------------------------------|---------------|----------------|---------------|---------------|---------------------------------|--------------------------|-----------------|--------------|---------|
| | Team: | C Vileno . | I. McGuirk, | | Julu Ono | ot and o | | | M Northing: | 39 201316 | |
| Pro | oject Name: | | . mocanit, | 7 ti Tviorigo: | | | | | ΓM Easting: | | |
| | = | | 2 (Doddridge | e County, W | /V) | | _ | - | npling Date: | | |
| SA | AR Number: | | , | Length (ft): | , | Stream Ty | pe: Intern | nittent Stream | | | _ |
| | Top Strata: | Sh | rub/Herb Str | ata | (determined | d from perce | ent calculated | d in V _{CCANOR} | ₂ Y) | | |
| Site | and Timing: | ng: Project Site Before Project | | | | | | | | | |
| Sample | • Variables | 1-4 in strea | m 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 | | | | | | | | | Not Used, <20% | | |
| | List the per | cent cover r | neasuremer | nts at each p | oint below: | | | | | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | | | | | | | | | | |
| 2 | V_{EMBED} | along the s | tream. Sele | ct a particle | from the be | d. Before n | at no fewer t noving it, det | ermine the | percentage | of the | 1.9 |
| | | | | | | | y fine sedime composed of | | | | |
| | | | bed is comp | | | | | inie seanne | onio, use a i | atting score | |
| | | | | | | | les (rescaled | d from Platt | s, Megahan | and | • |
| | | Minshall 19 | | | | · | ` | | , , | | |
| | | Rating | Rating Des | cription | | | | | | | , |
| | | 5 | | | | | buried by fin | | |) | ı |
| | | 4 | 5 to 25 perc | cent of surfa | ce covered, | surrounded | l, or buried b | y fine sedin | nent . | | i |
| | | 3 2 | | | | | ed, or buried ed, or buried | | | | • |
| | | 1 | | | | | r buried by fi | | | I surface) | |
| | List the ration | ngs at each | point below | | | | | | (0. 0 | | |
| | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 2 | 2 | |
| | 2 | 3 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 2 | |
| | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 3 | V _{SUBSTRATE} | Median stre | eam channe | l substrate p | article size. | Measure a | t no fewer th | an 30 roug | hly equidista | int points | 0.00: |
| | | along the s | tream; use t | he same po | ints and par | ticles as use | ed in V_{EMBED} . | | | | 0.08 in |
| | Enter partic | le size in in | ches to the r | nearest 0.1 | inch at each | point below | (bedrock sh | ould be co | unted as 99 | in, asphalt | |
| | or concrete | as 0.0 in, s | and or finer | particles as | 0.08 in): | | | | | | |
| | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 3.10 | 2.40 | 0.08 | 0.08 | |
| | 1.90 | 0.08 | 0.08 | 4.30 | 0.08 | 3.70 | 0.08 | 0.08 | 0.08 | 0.08 | |
| | 2.40 | 4.70 | 0.08 | 3.90 | 0.08 | 0.08 | 0.08 | 2.90 | 0.08 | 0.08 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 4 | V_{BERO} | • | | | | | tal number c | | | | |
| | | | | e will be cal | culated If b | oth banks a | re eroded, to | otal erosion | for the stream | am may be | 160 % |
| | | up to 200% | Left Bank: | 40 | 0 ft | | Right Bank: | |) ft | | |
| | | | LUIL Dalik. | 10 | UIL | | night Dalik. | 00 | <i>)</i> | | |

| Sample | nple Variables 5-9 within the entire riparian/buffer zone adjacent to the stream channel (25 feet from each bank). | | | | | | | | | | |
|--------|--|--------------|--------------|------------------------------|--|----------------|--------------------------------|----------------|--------------|--------------|----------|
| 5 | V_{LWD} | stream rea | ch. Enter th | | om the entir | | er and 36 ind ouffer and wi | | | | 0.0 |
| | | P 0 | | | | f downed w | oody stems: | | 0 | , | |
| 6 | V_{TDBH} | | | | ly if V _{CCANOP} tree DBHs i | | ng cover is at | t least 20%) | . Trees are | at least 4 | Not Used |
| | | • | , | | | | n) within the | buffer on ea | ich side of | | |
| | _ | the stream | | ionio oi inan | riadai ii ooo i | (at lodot 1 li | ., | | ion oldo ol | | |
| | | | Left Side | | | | | Right Side | | | |
| | 0 | | | | | 0 | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 7 | V_{SNAG} | | | | and 36" tall) t per 100 fee | | t of stream. culated. | Enter numb | er of snags | on each | 0.0 |
| | | | Left Side: | | 0 | | Right Side: | | 0 | | |
| 8 | V_{SSD} | | | | | | es dbh) per | | | | |
| | | | | inter numbe Il be calcula | | and shrubs | on each sic | le of the stre | eam, and the | e amount | 0.0 |
| | | per 100 it c | Left Side: | | 0 | | Right Side: | | 0 | | |
| 9 | V_{SRICH} | | | | | | m reach. Ch | | | | |
| | | | | | | | ve species p rom these da | | strata. Spe | ecies | 0.00 |
| | | | ip 1 = 1.0 | ind the Subh | idex will be | calculated i | ioni inese da | | 2 (-1.0) | | |
| | Acer rubru | | <u> </u> | Magnolia t | ripetala | | Ailanthus a | | Z (1.0) | Lonicera ja | ponica |
| | Acer sacci | | | Nyssa sylv | - | | Albizia julib | | | Lonicera ta | |
| | Aesculus f | lava | Ш | Oxydendrun | | | Alliaria peti | | | Lotus corni | culatus |
| | Asimina tri | iloba | | Prunus sei | rotina | | Alternanthe | uro. | | Lythrum sa | licaria |
| | Betula alleg | | _ | Quercus a | | | philoxeroid | | _ | Microstegiun | |
| | Betula leni | - | | Quercus co | | | Aster tatari | CUS | | Paulownia | |
| | Carya alba | | | Quercus in | | | Cerastium | | | Polygonum o | |
| | Carya glab | | | Quercus p | | | Coronilla va | | | Pueraria m | |
| Ш | Carya ovalis | | | Elaeagnus u | mbellata | | Rosa multii | flora | | | |
| Ш | Carya ovata | | | Lespedeza | bicolor | | Sorghum h | alepense | | | |
| | Cornus florida Sassafras albidum | | | Lespedeza | cuneata | | Verbena br | asiliensis | | | |
| Ш | Fagus grandifolia Lilia americana | | | cana | | Ligustrum ob | otusifolium | | | | |
| | Fraxinus americana Tsuga canadensis | | adensis | | Ligustrum s | sinense | | | | | |
| Ш | Liriodendron tulipifera Ulmus americana | | | | ericana | | | | | | |
| | Magnolia a | acuminata | | | | | | | | | |
| | | 0 | Species in | Group 1 | | | | 0 | Species in | Group ? | |

| | | | | | 40" x 40", o equidistant | | | | one within | 25 feet from | n each |
|-----------------|-----------------------|-------------------|-------------------|--------------|-----------------------------|--------------|--------------|--------------|-----------------|---------------------|----------------------------------|
| 10 | V_{DETRITUS} | Average pe | rcent cover | of leaves, s | sticks, or other | er organic n | naterial. Wo | ody debris « | <4" diamete | er and <36" | 0.00 % |
| | | | Left | • | | <u> </u> | | t Side | | 1 | |
| | | 0 | | | | 0 | | | | | |
| | | | | | | | | | | | |
| 11 | V_{HERB} | | | | aceous vege h and 36" ta | | | | | | |
| | | vegetation | percentages | | 200% are a | | | | | | 99 % |
| | | each subple | | Side | | ı | Righ | t Side | | 1 | |
| | | 90 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | i | |
| | | | | | | | | | | | |
| Sample | Variable 1 | 2 within the | entire cato | chment of t | the stream. | | | | | | |
| 12 | V_{WLUSE} | Weighted A | verage of R | unoff Score | e for watersh | ied: | | | | | 0.91 |
| | | | Land | Use (Choos | se From Dro | p List) | | | Runoff Score | % in Catch- ment | Running Percent (not >100) |
| | Forest and n | ative range (> | 75% ground | cover) | | | | • | 1 | 90 | 90 |
| | Open space | (pasture, lawn | ns, parks, etc.), | grass cover | <50% | | | • | 0.1 | 10 | 100 |
| | - | | | | | | | - | | | |
| | - | | | | | | | _ | | | |
| | _ | | | | | | | _ | | | |
| | - | | | | | | | _ | | | |
| | - | | | | | | | | | | |
| | _ | | | | | | | • | | | |
| | | | | | | | | • | | | |
| | Su | mmary | | | | | No | tes: | | | |
| Vä | ariable | Value | VSI | | | | | | | | |
| V _C | CANOPY | Not Used, <20% | Not Used | | | | | | | | |
| VE | MBED | 1.9 | 0.44 | | | | | | | | |
| V _{st} | JBSTRATE | 0.08 in | 0.04 | | | | | | | | |
| V _{BI} | ERO | 160 % | 0.22 | | | | | | | | |
| VLV | WD | 0.0 | 0.00 | | | | | | | | |
| V _{TI} | ОВН | Not Used | Not Used | | | | | | | | |
| Vsi | NAG | 0.0 | 0.10 | | | | | | | | |
| Vs | SD | 0.0 | 0.00 | | | | | | | | |
| V _{SI} | RICH | 0.00 | 0.00 | | | | | | | | |
| V _{DI} | ETRITUS | 0.0 % | 0.00 | | | | | | | | |
| V_{HI} | ERB | 99 % | 1.00 | | | | | | | | |
| Vw | LUSE | 0.91 | 0.96 | | | | | | | | |

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

| STREAM NAME S-A110/K62 | LOCATION Doddridge County, WV | | | |
|---|-------------------------------|---------------------|--|--|
| STATION # RIVERMILE | STREAM CLASS Intermittent | | | |
| LAT <u>39.201316</u> LONG <u>-80.553306</u> | RIVER BASIN Little Musk | ingum-Middle Island | | |
| STORET# | AGENCY Tetra Tech | | | |
| INVESTIGATORS J. McGuirk, C. Vileno, A | . Mengel | | | |
| FORM COMPLETED BY | DATE 06/01/2016 | REASON FOR SURVEY | | |
| A. Mengel | ^{TIME} 13:00 | SWVM | | |

| | Habitat | | Condition | ı Category | | |
|--|---|---|---|---|---|--|
| | Parameter | 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 6 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | |
| n sampling reach | 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. | |
| ted in | SCORE 5 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | |
| Parameters to be evaluated in sampling reach | 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). | |
| ıram | SCORE 1 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | |
| Par | 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 3 | 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. | |
| L | SCORE 1 | 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 | Condition Category | | | | | | | | | |
|--|---|--|--|--|---|--|--|--|--|--|--|
| | Parameter | 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 2 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | | | | | |
| ling reach | 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. | | | | | | |
| samp | SCORE 1 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | | | | | |
| Parameters to be evaluated broader than sampling reach | 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. | | | | | | |
| oe ev | SCORE 1 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | | | | | |
| s to l | SCORE 1 (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | | | | | |
| Parameter | 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 0 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | | | | | |
| | SCORE 0 (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 10(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 | | | | | | |

Total Score 33

A-8

No / low flow at time of survey. Unable to sample water quality or $\ensuremath{\mathbf{WVSCI}}$.



Photograph Direction $\underline{^{NE}}$

Comments:

| STREAM ID S-K43 | STREAM NAME Cove Lick |
|---|-------------------------|
| LAT 39.002050 LONG -80.596017 | DATE 05/19/2015 |
| CLIENT MVP | PROJECT NAME MVP |
| INVESTIGATORS A.Bensted, V. Prilepin, J. Bit | tner |
| FLOW REGIME Perennial Land Intermittent Ephemeral | WATER TYPE TNW RPW NRPW |

| Perennial 🕹 | _ Intermitte | nt Ephem | eral TNW | RPW – | NRPW | | | |
|--------------------------|--------------|---------------------|------------------------------------|-------------------|---|-----------------------------------|--|--|
| | 1 | | _ | | | | | |
| | | | leasurements | | Stream ErosionNone ✓ Moderate | Ноэми | | |
| | | - | k Width: 7.0 ft | | NoneNoderate | <u> —</u> пеаvy | | |
| | | Top of Ban | • | | Artificial, Modified or Char | nnelized | | |
| | | LB <u>4.0</u> | ft RB <u>4.0</u> | <u>ft</u> | Yes _ <u>✓</u> No | | | |
| CHANNEL FE | ATURES | Water Dept | h: 1.00 ft | | Dam Present Yes | ∠ No | | |
| | | Water Widt | h: <u>4.0 ft</u> | | | <u></u> | | |
| | | High Water | Mark: <u>7.0</u> ft | | Sinuosity Low | Medium <u>v</u> High | | |
| | | Flow Direct | ion: West | | Gradient | | | |
| | | | | | Flat Moderate | | | |
| | | 14/ 4 B | | | | (10 ft/100 ft) | | |
| | | Water Pres | sent r, stream bed dry | | Proportion of Reach Representation Morphology Types | esented by Stream | | |
| | | Stream | · | | Riffle 70 % Run 10 | % | | |
| FLOW | | Standing | g water | | Pool 20 % | | | |
| CHARACTER | STICS | <u></u> Flowing | water | | Turbidity | | | |
| | | Velocity | | | Clear Slightly | turbidTurbid | | |
| | | • | Moderate | | OpaqueStained | | | |
| | | ✓ Slow | | | Other | | | |
| INOR | | STRATE CO | | | RGANIC SUBSTRATE COMPONENTS | | | |
| | (should a | add up to 10 | • | (0 | (does not necessarily add up | | | |
| Substrate Type | Diame | ter | % Composition in Sampling Reach | Substrate Type | Characteristic | % Composition in Sampling Area | | |
| Bedrock | | | | Detritus | sticks, wood, coarse | | | |
| Boulder | | mm (10") | | | plant materials (CPOM) | 10 | | |
| Cobble | | m (2.5"-10") | 40 | Muck-Mud | black, very fine organic | | | |
| Gravel | 2-64 mm | (0.1"-2.5") | 25 | | (FPOM) | | | |
| Sand | | nm (gritty) | 15 | | | | | |
| Silt | | 0.06 mm | 5 | Marl | grey, shell fragments | | | |
| Clay | < 0.004 ı | mm (slick) | 15 | _ | | | | |
| | | Predomina ✓ Forest | ant Surrounding Lan Commer | | Indicate the dominant type ✓ Trees Shrub | | | |
| | | Field/Pa | | | Grasses Herba | | | |
| | | Agricult | | tial | _ | | | |
| WATERSHED FEATURES | | Other: | _ | | Floodplain Width ✓ Wide > 30ft Mode | rate 15-30ft | | |
| | | Canopy Co | wor | | Narrow <16ft | | | |
| | | <u>✓</u> Partly o | pen Partly sh | aded | | | | |
| | | Shaded | | | Wetland PresentYes Wetland ID | <u>✓</u> No | | |
| | | Indicate th | e dominant type and | | Iominant species present | | | |
| AQUATIC VE | SETATION | | | Rooted subme | | tingFree floating | | |
| | | Floating | g algae | Attached algae | е | | | |
| | | | | | | | | |
| | | Stream me | anders within wide flo | odplain on val | ley floor. | | | |
| | | | | | | | | |
| MACROINVER OR OTHER | RTEBRATES | | | | | | | |
| WILDLIFE | | | | | | | | |
| OBSERVED/C OBSERVATIO | | | | | | | | |
| NOTES | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| USACE FILE NO./ Project Name: (v2.1, Sept 2015) | | | illey Pipeline Project WVM v2.1 | IMPACT COORDINATES (in Decimal Degrees) | : Lat. | 39.002097° | Lon. | -80.595753° | WEATHER: | | DATE: | 8/10/2015 |
|--|---------------------|--|--|--|--------|---|---|-------------------|--|--|--|--------------------------------|
| IMPACT STREAM/SITE ID (watershed size (acreage). | | | | S-K43; Cove Lick Form of Mitigation: Mitigation Bank | | | MITIGATION STREAM CLASS./SITE ID AND SITE DESCRIPTION: (watershed size (acreage), unalitered or impairments) | | | | Comments: | |
| STREAM IMPACT LENGTH: | 27 | FORM OF MITIGATION: | RESTORATION (Levels I-III) | MIT COORDINATES: (in Decimal Degrees) | Lat. | | Lon. | | PRECIPITATION PAST 48 HRS: | PRECIPITATION PAST 48 HRS: | | |
| Column No. 1- Impact Existing | Condition (Deb | bit) | Column No. 2- Mitigation Existing C | Condition - Baseline (Credit) | | Column No. 3- Mitigation | on Projected at loletion (Credit) | ive Years | Column No. 4- Mitigation Pro Post Completion | | Column No. 5- Mitigation Project | ted at Maturity (Credit) |
| Stream Classification: | Perei | nnial | Stream Classification: | Intermittent | | Stream Classification: | | Intermittent | Stream Classification: | Intermittent | Stream Classification: | Intermittent |
| Percent Stream Channel SI | оре | 3 | Percent Stream Channel SI | ope | | Percent Stream Chann | nel Slope | 0 | Percent Stream Channel S | lope 0 | Percent Stream Channel S | ilope 0 |
| HGM Score (attach d | ata forms): | | HGM Score (attach | data forms): | 1 | HGM Score (at | ttach data form | s): | HGM Score (attach d | iata forms): | HGM Score (attach d | lata forms): |
| Hydrology | | Average | Hydrology | Average | | Hydrology | 1 | Average | Hydrology | Average | Hydrology | Average |
| Biogeochemical Cycling Habitat | | 0 | Biogeochemical Cycling Habitat | 1 0 | | Biogeochemical Cycling Habitat | 1 | 0 | Biogeochemical Cycling Habitat | 1 0 | Biogeochemical Cycling Habitat | 1 0 |
| PART I - Physical, Chemical and | Biological Indic | ators | PART I - Physical, Chemical an | d Biological Indicators | | PART I - Physical, Chemic | cal and Biologic | I Indicators | PART I - Physical, Chemical and | l Biological Indicators | PART I - Physical, Chemical and | l 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 st | treams classification | s) | PHYSICAL INDICATOR (Applies to all stream | s classifications) | PHYSICAL INDICATOR (Applies to all streams | s classifications) |
| USEPA REP (High Gradient Data Sheet) L. Epflanual Subtratio-(Available Cover 2. Embodschess 3. Velocity Depth Regime 4. Sediment Deposition 5. Channel Flow Status 6. Channel Alteration 7. Frequency of Riffles (or bends) 5. Bank Stability (L.B. & RB) 10. Repairs Vegetative Zore Width (LB & RB) 10. Repairs Vegetative Zore Width (LB & RB) Total RBP Score Sub-Total CHEMICAL INDICATOR (Applies to Intermitter WVDEP Water Quality Indicators (General | | 14 11 9 9 6 11 15 14 14 11 11 114 0.57 | USEPA RBP (High Gradient Data Sheet) 1.Epfluraul Substrate/Available Cover 2. Embeddedness 3. Velocity Depth Regime 4. Sediment Deposition 5. Channel Flow Status 6. Channel Alteration 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) 9. Vegetative Protection (LB & RB) 10. Ripartian Vegetative Zone Width (LB & RB) 10. Ripartian Ve | | | USEPA RBP (High Gradient Data She L. Epflaunal Substrate/Available Cover. 2. Embeddedness 3. Velocity Depth Regime 4. Sediment Deposition 6. Channel Alteration 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) 9. Vegetalter Protection (LB & RB) 10. Repariar Vegetalive Zone Width (LB & R 104 RBP Scoot Sub-Total CHEMICAL INDICATOR (Applies to Inter- WWDEP Water Quality Indicators (Ge | 0-20 0-20 0-20 0-20 0-20 0-20 0-20 0-20 | 0 | USEPA RBP (High Gradient Data Sheet) 1. Epfluraui Substratin/Available Cover 2. Emboddedness 3. Vedocrly Depth Regime 4. Sedment Deposition 5. Channel Flow Status 6. Channel Flow Status 6. Channel Rive Status 6. Sedment Deposition 7. Frequency of Riffles (or bends) 8. Bark Stability (LB & RB) 10. Repartan Vegetative Zone Width (LB & RB) 10. Repartan Vegetative Zone Width (LB & RB) 10. Repartan Vegetative Zone Width (LB & RB) 10. Total RBP Score Sub-Total CHEMICAL INDICATOR (Applies to Internitie WVDEP Water Quality Indicators (Genera | | USEPA RBP (High Gradient Data Sheet) 1. Epfiram Substrate Navaliable Cover 2. Embeddedness 3. Veolotyl Opeth Regime 4. Sedment Deposition 5. Channel Flow Satus 6. Channel Alteration 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) 10. Reparten Vepetierie Zore Wirth (LB & RB) 10. Reparten Vepetierie Zore Wirth (LB & RB) 10. Reparten Vepetierie Zore Wirth (LB & RB) 10. Total RBP Score Sub-Total CHEMICAL INDICATOR (Applies to Intermitte WIVDEP Water Quality Indicators (Genera | |
| Sub-Total | 0-90 | 7.88 8.71 | Specific Conductivity DO Sub-Total | 0-90 5-90 0-1 0 0 | | pH DO Sub-Total | 0-90 5-90 | 0 0 0 | Specific Conductivity DO Sub-Total | 0.90 0.1 0 0 10.30 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | Specific Conductivity DH DO Sub-Total | 5-90 |
| BIOLOGICAL INDICATOR (Applies to Intermit | ent and Perennial S | Streams) | BIOLOGICAL INDICATOR (Applies to Intermitt | ent and Perennial Streams) | | BIOLOGICAL INDICATOR (Applies to I | Intermittent and P | erennial Streams) | BIOLOGICAL INDICATOR (Applies to Interr | mittent and Perennial Streams) | BIOLOGICAL INDICATOR (Applies to Intern | nittent and Perennial Streams) |
| WV Stream Condition Index (WVSCI) Fair Sub-Total | 0-100 0-1 | 54.5 0.445 | WV Stream Condition Index (WVSCI) Sub-Total | 0-100 0-1 0 | | WV Stream Condition Index (WVSCI) Sub-Total | 0-100 | 0-1 0 | WV Stream Condition Index (WVSCI) Sub-Total | 0-100 0-1 0 | WV Stream Condition Index (WVSCI) Sub-Total | 0-100 0-1 |
| PART II - Index and U | nit Score | | PART II - Index and | Unit Score | | PART II - Inde | x and Unit Scor | | PART II - Index and U | Unit Score | PART II - Index and I | Unit Score |
| Index | Linear Feet | Unit Score | Index | Linear Feet Unit Score | | Index | Linear | eet Unit Score | Index | Linear Feet Unit Score | Index | Linear Feet Unit Score |
| 0.672 | 27 | 18.135 | 0 | 0 0 | | 0 | 0 | 0 | 0 | 0 0 | 0 | 0 0 |

| | | (See instruction p | | - Impact Factors ilt values for MITIGATIO | N BANKING and IL | _F) | | | |
|--|--|--|------------------------|--|-------------------|--|---------------------------|-------------------------|-----------|
| Temp | oral Loss-Construction | | | | | Long | term Protection | | |
| *Note: Reflects duration of aquatic function | | nn impact (debit) and completion of | | | % Add. Mitigation | on and Monitoring Period | | Term Protection (Years) | |
| | ensatory mitigation (credit). | , , , | | | g | | | Torm Frotoculon (Toulo) | |
| V | | 0 | | | | | | | |
| Years Sub-Total | | 0 | | | | | | | |
| Sub-Total | | Ů. | | | | | | | |
| | nporal Loss-Maturity | | | | 0 + 5/ | 10 Year Monitoring | | 101 | |
| *Note: Period between completion of compensato | ory mitigation measures and t | the time required for maturity, as it relates | | | Sub-Total | | | 0 | |
| to function (i.e. maturity of tree stratum to provid | le organic matter and detritus corridor). | within riparian stream or wetland buffer | | | | | | | |
| | cornaor). | | | | | PART IV - Index | to Unit Score Con | | |
| | | | | | Final Index Score | Linear Feet | Unit Score | ILF Costs | |
| % Add. Mitigation | | Temporal Loss-Maturity (Years) | | | (Debit) | | (Debit) | (Offsetting Debit | Units) |
| | | | 0.671666667 | 27 | 18.135 | \$14,508.00 |) | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 0% | | 0 | | | | | | | |
| Sub-Total | | U | | | | | | | |
| | | | | | | | | | |
| | | PART V | - Comparison of U | nit Scores and Projecte | d Balance | | | | |
| | | | | Mitimatian Duals at all at | | | | | |
| Final Unit Score (Debit) | | Mitigation Existing | | Mitigation Projected at Five Years | | Mitigation Projected at | | Mitigation Projected | |
| [No Net Loss Value] | 18.135 | Condition - Baseline | | Post Completion | | Ten Years | | At Maturity | |
| [NO Net Loss value] | | (Credit) | | (Credit) | | Post Completion (Credit) | | (Credit) | |
| | | | | (Orealt) | | | | | |
| FINAL PROJECTED NET BALANCE | | | | | 0 | | 0 | | 0 |
| | | | | | | | - | | - |
| | | F | Part VI - Mitigation (| Considerations (Incentiv | ves) | | | | |
| | Extent of Stream Re | estoration | | | | | | | |
| *Note1: Reference the Instructio | | correct Restoration Levels (below) for your pr | roiect | | | | Upland Buffer Zone | | |
| | Place an "X" in the appropriate | | • | | *Note': Referen | ce Instructional handout for the de *Note ² : Enter the buffer width for | | | s (below) |
| E Partametian Laural 4 | | | | | | | ne appropriate mitigation | | |
| Restoration Level 1 | | | | | | Note : Gelect ti | ie appropriate intigation | туро | |
| Restoration Level 2 | | | | | Buffer Width | | Left Bank | (| |
| Restoration Level 3 | | | | | | 0-50 | | None | |
| | | | | J | | 51-150 | | None | |
| | | | | | Buffer Width | 01 100 | Right Ban | | |
| | | | | | | 0-50 | <u> </u> | None | |
| Compensatory Mitigation Plan incorpo | rates HUC 12-based wate | ershed approach? (Yes or No) | | | | 51-150 | | None | |
| *Note: HUC 12-based watershed | approach required to obtain Strea | am Restoration incentive | No | | Average Buffer | 0 | | | |
| | | | | | Width/Side | | | | |
| | | Impact | Mitigation Unit | | | | Ctua | ight Preservation Ratio | |
| Site | | Unit Yield (Debit) | Yield (Credit) | | | | Stra | (v2.1, Sept 2015) | |
| | riela (Orealt) | | | | | (12.1., Oopt 2010) | | | |
| S-K43 | | 18.135 | #DIV/0! | | | Final Mitigation Unit Yield | | | |
| 3-1140 | | 10.133 | #01970: | | | | | | |
| | | | | | | #DIV/0! | | | |
| | | | | | | | | | |

| Insects | Count | Tolerance | TV | Insects | Count | Tolerance | TV | Non-Insects | Count | Tolerance | TV | 1 | |
|-------------------|----------------|--------------|-----|---|-------|-----------|----|-----------------|---------------|-----------|--------------|---------------------|-------|
| Ephemeroptera | | • | 4 | Odonata | | | 3 | Crustacea | | | 0 | | |
| Ameletidae | 1 | 2 | 0 | Aeshnidae | | 3 | 0 | Asellidae | | 7 | 0 | | |
| Baetidae | | 4 | 0 | Calopterygidae | | 6 | 0 | Cambaridae | | 5 | 0 | 1 | |
| Beatiscidae | | 4 | 0 | Coenagrionidae | | 7 | 0 | Gammaridae | | 5 | 0 | 1 | |
| Caenidae | | 5 | 0 | Cordulegastridae | | 3 | 0 | Palaemonidae | | 5 | 0 | 1 | |
| Ephemerellidae | | 3 | 0 | Gomphidae | 3 | 5 | 15 | Annelida | | | 0 | | |
| Ephemeridae | | 5 | 0 | Lestidae | | 7 | 0 | Hirudinea | | 10 | 0 | | |
| Heptageniidae | 2 | 3 | 6 | Libellulidae | | 7 | 0 | Nematoda | | 10 | 0 | | |
| Isonychiidae | | 3 | 0 | Coleoptera | | | 3 | Nematomorpha | | 10 | 0 | | |
| Leptophlebiidae | 2 | 4 | 8 | Chrysomelidae | | 7 | 0 | Oligochaeta | | 10 | 0 | | |
| Potamanthidae | | 5 | 0 | Dryopidae | | 5 | 0 | Turbellaria | | | 0 | | |
| Siphlonuridae | | 3 | 0 | Dytiscidae | | 6 | 0 | Turbellaria | | 7 | 0 | | |
| Tricorythidae | | 5 | 0 | Elmidae | 3 | 4 | 12 | Bivalvia | | | 0 | | |
| Plecoptera | | | 0 | Gyrinidae | | 5 | 0 | Corbiculidae | | 6 | 0 | | |
| Capniidae | | 2 | 0 | Haliplidae | | 7 | 0 | Sphaeriidae | | 5 | 0 | | |
| Chloroperlidae | | 2 | 0 | Hydrophilidae | | 7 | 0 | Unionidae | | 4 | 0 | | |
| Leuctridae | | 2 | 0 | Psephenidae | | 3 | 0 | Gastropoda | | | 0 | | |
| Nemouridae | | 2 | 0 | Ptilodactylidae | | 5 | 0 | Ancylidae | | 7 | 0 | | |
| Peltoperlidae | | 1 | 0 | Hemiptera | | | 0 | Hydrobiidae | | 4 | 0 | | |
| Perlidae | | 1 | 0 | Belostomatidae | | 8 | 0 | Physidae | | 7 | 0 | | |
| Perlodidae | | 1 | 0 | Corixidae | | 8 | 0 | Planorbidae | | 5 | 0 | | |
| Pteronarcyidae | | 1 | 0 | Gerridae | | 10 | 0 | Pleuroceridae | | 5 | 0 | | |
| Taeniopterygidae | | 2 | 0 | Hydrometridae | | 8 | 0 | Viviparidae | | 5 | 0 | | |
| Trichoptera | | | 4 | Nepidae | | 8 | 0 | Miscellaneous | | | 0 | | |
| Brachycentridae | | 2 | 0 | Notonectidae | | 8 | 0 | Collembola | | 6 | 0 | | |
| Glossosomatidae | | 2 | 0 | Megaloptera | | | 1 | Lepidoptera | | 5 | 0 | | |
| Helicopsychidae | | 3 | 0 | Corydalidae | 1 | 3 | 3 | Neuroptera | | 5 | 0 | | |
| Hydropsychidae | 4 | 5 | 20 | Sialidae | | 6 | 0 | Hydrachnidae | | 6 | 0 | | |
| Hydroptilidae | | 3 | 0 | Diptera | - | | 14 | Totals | Totalı | number | 29 | | |
| Lepidostomatidae | | 3 | 0 | Athericidae | | 3 | 0 | Totals | Total f | amilies | 7 | | |
| Leptoceridae | | 3 | 0 | Blephariceridae | | 2 | 0 | | | Metric | calculations | | |
| Limnephilidae | | 4 | 0 | Ceratopogonidae | | 8 | 0 | | Richnes | ss | | Additional metri | cs |
| Molannidae | | 3 | 0 | Chironomidae | | 9 | 0 | Total Taxa | | 7 | 31.8 | Ephemeroptera Taxa | 2 |
| Philopotamidae | | 4 | 0 | Culicidae | | 10 | 0 | EPT Taxa | | 3 | 23.1 | Plecoptera Taxa | 0 |
| Phryganeidae | | 4 | 0 | Dixidae | | 6 | 0 | | Toleran | ce | | Trichoptera Taxa | 1 |
| Polycentropodidae | | 5 | 0 | Empididae | | 7 | 0 | Biotic Index | | 4.62 | 76.8 | Long-lived Taxa | 5 |
| Psychomiidae | | 3 | 0 | Psychodidae | | 8 | 0 | % Tolerant | | 0.0 | 100.0 | Odonata Taxa | 1 |
| Rhyacophilidae | | 3 | 0 | Ptychopteridae | | 8 | 0 | | Composit | ion | | Diptera Taxa | 1 |
| Uenoidae | | 2 | 0 | Simuliidae | | 6 | 0 | % EPT Abundance | | 27.6 | 30.7 | COET Taxa | 5 |
| | Total Tol | erance Value | 134 | Stratiomyidae | | 10 | 0 | % Dominance | | 48.3 | 64.7 | % Sensitive | 10.3 |
| West Vi | rginia Save O | ur Streams | | Syrphidae 10 0 % Net-spinners 13.8 NA % | | | | % Chironomidae | 0.0 | | | | |
| 601 57th Stre | et, SE, Charle | ston WV 253 | 304 | Tabanidae | | 7 | 0 | Stream (| Condition Ind | | 54.5 | % Clingers | 24.1 |
| http:// | /www.dep.w | v.gov/sos | | Tipulidae | 14 | 5 | 70 | Integrity Ra | ating | Mar | ginal | More diversity meas | sures |

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.

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

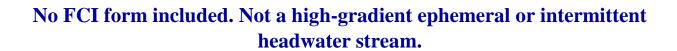
| STREAM NAME S-K43 | LOCATION Lewis County | LOCATION Lewis County, WV | | | | |
|---|------------------------|----------------------------------|--|--|--|--|
| STATION # RIVERMILE | STREAM CLASS Perennial | | | | | |
| LAT <u>39.002097°</u> LONG <u>-80.595753°</u> | RIVER BASIN Headwater | RIVER BASIN Headwaters Sand Fork | | | | |
| STORET# | AGENCY Tetra Tech | | | | | |
| INVESTIGATORS J.McGuirk, C.Stoliker | _ | | | | | |
| FORM COMPLETED BY | DATE 09/07/2016 | REASON FOR SURVEY | | | | |
| J.McGuirk | TIME 2:00PM | | | | | |

| | Habitat | Condition Category | | | | | | | | | |
|--|---|---|---|---|---|--|--|--|--|--|--|
| | Parameter | 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 14 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | | | | | |
| ı sampling reach | 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. | | | | | | |
| ted in | SCORE 11 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | | | | | |
| Parameters to be evaluated in sampling reach | 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). | | | | | | |
| ıram | SCORE 9 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | | | | | |
| P ₂ | 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 9 | 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 6 | 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)

| | II-lia-a | | Condition | Category | | | |
|--|--|--|--|--|---|--|--|
| | Habitat Parameter | 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 11 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| ling reach | 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. | | |
| samp | SCORE 15 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| Parameters to be evaluated broader than sampling reach | 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. | | |
| e eva | SCORE 7 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |
| to b | SCORE 7 (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |
| Parameter | 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 4 (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 114





Photograph Direction SW

Comments:

| STREAM ID S-163 | STREAM NAME Sand Fork |
|--|---------------------------|
| LAT 38.969345 LONG -80.593157 | DATE 05/16/2015 |
| CLIENT MVP | CLIENT MVP |
| INVESTIGATORS SET SJC GS | |
| FLOW REGIME Perennial ✓ Intermittent Ephemeral — | WATER TYPE TNW RPW ✓ NRPW |

| CHANNEL FEATURES | relellillal = | _ | nt <u> — Epnem</u> | erai rivvv | RPW — | NRPW — | | | |
|--|---------------|-----------|--------------------|-------------------------|------------------|-------------------------------------|-------------------|--|--|
| Top of Bank Width: 20.0 ft Top of Bank Height: Top of Bank Height: Artificial, Modified or Channelized Water Depth: 18.00 in Water Width: 12.0 ft High Water Mark: 2.0 ft Flow Direction: W Flow Direction: W Water Present No No water, stream bed dry Stream bed dry Stream bed moist Standing water Flow Fresent No No water, stream bed dry Stream bed moist Standing water Flowing water Flowing water Velocity Flowing The Water Water Reveal water Velocity Flowing water Velocity Flowing Water Velocity Clear Slightly turbid Turbidity Clear Slightly turbid Velocity Clear Slightly turbid Velocity Clear Slightly Velocity | | | | | | | | | |
| Top of Bank Height: LB 3.0 ft RB 4.0 ft Yes _ No Water Depth: 18.00 in Water Width: 12.0 ft High Water Mark: 2.0 ft Flow Direction: W | | | | | | | Harris | | |
| CHANNEL FEATURES Channel Features Water property 18.00 in Water Width; 12.0 ft Dam Present Yes No | | | | | | None/ Moderate | Heavy | | |
| CHANNEL FEATURES LB 3.0 | | | Top of Ban | k Height: | | Artificial. Modified or Channelized | | | |
| Water Width: 12.0 ft High Water Mark: 2.0 ft Flow Direction: W Flow Direction: W Water Present No water, stream bed dry Stream hed moist Standing water Flow CHARACTERISTICS Flow CHARACTERISTICS Water Present No water, stream bed dry Stream hed moist Standing water Flowing water Velocity Flowing water Velocity Flowing water Velocity Sinus SIBSTRATE COMPONENTS (should add up to 100%) Substrate Sampling Reach Type Bedrock Boulder Sampling Reach Boulder Server Boulder Server Server Sampling Reach Type Bedrock Boulder Server Many Maderate Server Server Server Server Server Server Server Server Many Many macroinverts, songbirds, butterflies Sinusity Velocity Server Many macroinverts, songbirds, butterflies Sinusity Velow Medium — High Server | | | LB <u>3.0</u> | ft RB <u>4.0</u> | •. | | | | |
| Water Width: 12.0 ft High Water Mark: 2.0 ft Sinuosity | CHANNEL FE | ATURES | Water Dep | th: 18.00 in | | | | | |
| High Water Mark: 2.0 ft Flow Direction: W Sinuosity v Low Medium High Flow Direction: W Flow Direction | CHANNEL FE | ATURES | Water Widt | h: 12.0 ft | | Dam PresentYes _ | <u>∕</u> No | | |
| Flow Direction: W Cardient Flow Direction: W Car | | | | | | Sinuosity V Low | Medium High | | |
| Water Present | | | Ū | | | | _ • | | |
| Water Present | | | Flow Direct | IIOI1. <u>**</u> | | | Sovoro | | |
| No water, stream bed dry Stream bed moist St | | | | | | | | | |
| FLOW CHARACTERISTICS Stream bed moist Standing water | | | Water Pres | sent | | Proportion of Reach Repre | esented by Stream | | |
| Standing water | | | | | | | - | | |
| CHARACTERISTICS Flowing water Flow | | | | | | | % | | |
| Velocity | | | | • | | P001 15 % | | | |
| INORGANIC SUBSTRATE COMPONENTS (should add up to 100%) Substrate Type | CHARACTER | ISTICS | <u>v</u> Flowing | water | | Turbidity | | | |
| Slow | | | Velocity | | | | | | |
| INORGANIC SUBSTRATE COMPONENTS (should add up to 100%) Composition in Type Diameter Sampling Reach Sampling Area Sampling Area Sampling Reach Sampling Area Sampling Area Sampling Area Sampling Area Sampling Reach Sampling Area Sampling Area Sampling Area Sampling Reach Sampling Reach Sampling Area Sampli | | | | Moderate | | | | | |
| Substrate Diameter Sampling Reach Type Characteristic Sampling Area | | | <u>✓</u> Slow | | | Otner | | | |
| Substrate Type Diameter Sampling Reach Type Detritus | INOR | | | | | | | | |
| Bedrock Sampling Reach Type Characteristic Sampling Area | Substrate | , 5: | | % Composition in | Substrate | 0, , , , | % Composition in | | |
| Boulder > 256 mm (10") Detritus Detritus | | Diame | ter | | | Characteristic | | | |
| Cobble 64-256 mm (2.5"-10") 45 Gravel 2-64 mm (0.1"-2.5") 10 Sand 0.06-2mm (gritty) Silt 0.004-0.06 mm 45 Clay < 0.004 mm (slick) Predominant Surrounding Landuse Field/Pasture Industrial Agricultural Residential Other: Road on right bank, boat laun Canopy Cover Partly open Partly shaded Shaded Open AQUATIC VEGETATION Mary Mick-Mud black, very fine organic (FPOM) Mary grey, shell fragments 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 Indicate the dominant type and record the dominant species present Rooted submergent Rooted slubmergent Rooted floating Free floating Floating algae Attached algae Many macroinverts, songbirds, butterflies | | | (4011) | | Detritus | | 10 | | |
| Gravel 2-64 mm (0.1"-2.5") 10 Muck-Mud (FPOM) 10 | | | ` , | | | piant materials (CPOW) | 10 | | |
| Sand 0.06-2mm (gritty) Silt 0.004-0.06 mm 45 Clay < 0.004 mm (slick) Predominant Surrounding Landuse Field/Pasture Industrial Residential Agricultural Residential Canopy Cover Partly open Partly shaded Shaded Open Matl Gresses Field Present Wetland Present Wetland ID Indicate the dominant species present Rooted emergent Floating algae Many macroinverts, songbirds, butterflies Macroinverterebrates Macroinverterebrates Macroinverterebrates OBSERVED/OTHER OTHER OTH | | | , | 45 | Muck-Mud | | 10 | | |
| Silt 0.004-0.06 mm 45 Marl grey, shell fragments O | | | , | 10 | | (FPOM) | 10 | | |
| Clay < 0.004 mm (slick) Predominant Surrounding Landuse Indicate the dominant type (Check one) | | | | | | | 0 | | |
| ## Predominant Surrounding Landuse | Silt | | | 45 | Marl | grey, shell fragments | | | |
| WATERSHED FEATURES WATERSHED FEATURES WATERSHED FEATURES Watershed — Agricultural — Residential — Agricultural — Residential — Other: Road on right bank, boat laun — Canopy Cover — Partly open — Partly shaded — Shaded — Open Wetland Present — Yes ✓ No Wetland ID 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 | Clay | < 0.004 i | ` ′ | | | | | | |
| WATERSHED FEATURES Field/Pasture | | | | | | | | | |
| WATERSHED FEATURES AgriculturalResidentialV Other: Road on right bank, boat launV Wide > 30ft Moderate 15-30ftV Narrow <16ftV Partly openPartly shadedShadedOpenPopenPopenPopenNarrow <16ftV No Wetland IDNarrow <16ftNarrow <16ftNar | | | _ | | | | | | |
| WATERSHED FEATURES Other: Road on right bank, boat laun Canopy Cover Partly open Shaded Open Partly shaded Wetland Present Wetland ID Indicate the dominant type and record the dominant species present Rooted emergent Floating algae Attached algae Many macroinverts, songbirds, butterflies MACROINVERTEBRATES OR OTHER WILDLIFE OBSERVED/OTHER OBSERVATIONS AND | | | | | | | 00000 | | |
| Canopy Cover Partly open Partly shaded Shaded Open Wetland ID 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 | | | — · | | oat laun | | 45 20# | | |
| Partly openPartly shadedOpen Wetland PresentYesNo Wetland ID Indicate the dominant type and record the dominant species presentRooted emergentRooted submergentRooted floatingFree floatingFloating algaeAttached algae MACROINVERTEBRATES OR OTHER WILDLIFE OBSERVED/OTHER OBSERVATIONS AND | PEATURES | | | _ | | | rate 15-301t | | |
| AQUATIC VEGETATION Indicate the dominant type and record the dominant species present Rooted emergent Floating algae Macroinverts, songbirds, butterflies MACROINVERTEBRATES OR OTHER WILDLIFE OBSERVED/OTHER OBSERVATIONS AND | | | | | adod | Nanow stole | | | |
| Indicate the dominant type and record the dominant species present Rooted emergent Floating algae Attached algae Macroinvertebrates OR OTHER OBSERVATIONS AND Metiand ID Wetland ID Wetland ID Wetland ID Wetland ID Wetland ID Wetland ID Wetland ID Rooted species present Rooted floating Attached algae Free floating Attached algae | | | - | . — <u> </u> | | | <u>✓</u> No | | |
| AQUATIC VEGETATIONRooted emergentRooted submergentRooted floatingFree floatingFree floatingRooted floatingFree floatingRooted floatingFree floatingFree floatingRooted floatingFree floatingFree floatingFree floatingRooted floatingFree floatingRooted floatingFree floatingRooted floatingFree floatingRooted floatingFree floatingRooted floatingFree floating | | | | | | | | | |
| MACROINVERTEBRATES OR OTHER WILDLIFE OBSERVED/OTHER OBSERVATIONS AND | A CHATIC VE | SETATION | | | | | ina Eroo flooting | | |
| Many macroinverts, songbirds, butterflies MACROINVERTEBRATES OR OTHER WILDLIFE OBSERVED/OTHER OBSERVATIONS AND | AQUATIC VEC | SEIAIION | | | | _ | ingriee iloating | | |
| MACROINVERTEBRATES OR OTHER WILDLIFE OBSERVED/OTHER OBSERVATIONS AND | | | | | , titaonoa aigat | | | | |
| MACROINVERTEBRATES OR OTHER WILDLIFE OBSERVED/OTHER OBSERVATIONS AND | | | Many maar | oinvorto conghirdo h | uttorflico | | | | |
| OR OTHER WILDLIFE OBSERVED/OTHER OBSERVATIONS AND | | | Ivially Illaci | oinverts, sorigolius, t | utternies | | | | |
| OR OTHER WILDLIFE OBSERVED/OTHER OBSERVATIONS AND | MACROINVE | RTFRRATES | | | | | | | |
| OBSERVED/OTHER OBSERVATIONS AND | OR OTHER | | | | | | | | |
| OBSERVATIONS AND | | THER | | | | | | | |
| | OBSERVATIO | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

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

| | | n Valley Pipeline Project SWVM v2.1 | SWVM v2.1 (in Decimal Degrees) | | | | -80.593157 | WEATHER: | Sunny, 80° | DATE: | September 7, 2016 | |
|--|---------------------|--|--|--|------|---|--------------------|---------------|---|-------------------------------|--|--|
| IMPACT STREAM/SITE ID (watershed size {acreage}, | | | S-I63; Sand Fork; Form of Mitigation | | | MITIGATION STREAM CLASS (watershed size {acrea | | | | | Comments: | Low water flow at time of survey. Unable to sample WVSCI |
| STREAM IMPACT LENGTH: | 26 | 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 (Del | oit) | Column No. 2- Mitigation Existing Co | ondition - Baseline (Credit) | | Column No. 3- Mitigation F Post Completi | | Years | Column No. 4- Mitigation Project Post Completion (C | | Column No. 5- Mitigation Proje | cted at Maturity (Credit) |
| Stream Classification: | Pere | nnial | Stream Classification: | Intermittent | | Stream Classification: | In | termittent | Stream Classification: | Intermittent | Stream Classification: | Intermittent |
| Percent Stream Channel Slo | ppe | 1 | Percent Stream Channel Slo | ре | | Percent Stream Channel | Slope | 0 | Percent Stream Channel Slo | pe 0 | Percent Stream Channel | Slope 0 |
| HGM Score (attach da | ata forms): | | HGM Score (attach o | lata forms): | | HGM Score (attac | h data forms): | | HGM Score (attach dat | ta forms): | HGM Score (attach | data forms): |
| | | Average | | Average | | | | Average | | Average | | Average |
| Hydrology | | | Hydrology | 1 | | Hydrology | 1 | | Hydrology | 1 | Hydrology | 1 |
| Biogeochemical Cycling | | 0 | Biogeochemical Cycling | 1 0 | | Biogeochemical Cycling | 1 | 0 | Biogeochemical Cycling | 1 0 | Biogeochemical Cycling | 1 0 |
| Habitat | | | Habitat | 1 | | Habitat | 1 | | Habitat | 1 | Habitat | 1 |
| PART I - Physical, Chemical and | Biological Indic | ators | PART I - Physical, Chemical and | Biological Indicators | | PART I - Physical, Chemical | and Biological I | ndicators | PART I - Physical, Chemical and B | Biological Indicators | PART I - Physical, Chemical ar | nd Biological Indicators |
| | Points Scale Range | Site Score | | Points Scale Range Site Score | | | Points Scale Rang | ge Site Score | | Points Scale Range Site Score | | Points Scale Range Site Score |
| PHYSICAL INDICATOR (Applies to all stream: | s classifications) | | PHYSICAL INDICATOR (Applies to all streams | classifications) | | PHYSICAL INDICATOR (Applies to all stream | ms classifications | | PHYSICAL INDICATOR (Applies to all streams | classifications) | PHYSICAL INDICATOR (Applies to all stream | ams 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) | |
| Epifaunal Substrate/Available Cover | 0-20 | 17 | Epifaunal Substrate/Available Cover | 0-20 0 | | Epifaunal Substrate/Available Cover | 0-20 | 0 | Epifaunal Substrate/Available Cover | 0-20 | Epifaunal Substrate/Available Cover | 0-20 |
| 2. Embeddedness | 0-20 | 10 | 2. Embeddedness | 0-20 | | 2. Embeddedness | 0-20 | 0 | 2. Embeddedness | 0-20 | 2. Embeddedness | 0-20 |
| 3. Velocity/ Depth Regime | 0-20 | 11 | 3. Velocity/ Depth Regime | 0-20 0 | | Velocity/ Depth Regime Sediment Deposition | 0-20 | 0 | Velocity/ Depth Regime Sediment Deposition | 0-20 0 0 | 3. Velocity/ Depth Regime | 0-20 |
| Sediment Deposition Channel Flow Status | 0-20 | 8 | Sediment Deposition Channel Flow Status | 0-20 0 0 | | 5. Channel Flow Status | 0-20 | 0 | Sediment Deposition Channel Flow Status | 0-20 0 0 | Sediment Deposition Channel Flow Status | 0-20 |
| 6. Channel Alteration | 0-20 0-20 0-1 | 15 | 6. Channel Alteration | 0-20 0-1 0 | | 6. Channel Alteration | 0-20 0-20 | 0 | 6. Channel Alteration | 0-20 0-1 0 | 6. Channel Alteration | 0-20 0-1 |
| 7. Frequency of Riffles (or bends) | 0-20 | 11 | 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 | 14 | 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 | 16 | 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 | 13 | 10. Riparian Vegetative Zone Width (LB & RB) | 0-20 0 | | 10. Riparian Vegetative Zone Width (LB & RB) | | 0 | 10. Riparian Vegetative Zone Width (LB & RB) | 0-20 | 10. Riparian Vegetative Zone Width (LB & RB) | |
| Total RBP Score | Suboptimal | 128 | Total RBP Score | Poor 0 | | Total RBP Score | Poor | 0 | Total RBP Score | Poor 0 | Total RBP Score | Poor 0 |
| Sub-Total | | 0.64 | Sub-Total | 0 | | Sub-Total | - | 0 | Sub-Total | 0 | Sub-Total | 0 |
| CHEMICAL INDICATOR (Applies to Intermitte | nt and Perennial S | treams) | CHEMICAL INDICATOR (Applies to Intermitten | t and Perennial Streams) | | CHEMICAL INDICATOR (Applies to Intermi | ttent and Perennia | Streams) | CHEMICAL INDICATOR (Applies to Intermitten | t and Perennial Streams) | CHEMICAL INDICATOR (Applies to Intermi | ttent and Perennial Streams) |
| WVDEP Water Quality Indicators (General |) | | WVDEP Water Quality Indicators (General) | | | WVDEP Water Quality Indicators (General | ral) | | WVDEP Water Quality Indicators (General) | | WVDEP Water Quality Indicators (Gene | ral) |
| Specific Conductivity | | | Specific Conductivity | 0 | | Specific Conductivity | | | Specific Conductivity | | Specific Conductivity | |
| 100-199 - 85 points | 0-90 | | | 0-90 | | | 0-90 | 0 | | 0-90 | | 0-90 |
| рн | 0-1 | | рн | 0-1 0 | | рн | 0- | 1 0 | рн | 0-1 0 | рн | 0-1 |
| 5.6-5.9 = 45 points | 0-80 | | | 5-90 | | | 5-90 | | | 5-90 | | 5-90 |
| DO | | 100 | DO | | | DO | | | DO | | DO | |
| | 10-30 | | | 10-30 | | | 10-30 | 0 | | 10-30 | | 10-30 |
| Sub-Total | | | Sub-Total | 0 | | Sub-Total | | 0 | Sub-Total | 0 | Sub-Total | |
| BIOLOGICAL INDICATOR (Applies to Intermit | ttent and Perennia | l Streams) | BIOLOGICAL INDICATOR (Applies to Intermitt | ent and Perennial Streams) | | BIOLOGICAL INDICATOR (Applies to Inte | rmittent and Pere | | BIOLOGICAL INDICATOR (Applies to Intermi | ttent and Perennial Streams) | BIOLOGICAL INDICATOR (Applies to Inte | ermittent 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) | |
| TVV Gardan Gorialatin mack (VVGG) | | 66.0 | TV Cucam Condition mack (VVCCI) | 0 100 | | TVV Gudan Condition mack (VVCC) | 0.400 | . 0 | WY Gueam Condition mack (WYCO) | 0-100 0-1 0 | WW Caream Condition mack (WVCO) | 0.400 |
| Grey Zone | 0-100 0-1 | 66.9 | | 0-100 0-1 | | | 0-100 0- | | | 0-100 0-1 | | 0-100 0-1 |
| Sub-Total | | 0.669 | Sub-Total | 0 | | Sub-Total | | 0 | Sub-Total | 0 | Sub-Total | 0 |
| PART II - Index and U | nit Score | | PART II - Index and | Jnit Score | | PART II - Index ar | nd Unit Score | | PART II - Index and Un | it Score | PART II - Index and | Unit Score |
| | | | | | | | | | | | | |
| Index | Linear Feet | Unit Score | Index | Linear Feet Unit Score | | Index | Linear Fee | t Unit Score | Index | Linear Feet Unit Score | Index | Linear Feet Unit Score |
| 0.703 | 26 | 18.278 | 0 | 0 0 | | 0 | 0 | 0 | 0 | 0 0 | 0 | 0 0 |

| | | (See instruction pa | | - Impact Factors It values for MITIGATIO | ON BANKING and I | LF) | | | |
|---|-----------------------------------|---|-----------------------|---|---------------------------|---|--|---------------------------------------|------------|
| Temn | oral Loss-Construction | (111 1111) | 9 | | | <u> </u> | -term Protection | | |
| *Note: Reflects duration of aquatic function | | n impact (debit) and completion of | | | % Add. Mitigation | on and Monitoring Period | | Term Protection (Years) | |
| сотре | ensatory mitigation (credit). | | | | | <u> </u> | | , , , , , , , , , , , , , , , , , , , | |
| | | | | | | | | | |
| Years Sub-Total | | 0 | | | | | | | |
| Sub-Total | | · · | | | | | | | |
| Tel | mporal Loss-Maturity | | | | 0 + 5/ | 10 Year Monitoring | | 101 | |
| *Note: Period between completion of compensate | ory mitigation measures and the | | | | Sub-Total | Ç | | 0 | |
| to function (i.e. maturity of tree stratum to provide | _ | within riparian stream or wetland buffer | | | | | | | |
| | corridor). | | | | | PART IV - Index | to Unit Score Con | nversion | |
| | | | | | Final Index Score | Linear Feet | Unit Score | ILF Costs | |
| % Add. Mitigation | | Temporal Loss-Maturity (Years) | | | (Debit) | | (Debit) | (Offsetting Debit | t Units) |
| | | | | | 0.703 | 26 | 18.278 | \$14,622.40 | 0 |
| | | | | | | | | | |
| | | | | | | | | | |
| 0% | | 0 | | | | | | | |
| Sub-Total | | 0 | | | | | | | |
| | | | | | | | | | |
| | | PART V | - Comparison of U | nit Scores and Projecte | ed Balance | | | | |
| | | ., | | | | | | | |
| | | | | Mitigation Projected at | | | | | |
| Final Unit Score (Debit) | | Mitigation Existing | | Five Years | | Mitigation Projected at | | Mitigation Projected | |
| [No Net Loss Value] | 18.278 | Condition - Baseline | | Post Completion | | Ten Years | | At Maturity | |
| [110,1100,2000,1100,1 | | (Credit) | | (Credit) | | Post Completion (Credit) | | (Credit) | |
| | | | | ` ′ | | | | | |
| FINAL PROJECTED NET BALANCE | | | | | 0 | | 0 | | 0 |
| | | | | | | | | | |
| | | Р | art VI - Mitigation (| Considerations (Incenti | ives) | | | | |
| | | | _ | · | | | | | |
| | Extent of Stream Re | storation | | | | | | | |
| *Note1: Reference the Instruction | | orrect Restoration Levels (below) for your pr | oiect | | | | Upland Buffer Zone | | |
| | Place an "X" in the appropriate | | -1 | | *Note1: Reference | ce Instructional handout for the def | | | es (below) |
| Parts and and an I amed 4 | | | | | | *Note ² : Enter the buffer width for | each channel side (Left ne appropriate mitigation | | |
| Restoration Level 1 | | | | | | Note : Geleet ti | ie appropriate magation | турс | |
| Restoration Level 2 | | | | | | | Left Bank | , | |
| | | | | | Buffer Width | | Leit Dallk | | |
| Restoration Level 3 | | | | | | 0-50 | | None | |
| | ! | | | 1 | | 51-150 | | None | |
| | | | | | Buffer Width | | Right Ban | | |
| | | | | 1 | | 0-50 | | None | |
| Compensatory Mitigation Plan incorports *Note: HUC 12-based watershed | | | No | | Avoraga Duffer | 51-150 | | None | |
| "Note: HUC 12-based watershed | approach required to obtain Strea | IIII Nestoration incentive | NO | I | Average Buffer Width/Side | 0 | | | |
| | | | | 1 | width/Side | | | | |
| | Impact | | | | | | Stra | ight Preservation Ratio | |
| Site | Site Unit Yield (Debit) | | | | | | Julia | (v2.1, Sept 2015) | |
| ome nou (posit) | | | Yield (Credit) | | | | | | |
| S-I63 | | 18.278 | #DIV/0! | | | Final Mitigation Unit Yield | | | |
| | | | | | | | | | |
| | | | | | | #DIV/0! | | | |

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

| STREAM NAME S-163 | LOCATION Lewis County | /, WV | | |
|---|----------------------------------|-------------------------------------|--|--|
| STATION # RIVERMILE | STREAM CLASS Perennia | I | | |
| LAT <u>38.969302°</u> LONG <u>-80.593172°</u> | RIVER BASIN Headwaters Sand Fork | | | |
| STORET# | AGENCY Tetra Tech | | | |
| INVESTIGATORS C. Vileno, J. Bittner | | | | |
| FORM COMPLETED BY C. Vileno, J. Bittner | DATE 09/07/2016 TIME 1:00 | REASON FOR SURVEY Proposed pipeline | | |

| | Habitat | | Condition | ı Category | | | |
|--|---|---|---|---|---|--|--|
| | Parameter | Optimal | Suboptimal | Marginal | Poor | | |
| | 1. Epifaunal Substrate/ Available Cover | Greater than 50% 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). | 30-50% 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). | 10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed. | Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking. | | |
| each | SCORE 17 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| Parameters to be evaluated in sampling reach | 2. Pool Substrate Characterization | Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common. | Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present. | All mud or clay or sand bottom; little or no root mat; no submerged vegetation. | Hard-pan clay or bedrock; no root mat or vegetation. | | |
| uate | SCORE 10 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| rs to be eval | 3. Pool Variability | Even mix of large- shallow, large-deep, small-shallow, small-deep pools present. | Majority of pools large-deep; very few shallow. | Shallow pools much more prevalent than deep pools. | Majority of pools small- shallow or pools absent. | | |
| mete | SCORE 11 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| Para | 4. Sediment Deposition | Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition. | Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools. | Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% 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 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition. | | |
| | SCORE 13 | 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 8 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |

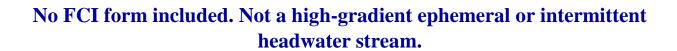
HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (BACK)

| | Habitat | | Condition | Category | | | |
|--|--|--|--|---|---|--|--|
| | Parameter | 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 15 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| npling reach | 7. Channel Sinuosity | The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.) | The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line. | The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line. | Channel straight; waterway has been channelized for a long distance. | | |
| san | score 11 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| Parameters to be evaluated broader than sampling reach | 8. Bank Stability (score each bank) | 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. | | |
| e eva | SCORE 7 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |
| to be | SCORE 7 (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |
| Parameters | 9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream. | 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 8 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |
| | SCORE 8 (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 $\frac{5}{2}$ (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |
| | SCORE 8 (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |

Total Score 128

| Insects | Count | Tolerance | TV | Insects | Count | Tolerance | TV | Non-Insects | Count | Tolerance | TV | 1 | |
|-------------------|----------------|---------------|-----|------------------|-------|-----------|----|-----------------|---------------|-----------|--------------|--------------------|-------|
| Ephemeroptera | | • | 10 | Odonata | | | 2 | Crustacea | | | 0 | 1 | |
| Ameletidae | | 2 | 0 | Aeshnidae | | 3 | 0 | Asellidae | | 7 | 0 | 1 | |
| Baetidae | | 4 | 0 | Calopterygidae | | 6 | 0 | Cambaridae | | 5 | 0 | 1 | |
| Beatiscidae | | 4 | 0 | Coenagrionidae | | 7 | 0 | Gammaridae | | 5 | 0 | 1 | |
| Caenidae | 1 | 5 | 5 | Cordulegastridae | | 3 | 0 | Palaemonidae | | 5 | 0 | 1 | |
| Ephemerellidae | | 3 | 0 | Gomphidae | 2 | 5 | 10 | Annelida | | | 0 | | |
| Ephemeridae | 3 | 5 | 15 | Lestidae | | 7 | 0 | Hirudinea | | 10 | 0 | | |
| Heptageniidae | 5 | 3 | 15 | Libellulidae | | 7 | 0 | Nematoda | | 10 | 0 | | |
| Isonychiidae | | 3 | 0 | Coleoptera | | | 1 | Nematomorpha | | 10 | 0 | | |
| Leptophlebiidae | | 4 | 0 | Chrysomelidae | | 7 | 0 | Oligochaeta | | 10 | 0 | | |
| Potamanthidae | | 5 | 0 | Dryopidae | | 5 | 0 | Turbellaria | | | 0 | | |
| Siphlonuridae | 1 | 3 | 3 | Dytiscidae | | 6 | 0 | Turbellaria | | 7 | 0 | | |
| Tricorythidae | | 5 | 0 | Elmidae | | 4 | 0 | Bivalvia | | | 0 | | |
| Plecoptera | | | 0 | Gyrinidae | | 5 | 0 | Corbiculidae | | 6 | 0 | | |
| Capniidae | | 2 | 0 | Haliplidae | | 7 | 0 | Sphaeriidae | | 5 | 0 | | |
| Chloroperlidae | | 2 | 0 | Hydrophilidae | | 7 | 0 | Unionidae | | 4 | 0 | | |
| Leuctridae | | 2 | 0 | Psephenidae | 1 | 3 | 3 | Gastropoda | | | 0 | | |
| Nemouridae | | 2 | 0 | Ptilodactylidae | | 5 | 0 | Ancylidae | | 7 | 0 | | |
| Peltoperlidae | | 1 | 0 | Hemiptera | - | - | 0 | Hydrobiidae | | 4 | 0 | | |
| Perlidae | | 1 | 0 | Belostomatidae | | 8 | 0 | Physidae | | 7 | 0 | | |
| Perlodidae | | 1 | 0 | Corixidae | | 8 | 0 | Planorbidae | | 5 | 0 | | |
| Pteronarcyidae | | 1 | 0 | Gerridae | | 10 | 0 | Pleuroceridae | | 5 | 0 | | |
| Taeniopterygidae | | 2 | 0 | Hydrometridae | | 8 | 0 | Viviparidae | | 5 | 0 | | |
| Trichoptera | | | 0 | Nepidae | | 8 | 0 | Miscellaneous | | | 0 | | |
| Brachycentridae | | 2 | 0 | Notonectidae | | 8 | 0 | Collembola | | 6 | 0 | | |
| Glossosomatidae | | 2 | 0 | Megaloptera | | | 0 | Lepidoptera | | 5 | 0 | | |
| Helicopsychidae | | 3 | 0 | Corydalidae | | 3 | 0 | Neuroptera | | 5 | 0 | | |
| Hydropsychidae | | 5 | 0 | Sialidae | | 6 | 0 | Hydrachnidae | | 6 | 0 | | |
| Hydroptilidae | | 3 | 0 | Diptera | | | 2 | Totals | Totalı | number | 15 | | |
| Lepidostomatidae | | 3 | 0 | Athericidae | | 3 | 0 | Totals | Total f | amilies | 8 | | |
| Leptoceridae | | 3 | 0 | Blephariceridae | | 2 | 0 | | | Metric | calculations | | |
| Limnephilidae | | 4 | 0 | Ceratopogonidae | | 8 | 0 | | Richnes | SS | | Additional metri | cs |
| Molannidae | | 3 | 0 | Chironomidae | | 9 | 0 | Total Taxa | | 8 | 36.4 | Ephemeroptera Taxa | 4 |
| Philopotamidae | | 4 | 0 | Culicidae | | 10 | 0 | EPT Taxa | | 4 | 30.8 | Plecoptera Taxa | 0 |
| Phryganeidae | | 4 | 0 | Dixidae | | 6 | 0 | | Toleran | ce | | Trichoptera Taxa | 0 |
| Polycentropodidae | | 5 | 0 | Empididae | | 7 | 0 | Biotic Index | | 4.27 | 81.9 | Long-lived Taxa | 3 |
| Psychomiidae | | 3 | 0 | Psychodidae | 1 | 8 | 8 | % Tolerant | | 6.7 | 95.2 | Odonata Taxa | 1 |
| Rhyacophilidae | | 3 | 0 | Ptychopteridae | | 8 | 0 | | Composit | ion | | Diptera Taxa | 2 |
| Uenoidae | | 2 | 0 | Simuliidae | | 6 | 0 | % EPT Abundance | | 66.7 | 74.1 | COET Taxa | 6 |
| | Total To | lerance Value | 64 | Stratiomyidae | | 10 | 0 | % Dominance | | 33.3 | 83.3 | % Sensitive | 46.7 |
| West Vi | irginia Save O | ur Streams | | Syrphidae | | 10 | 0 | % Net-spinners | | 0.0 | NA | % Chironomidae | 0.0 |
| 601 57th Stre | et, SE, Charle | eston WV 253 | 304 | Tabanidae | | 7 | 0 | Stream | Condition Ind | ex | 66.9 | % Clingers | 40.0 |
| http:/ | /www.dep.w | v.gov/sos | | Tipulidae | 1 | 5 | 5 | Integrity R | ating | Subo | ptimal | More diversity mea | sures |

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.



S-UV11



Photograph Direction SW

Comments:

| STREAM ID | S-UV11 | | STREAM NA | AME Oil Cre | eek | | | |
|---|-----------|---|------------------------------------|------------------|--|-----------------------------------|--|--|
| CLIENT EQ | | | PROJECT N | | | | | |
| LAT 38.89314 | | ONG -80.555856 | | | COUNTY Lewis | | | |
| INVESTIGATO | ORS C. St | oliker J. Niergartl | h L. McCarrell | | | | | |
| WATER TYPE | | NRPW | FLOW REG Perennial | | ittent Ephemeral | | | |
| | | Estimate Mea | suraments | | Sinuosity & Low | Medium High | | |
| CHANNEL FE | ATURES | Top of Bank W Top of Bank H LB <u>10.0</u> ft Water Depth: _ Water Width: _ Ordinary High | /idth:30.0ft eight: | <u>15.0</u> _ft | Gradient <u>✓</u> FlatMo | nelized <u>~</u> No | | |
| FLOW CHARACTER | ISTICS | Stream bed Standing water Flowing water | ream bed dry moist ater | | Proportion of Reach Represented by Stream Morphology Types (Only enter if water present) Riffle 25 % Run 25 % Pool 50 % Turbidity ClearSlightly turbidTurbid Other | | | |
| INOR | _ | JBSTRATE CON | | | ORGANIC SUBSTRATE COM (does not necessarily add u | - | | |
| Substrate Type | , | meter | % Composition in Sampling Reach | Substrat Type | · · | % Composition in Sampling Area | | |
| Bedrock | | | | Dotrituo | sticks, wood, coarse | | | |
| Boulder | > 25 | 56 mm (10") | 20 | Detritus | plant materials (CPOM) | 5 | | |
| Cobble | 64-256 | mm (2.5"-10") | 50 | Muck-Muc | black, very fine organic | | | |
| Gravel | 2-64 r | nm (0.1"-2.5") | 25 | WIUCK-WIUC | (FPOM) | | | |
| Sand | 0.06 | -2mm (gritty) | 5 | | | | | |
| Silt | 0.00 | 4-0.06 mm | | Marl | grey, shell fragments | | | |
| Clay | < 0.00 | 4 mm (slick) | | | | | | |
| WATERSHED FEATURES | | Predominant ✓ Forest — Field/Pastu — Agricultura — ROW Canopy Cove — Open ✓ Shaded | Residentia Other: | al | Floodplain Width Wide > 30ft Modera Narrow <15ft | ate 15-30ft | | |
| | | | | | | | | |
| MAC | ROINVER | TEBRATES/OTH | HER WILDLIFE OBS | SERVED OR | OTHER NOTES AND OBSER | RVATIONS | | |
| Observed crayfish, small fish, and other macroinvertebrates within stream | | | | | | | | |

| USACE FILE NO./ Project Name: (v2.1, Sept 2015) | | Mour | ntain Valley SWVN | Pipeline Project I v2.1 | | COORDINATES: cimal Degrees) | Lat. | 38.892980° | Lon. | -80.556210° | | WEATHER: | | | DATE: | 8/10/2 | 2015 |
|---|---------------------|-------------------|----------------------|--|----------------------|--------------------------------|------|--|-------------------------|---------------|-------|---|-------------------------|---------------|---|------------------------|---------------|
| IMPACT STREAM/SITE ID (watershed size {acreage} | | | | S-UV1 Form of Mitigat | 1; Oil Creek | Bank | | MITIGATION STREAM CLASS. (watershed size {acreag | | | i: | | | | Comments: | | |
| STREAM IMPACT LENGTH: | 25 | FORM MITIGAT | | RESTORATION (Levels I-III) | | OORDINATES: cimal Degrees) | Lat. | | Lon. | | | PRECIPITATION PAST 48 HRS: | | | Mitigation Length: | | |
| Column No. 1- Impact Existin | ng Condition (De | ebit) | | Column No. 2- Mitigation Existing | Condition - Base | eline (Credit) | | Column No. 3- Mitigation Projected at Five Years Post Completion (Credit) | | | Ĺ | Column No. 4- Mitigation Projected at Ten Years Post Completion (Credit) | | | Column No. 5- Mitigation Projected at Maturity (Credit) | | |
| Stream Classification: | Per | ennial | S | tream Classification: | Inte | ermittent | | Stream Classification: | Inte | ermittent | | Stream Classification: | Intern | nittent | Stream Classification: | Intermi | ittent |
| Percent Stream Channel S | <u> </u> | 7 | | Percent Stream Channel S | <u> </u> | | | Percent Stream Channel S | | 0 | | Percent Stream Channel S | <u> </u> | 0 | Percent Stream Channel Sto | <u> </u> | 0 |
| HGM Score (attach o | data forms): | | | HGM Score (attack | n data forms): | | | HGM Score (attack | h data forms): | | | HGM Score (attach data forms): | | | HGM Score (attach da | a forms): | |
| II. daylara | | Average | | hada da sa | 4 | Average | | II. deele le me | 4 | Average | | Harder Laws | - | Average | The desired of the second | 4 | Average |
| Hydrology Biogeochemical Cycling | | 0 | | lydrology Biogeochemical Cycling | 1 | 0 | | Hydrology Biogeochemical Cycling | 1 | 0 | | Hydrology Biogeochemical Cycling | 1 | 0 | Hydrology Biogeochemical Cycling | 1 | 0 |
| Habitat PART I - Physical, Chemical and | d Biological Indi | cators | F | PART I - Physical, Chemical a | and Biological Inc | dicators | | Habitat PART I - Physical, Chemical a | 1 and Biological Inc | dicators | | Habitat PART I - Physical, Chemical and | 1 I Biological Indic | cators | Habitat PART I - Physical, Chemical and I | 1 Biological Indica | ators |
| | 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 stream | ms classifications) | | P | HYSICAL INDICATOR (Applies to all strea | ns classifications) | | | PHYSICAL INDICATOR (Applies to all stream | ms classifications) | | | PHYSICAL INDICATOR (Applies to all stream | ns classifications) | | PHYSICAL INDICATOR (Applies to all streams | classifications) | |
| USEPA RBP (Low Gradient Data Sheet) | | | | SEPA RBP (High Gradient Data Sheet) | | | | USEPA RBP (High Gradient Data Sheet) | | | | USEPA RBP (High Gradient Data Sheet) | | | USEPA RBP (High Gradient Data Sheet) | | |
| Epifaunal Substrate/Available Cover Pool Substrate Characterization | 0-20 | 17 15 | - ⊩ | . Epifaunal Substrate/Available Cover . Embeddedness | 0-20 | 0 | | Epifaunal Substrate/Available Cover Embeddedness | 0-20 | 0 | I II- | Epifaunal Substrate/Available Cover Embeddedness | 0-20 | 0 | Epifaunal Substrate/Available Cover Embeddedness | 0-20 | |
| 3. Pool Variability | 0-20 | 15 | II- | . Velocity/ Depth Regime | 0-20 | 0 | | Velocity/ Depth Regime | 0-20 | 0 | - | Velocity/ Depth Regime | 0-20 | 0 | Velocity/ Depth Regime | 0-20 | |
| 4. Sediment Deposition | 0-20 | 13 | | . Sediment Deposition | 0-20 | 0 | | 4. Sediment Deposition | 0-20 | 0 | | Sediment Deposition | 0-20 | 0 | 4. Sediment Deposition | 0-20 | |
| 5. Channel Flow Status | 0-20 | 5 | 5 | . Channel Flow Status | 0-20 | 0 | | 5. Channel Flow Status | 0-20 | 0 | I II- | 5. Channel Flow Status | 0-20 | 0 | 5. Channel Flow Status | 0-20 | |
| 6. Channel Alteration | 0-20 | 17 | 6 | . Channel Alteration | 0-20 0-1 | 0 | | 6. Channel Alteration | 0-20 | 0 | | 6. Channel Alteration | 0-20 | 0 | 6. Channel Alteration | 0-20 | |
| 7. Channel Sinuosity | 0-20 | 14 | 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 | 16 | II- | . Bank Stability (LB & RB) | 0-20 | 0 | | 8. Bank Stability (LB & RB) | 0-20 | 0 | I 11- | 8. Bank Stability (LB & RB) | 0-20 | 0 | 8. Bank Stability (LB & RB) | 0-20 | |
| 9. Vegetative Protection (LB & RB) | 0-20 | 15 | 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) | | 16 | | Riparian Vegetative Zone Width (LB & RB) | | 0 | | 10. Riparian Vegetative Zone Width (LB & RB) | | 0 | | 10. Riparian Vegetative Zone Width (LB & RB) | | 0 | 10. Riparian Vegetative Zone Width (LB & RB) | 0-20 | |
| Total RBP Score | Suboptimal | 143 | II- | otal RBP Score | Poor | 0 | | Total RBP Score | Poor | 0 | ⊩ | Total RBP Score | Poor | 0 | Total RBP Score | Poor | 0 |
| Sub-Total CHEMICAL INDICATOR (Applies to Intermitt | tent and Perennial | 0.715 Streams) | | sub-Total CHEMICAL INDICATOR (Applies to Intermit | ent and Perennial S | O Streams) | | Sub-Total CHEMICAL INDICATOR (Applies to Intermit | tent and Perennial S | 0 Streams) | l li | Sub-Total CHEMICAL INDICATOR (Applies to Intermitte | ent and Perennial S | O Streams) | Sub-Total CHEMICAL INDICATOR (Applies to Intermitter | nt and Perennial St | O Streams) |
| WVDEP Water Quality Indicators (General | | outcums) | | VVDEP Water Quality Indicators (Gener | | ou cama) | | WVDEP Water Quality Indicators (General | | Succinity . | | WVDEP Water Quality Indicators (Genera | | ou cums) | WVDEP Water Quality Indicators (General) | | reams) |
| Specific Conductivity | | | | pecific Conductivity | | 0 | | Specific Conductivity | | | | Specific Conductivity | | | Specific Conductivity | | |
| <=99 - 90 points | 0-90 | 0.191 | | | 0-90 | 0 | | | 0-90 | 0 | | | 0-90 | 0 | | 0-90 | |
| pH | 0-80 | 7.63 | P | H | 5-90 0-1 | 0 | | pH | 5-90 0-1 | 0 | ľ | pH | 5-90 0-1 | 0 | pH | 5-90 0-1 | |
| 6.0-8.0 = 80 points | 0-00 | 7.03 | | 00 | 3-30 | | | DO | 5-50 | | l | DO | 3-30 | | DO | 3-30 | |
| >5.0 = 30 points | 10-30 | 98.5 | | | 10-30 | 0 | | | 10-30 | 0 | | | 10-30 | 0 | | 10-30 | |
| Sub-Total | | 1 | | ub-Total | | 0 | | Sub-Total | | 0 | | Sub-Total | | 0 | Sub-Total | | 0 |
| BIOLOGICAL INDICATOR (Applies to Interm | nittent and Perenni | al Streams) | | BIOLOGICAL INDICATOR (Applies to Interr | nittent and Perennia | al Streams) | | BIOLOGICAL INDICATOR (Applies to Inter | rmittent and Pereni | nial Streams) | | BIOLOGICAL INDICATOR (Applies to Inter | mittent and Peren | nial Streams) | BIOLOGICAL INDICATOR (Applies to Interm | ttent and Perenni | ial Streams) |
| WV Stream Condition Index (WVSCI) | 0-100 0-1 | 55.9 | <u> </u> | W Stream Condition Index (WVSCI) | 0-100 0-1 | 0 | | WV Stream Condition Index (WVSCI) | 0-100 0-1 | 0 | ľ | WV Stream Condition Index (WVSCI) | 0-100 0-1 | 0 | WV Stream Condition Index (WVSCI) | 0-100 0-1 | |
| Fair Sub-Total | 0-100 | 0.459 | s | sub-Total | 0-100 0-1 | 0 | | Sub-Total | 0-100 0-1 | 0 | | Sub-Total | 0-100 0-1 | 0 | Sub-Total | 0-100 0-1 | 0 |
| <u> </u> | | | | | | | L | 1 | | | · E | , | | | <u>u</u> | | |
| PART II - Index and | Unit Score | | | PART II - Index an | d Unit Score | | | PART II - Index an | d Unit Score | | | PART II - Index and U | Jnit Score | | PART II - Index and Ui | it 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 |
| 0.725 | 25 | 18.1166667 | | 0 | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |

| | | (See instruction p | | - Impact Factors ilt values for MITIGATIO | N BANKING and IL | _F) | | | |
|--|-----------------------------------|---|------------------------|--|-------------------|---|---------------------------|-------------------------|-----------|
| Temp | oral Loss-Construction | | | | | Long | term Protection | | |
| *Note: Reflects duration of aquatic function | | n impact (debit) and completion of | | | % Add. Mitigation | on and Monitoring Period | | Term Protection (Years) | |
| | ensatory mitigation (credit). | , | | | J | | 209 | Tomi Trottodion (Touro) | |
| | | | | | | | | | |
| Years | | 0 | | | | | | | |
| Sub-Total | | 0 | | | | | | | |
| | | | | | | | | | |
| | nporal Loss-Maturity | | | | | 10 Year Monitoring | | 101 | |
| *Note: Period between completion of compensato | ry mitigation measures and t | he time required for maturity, as it relates | | | Sub-Total | | | 0 | |
| to function (i.e. maturity of tree stratum to provid | | within riparian stream or wetland buffer | | | | | | | |
| | corridor). | | | | | PART IV - Index | to Unit Score Con | version | |
| | | | | | Final Index Score | Linear Feet | Unit Score | ILF Costs | |
| % Add. Mitigation | | Temporal Loss-Maturity (Years) | | | (Debit) | | (Debit) | (Offsetting Debit | Units) |
| - | | | | | 0.724666667 | 25 | 18.11666667 | \$14,493.33 | |
| | | | | | 0.724000007 | 25 | 10.11000007 | \$14,493.55 | ' |
| | | | | | | | | | |
| | | | | | | | | | |
| 0% | | 0 | | | | | | | |
| Sub-Total | | 0 | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | PART V | /- Comparison of U | nit Scores and Projecte | d Balance | | | | |
| | | | | Mitigation Projected at | | | | | |
| Final Unit Score (Debit) | | Mitigation Existing | | Five Years | | Mitigation Projected at | | Mitigation Projected | |
| [No Net Loss Value] | 18.11666667 | Condition - Baseline | | Post Completion | | Ten Years | | At Maturity | |
| [NO Net Loss Value] | | (Credit) | | (Credit) | | Post Completion (Credit) | | (Credit) | |
| | | | | (Orealt) | | | | | |
| FINAL PROJECTED NET BALANCE | | | | | | | | | |
| THALT ROOLOTED HET BALANCE | | | | | 0 | | 0 | | 0 |
| | | | | | | | | | |
| | | F | Part VI - Mitigation (| Considerations (Incentiv | /es) | | | | |
| | Extent of Stream Re | storation | | | | | | | |
| *Note1: Peference the Instruction | | orrect Restoration Levels (below) for your pr | rolant | | | Extended | Upland Buffer Zone | 9 | |
| | lace an "X" in the appropriate | | oject | | *Note1: Referen | ce Instructional handout for the def | | | s (below) |
| | | | | | | *Note ² : Enter the buffer width for | | | |
| Restoration Level 1 | | | | | | *Note ³ : Select th | ne appropriate mitigation | type | |
| | | | | | | | | | |
| Restoration Level 2 | | | | | Buffer Width | | Left Bank | í | |
| Restoration Level 3 | | | | | | 0.50 | | None | |
| | | | | j | | 0-50 | | None | |
| | | | | | D # | 51-150 | F F | None | |
| | | | | | Buffer Width | 0-50 | Right Ban | | |
| Commence Middle District | | on the discourage of the control of | | 1 | | 51-150 | | None None | |
| Compensatory Mitigation Plan incorpo *Note: HUC 12-based watershed a | rates HUC 12-based wate | rsneu approacn? (Yes or No) | No | | Average Buffer | | | None | |
| Note. HOC 12-based watershed a | approach required to obtain Strea | in Nestoration incentive | NO | ı | Width/Side | 0 | | | |
| | | | | 1 | | | | | |
| Site | | Impact | Mitigation Unit | | | | Strai | ight Preservation Ratio | |
| Site | | Unit Yield (Debit) | Yield (Credit) | | | | | (v2.1, Sept 2015) | |
| | | | | | | | | | |
| S-UV11 | | 18.11666667 | #DIV/0! | | | Final Mitigation Unit Yield | | | |
| | | 10.1100001 | #DIVIO | | | | | | |
| · | | · · | | | | #DIV/0! | | | |
| | | | | | | | | | |

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

| STREAM NAME S-UV11 | LOCATION Lewis County | v, WV | | |
|---|--------------------------------|-------------------------------------|--|--|
| STATION # RIVERMILE | STREAM CLASS Perennia | l | | |
| LAT <u>38.892980°</u> LONG <u>-80.556210°</u> | RIVER BASIN Oil Creek | | | |
| STORET# | AGENCY Tetra Tech | | | |
| INVESTIGATORS J. Bittner, C.Vileno | | | | |
| FORM COMPLETED BY J. Bittner | DATE _09/06/2016 TIME 14:40 | REASON FOR SURVEY Proposed pipeline | | |

| | Habitat | | Condition | Category | | | |
|--|---|---|---|---|---|--|--|
| | Parameter | Optimal | Suboptimal | Marginal | Poor | | |
| | 1. Epifaunal Substrate/ Available Cover | Greater than 50% 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). | 30-50% 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). | 10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed. | Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking. | | |
| each | SCORE 17 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| Parameters to be evaluated in sampling reach | 2. Pool Substrate Characterization | Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common. | Hard-pan clay or bedrock; no root mat or vegetation. | | | | |
| uated | SCORE 15 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| rs to be eval | 3. Pool Variability | Even mix of large- shallow, large-deep, small-shallow, small-deep pools present. | Majority of pools large-deep; very few shallow. | Shallow pools much more prevalent than deep pools. | Majority of pools small-shallow or pools absent. | | |
| mete | SCORE 15 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| Para | 4. Sediment Deposition | Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition. | Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools. | Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% 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 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition. | | |
| | SCORE 13 | 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 5 | 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—LOW GRADIENT STREAMS (BACK)

| | Habitat | | Condition | Category | | | |
|--|--|--|--|---|---|--|--|
| | Parameter | 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 17 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| pling reach | 7. Channel Sinuosity | The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.) | The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line. | The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line. | Channel straight; waterway has been channelized for a long distance. | | |
| sam | SCORE 14 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| Parameters to be evaluated broader than sampling reach | 8. Bank Stability (score each bank) | 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. | | |
| eva | SCORE 7 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |
| to be | SCORE 9 (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |
| Parameters | 9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream. | 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 6 (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 | | |
| | 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 8 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |
| | SCORE 8 (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |

Total Score 143

| Insects | Count | Tolerance | TV | Insects | Count | Tolerance | TV | Non-Insects | Count | Tolerance | TV | 1 | |
|-------------------|----------------|---------------|-----|------------------|-------|-----------|----|---------------------------|---------------|-----------|--------------|---------------------|-------|
| Ephemeroptera | • | | 64 | Odonata | • | • | 5 | Crustacea | | • | 10 | 1 | |
| Ameletidae | | 2 | 0 | Aeshnidae | 4 | 3 | 12 | Asellidae | | 7 | 0 | 1 | |
| Baetidae | | 4 | 0 | Calopterygidae | 1 | 6 | 6 | Cambaridae | 10 | 5 | 50 | 1 | |
| Beatiscidae | | 4 | 0 | Coenagrionidae | | 7 | 0 | Gammaridae | | 5 | 0 | 1 | |
| Caenidae | | 5 | 0 | Cordulegastridae | | 3 | 0 | Palaemonidae | | 5 | 0 |] | |
| Ephemerellidae | | 3 | 0 | Gomphidae | | 5 | 0 | Annelida | | | 0 | | |
| Ephemeridae | | 5 | 0 | Lestidae | | 7 | 0 | Hirudinea | | 10 | 0 | | |
| Heptageniidae | 64 | 3 | 192 | Libellulidae | | 7 | 0 | Nematoda | | 10 | 0 | | |
| Isonychiidae | | 3 | 0 | Coleoptera | | | 0 | Nematomorpha | | 10 | 0 | | |
| Leptophlebiidae | | 4 | 0 | Chrysomelidae | | 7 | 0 | Oligochaeta | | 10 | 0 | | |
| Potamanthidae | | 5 | 0 | Dryopidae | | 5 | 0 | Turbellaria | | | 0 | | |
| Siphlonuridae | | 3 | 0 | Dytiscidae | | 6 | 0 | Turbellaria | | 7 | 0 | | |
| Tricorythidae | | 5 | 0 | Elmidae | | 4 | 0 | Bivalvia | | | 0 | | |
| Plecoptera | | | 0 | Gyrinidae | | 5 | 0 | Corbiculidae | | 6 | 0 | | |
| Capniidae | | 2 | 0 | Haliplidae | | 7 | 0 | Sphaeriidae | | 5 | 0 | | |
| Chloroperlidae | | 2 | 0 | Hydrophilidae | | 7 | 0 | Unionidae | | 4 | 0 | | |
| Leuctridae | | 2 | 0 | Psephenidae | | 3 | 0 | Gastropoda | - | | 0 | | |
| Nemouridae | | 2 | 0 | Ptilodactylidae | | 5 | 0 | Ancylidae | | 7 | 0 | | |
| Peltoperlidae | | 1 | 0 | Hemiptera | | | 0 | Hydrobiidae | | 4 | 0 | | |
| Perlidae | | 1 | 0 | Belostomatidae | | 8 | 0 | Physidae | | 7 | 0 | | |
| Perlodidae | | 1 | 0 | Corixidae | | 8 | 0 | Planorbidae | | 5 | 0 | | |
| Pteronarcyidae | | 1 | 0 | Gerridae | | 10 | 0 | Pleuroceridae | | 5 | 0 | | |
| Taeniopterygidae | | 2 | 0 | Hydrometridae | | 8 | 0 | Viviparidae | | 5 | 0 | | |
| Trichoptera | | | 0 | Nepidae | | 8 | 0 | Miscellaneous | | | 0 | | |
| Brachycentridae | | 2 | 0 | Notonectidae | | 8 | 0 | Collembola | | 6 | 0 | | |
| Glossosomatidae | | 2 | 0 | Megaloptera | | | 0 | Lepidoptera | | 5 | 0 | | |
| Helicopsychidae | | 3 | 0 | Corydalidae | | 3 | 0 | Neuroptera | | 5 | 0 | | |
| Hydropsychidae | | 5 | 0 | Sialidae | | 6 | 0 | Hydrachnidae | | 6 | 0 | | |
| Hydroptilidae | | 3 | 0 | Diptera | | | 0 | Totals | | number | 79 | | |
| Lepidostomatidae | | 3 | 0 | Athericidae | | 3 | 0 | Totals | Total f | amilies | 4 | | |
| Leptoceridae | | 3 | 0 | Blephariceridae | | 2 | 0 | | | | calculations | | |
| Limnephilidae | | 4 | 0 | Ceratopogonidae | | 8 | 0 | | Richnes | S | | Additional metri | cs |
| Molannidae | | 3 | 0 | Chironomidae | | 9 | 0 | Total Taxa | | 4 | 18.2 | Ephemeroptera Taxa | 1 |
| Philopotamidae | | 4 | 0 | Culicidae | | 10 | 0 | EPT Taxa | | 1 | 7.7 | Plecoptera Taxa | 0 |
| Phryganeidae | | 4 | 0 | Dixidae | | 6 | 0 | | Toleran | | | Trichoptera Taxa | 0 |
| Polycentropodidae | | 5 | 0 | Empididae | | 7 | 0 | Biotic Index | | 3.29 | 95.8 | Long-lived Taxa | 3 |
| Psychomiidae | | 3 | 0 | Psychodidae | | 8 | 0 | % Tolerant | | 0.0 | 100.0 | Odonata Taxa | 2 |
| Rhyacophilidae | | 3 | 0 | Ptychopteridae | | 8 | 0 | | Composit | ion | | Diptera Taxa | 0 |
| Uenoidae | | 2 | 0 | Simuliidae | | 6 | 0 | % EPT Abundance 81.0 90.0 | | 90.0 | COET Taxa | 3 | |
| | Total To | lerance Value | 260 | Stratiomyidae | | 10 | 0 | % Dominance | | 81.0 | 23.7 | % Sensitive | 86.1 |
| | rginia Save O | | | Syrphidae | | 10 | 0 | % Net-spinners | | 0.0 | NA | % Chironomidae | 0.0 |
| 601 57th Stre | et, SE, Charle | eston WV 253 | 304 | Tabanidae | | 7 | 0 | Stream (| Condition Ind | | 55.9 | % Clingers | 81.0 |
| http:/ | /www.dep.w | v.gov/sos | | Tipulidae | | 5 | 0 | Integrity Ra | ating | Mar | ginal | More diversity meas | sures |

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.



Photograph Direction $\underline{^{NE}}$

Comments:

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

| USACE FILE NO./ Project Name: (v2.1, Sept 2015) | | | y Pipeline Project /M v2.1 | IMPACT COOR (in Decimal D | | 38.880121 | Lon80.563499 | WEATHER: | Sunny, 85 degrees | DATE: | 8/10/2015 |
|--|---|------------------------|--|------------------------------|------------|--|--|--|--------------------------------|--|--------------------------------|
| IMPACT STREAM/SITE ID (watershed size {acreage} | O AND SITE DESCRIPTION, unaltered or impairments) | ION: | S-L61; Crooke Form of Mitigation | • | | | BITE ID AND SITE DESCRIPTION , unaltered or impairments) | : | | Comments: | |
| STREAM IMPACT LENGTH: | | FORM OF IITIGATION: | RESTORATION (Levels I-III) | MIT COORD (in Decimal D | | | Lon. | PRECIPITATION PAST 48 HRS: | | Mitigation Length: | |
| Column No. 1- Impact Existin | ng Condition (Debit) | | Column No. 2- Mitigation Existing Co | ondition - Baseline (C | redit) | Column No. 3- Mitigation Pro Post Completion | | Column No. 4- Mitigation Proje Post Completion (| | Column No. 5- Mitigation Project | ed at Maturity (Credit) |
| Stream Classification: | Intermittent | | Stream Classification: | Intermitte | nt | Stream Classification: | Intermittent | Stream Classification: | Intermittent | Stream Classification: | Intermittent |
| Percent Stream Channel S | lope 5 | 5 | Percent Stream Channel Slo | ре | | Percent Stream Channel Slo | ope 0 | Percent Stream Channel Sle | ope 0 | Percent Stream Channel S | Slope 0 |
| HGM Score (attach d | data forms): | | HGM Score (attach d | ata forms): | | HGM Score (attach | data forms): | HGM Score (attach da | ata forms): | HGM Score (attach d | ata forms): |
| | Aver | rage | | - | Average | | Average | | Average | | Average |
| Hydrology Biogeochemical Cycling | 0.82 0.86 0.7 | 77 | Hydrology Biogeochemical Cycling | 1 | 0 | Hydrology Biogeochemical Cycling | 1 0 | Hydrology Biogeochemical Cycling | 1 0 | Hydrology Biogeochemical Cycling | 1 0 |
| Habitat PART I - Physical, Chemical and | 0.63 d Biological Indicators | | Habitat PART I - Physical, Chemical and | 1 Biological Indicators | s | Habitat PART I - Physical, Chemical an | d Biological Indicators | Habitat PART I - Physical, Chemical and | Biological Indicators | Habitat PART I - Physical, Chemical and | Biological Indicators |
| | Points Scale Range Site Sc | 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 stream | ms classifications) | | PHYSICAL INDICATOR (Applies to all streams | classifications) | | PHYSICAL INDICATOR (Applies to all streams | s classifications) | PHYSICAL INDICATOR (Applies to all stream | s classifications) | PHYSICAL INDICATOR (Applies to all stream | ns classifications) |
| USEPA RBP (High Gradient Data Sheet) 1. Epifaunal Substrate/Available Cover | 0-20 14 | 4 | USEPA RBP (High Gradient Data Sheet) 1. Epifaunal Substrate/Available Cover | 0.00 | 0 | USEPA RBP (High Gradient Data Sheet) 1. Epifaunal Substrate/Available Cover | | USEPA RBP (High Gradient Data Sheet) 1. Epifaunal Substrate/Available Cover | | USEPA RBP (High Gradient Data Sheet) 1. Epifaunal Substrate/Available Cover | 0.00 |
| Epilaunai Substrate/Available Cover Embeddedness | 0-20 14 | | Epilauriai Substrate/Available Cover Embeddedness | 0-20 0-20 | 0 | Epilaunai Substrate/Available Cover Embeddedness | 0-20 0 0 | Epilauriai Substrate/Available Cover Embeddedness | 0-20 0 0 | Epilaunal Substrate/Available Cover Embeddedness | 0-20 |
| 3. Velocity/ Depth Regime | 0-20 | | Velocity/ Depth Regime | 0-20 | 0 | Velocity/ Depth Regime | 0-20 | Velocity/ Depth Regime | 0-20 0 | 3. Velocity/ Depth Regime | 0-20 |
| Sediment Deposition | 0-20 | | Sediment Deposition | 0-20 | 0 | Sediment Deposition | 0-20 | Sediment Deposition | 0-20 | 4. Sediment Deposition | 0-20 |
| 5. Channel Flow Status | 0-20 0-1 | | 5. Channel Flow Status | 0-20 0-1 | 0 | 5. Channel Flow Status | 0-20 0-1 | 5. Channel Flow Status | 0-20 0-1 0 | 5. Channel Flow Status | 0-20 0-1 |
| 6. Channel Alteration | | 5 | 6. Channel Alteration | 0-20 | 0 | 6. Channel Alteration | 0-20 0 | 6. Channel Alteration | 0-20 0 0 | 6. Channel Alteration | 0-20 |
| 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) | 0-20 0 0-20 8 | | 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) | 0-20 0-20 | 0 | 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) | 0-20 0 0 | 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) | 0-20 0 0 | 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) | 0-20 0-20 |
| 9. Vegetative Protection (LB & RB) | | 0 | 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) | | | 10. Riparian Vegetative Zone Width (LB & RB) | 0-20 | 0 | 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) | |
| Total RBP Score | Marginal 78 | | Total RBP Score | Poor | 0 | Total RBP Score | Poor 0 | Total RBP Score | Poor 0 | Total RBP Score | Poor 0 |
| Sub-Total | 0.3 | | Sub-Total | | 0 | Sub-Total | 0 | Sub-Total | 0 | Sub-Total | 0 |
| CHEMICAL INDICATOR (Applies to Intermitt | <u> </u> | | CHEMICAL INDICATOR (Applies to Intermittent | and Perennial Streams) |) | CHEMICAL INDICATOR (Applies to Intermitter | · · · · · · · · · · · · · · · · · · · | CHEMICAL INDICATOR (Applies to Intermitte | | CHEMICAL INDICATOR (Applies to Intermitte | |
| WVDEP Water Quality Indicators (General Specific Conductivity | al) | | WVDEP Water Quality Indicators (General) Specific Conductivity | | | WVDEP Water Quality Indicators (General Specific Conductivity |) | WVDEP Water Quality Indicators (General Specific Conductivity | 1) | WVDEP Water Quality Indicators (General Specific Conductivity | .1) |
| | 0-90 | | | 0-90 | 0 | | 0-90 | | 0-90 | Specific Control of the Control of t | 0-90 |
| 100-199 - 85 points | 1 | | n11 | | | n11 | | -11 | • • • | -11 | |
| рп | 0-80 0-1 | | рп | 0-1 | 0 | рп | 0-1 | рп | 6 00 0-1 0 | рп | 0-1 |
| 5.6-5.9 = 45 points | 0-80 | | | 5-90 | | | 5-90 | | 5-90 | | 5-90 |
| DO | | | DO | | 0 | DO | | DO | | DO | |
| | 10-30 | | | 10-30 | 0 | | 10-30 | | 10-30 | | 10-30 |
| Sub-Total | | | Sub-Total | | 0 | Sub-Total | 0 | Sub-Total | 0 | Sub-Total | 0 |
| BIOLOGICAL INDICATOR (Applies to Interm | nittent and Perennial Streams | s) | BIOLOGICAL INDICATOR (Applies to Intermitte | ent and Perennial Stream | ns) | BIOLOGICAL INDICATOR (Applies to Interm | nittent and Perennial Streams) | BIOLOGICAL INDICATOR (Applies to Intern | nittent and Perennial Streams) | BIOLOGICAL INDICATOR (Applies to Interr | nittent 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 | | 0-100 0-1 0 | | 0-100 0-1 0 | | 0-100 0-1 |
| Sub-Total | 0 | 0 | Sub-Total | | 0 | Sub-Total | 0 | Sub-Total | 0 | Sub-Total | 0 |
| PART II - Index and I | Unit Score | | PART II - Index and U | Jnit Score | | PART II - Index and | Unit Score | PART II - Index and U | nit Score | PART II - Index and U | Jnit Score |
| Index | Linear Feet Unit S | Score | Index | Linear Feet U | nit Score | Index | Linear Feet Unit Score | Index | Linear Feet Unit Score | Index | Linear Feet Unit Score |
| 0.683 | 58 39.5 | 585 | 0 | 0 | 0 | 0 | 0 0 | 0 | 0 0 | 0 | 0 0 |
| | | | | | | | | | | <u> </u> | |

| | | (See instruction page | | - Impact Factors It values for MITIGATIO | N BANKING and II | LF) | | | |
|---|-----------------------------------|---|-----------------------|---|---------------------|--|---|----------------------------------|-----------|
| Tempo | oral Loss-Construction | | | | | <u> </u> | term Protection | | |
| *Note: Reflects duration of aquatic function | al loss between the time of ar | n impact (debit) and completion of | | | % Add. Mitigation | on and Monitoring Period | | Term Protection (Years) | |
| compe | ensatory mitigation (credit). | | | | | - | | | |
| | | | | | | | | | |
| Years Sub-Total | | 0 | | | | | | | |
| Sub-10tal | | 0 | • | | | | | | |
| Ten | nporal Loss-Maturity | | | | 0 + 5/1 | 0 Year Monitoring | | 101 | |
| *Note: Period between completion of compensator | ry mitigation measures and th | ne time required for maturity, as it relates | | | Sub-Total | o real mennesmig | | 0 | |
| to function (i.e. maturity of tree stratum to provide | | within riparian stream or wetland buffer | | | | | | | |
| | corridor). | | | | | PART IV - Index | to Unit Score Con | version | |
| | | | | | Final Index Score | Linear Feet | Unit Score | ILF Costs | |
| % Add. Mitigation | | Temporal Loss-Maturity (Years) | | | (Debit) | | (Debit) | (Offsetting Debit | Units) |
| | | | | | 0.6825 | 58 | 39.585 | \$31,668.00 | |
| | | | | | 0.0020 | | | 401,000.00 | |
| | | | | | | | | | |
| 0% | | 0 | | | | | | | |
| Sub-Total | | 0 | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | PART V | - Comparison of U | nit Scores and Projecte | d Balance | | | | |
| | | | | | <u> </u> | | | <u> </u> | |
| | | Midiration Eviation | | Mitigation Projected at | | Mitigation Dupingtod of | | Mitimation Duplantad | |
| Final Unit Score (Debit) | 39.585 | Mitigation Existing Condition - Baseline | | Five Years | | Mitigation Projected at Ten Years | | Mitigation Projected At Maturity | |
| [No Net Loss Value] | 39.303 | (Credit) | | Post Completion | | Post Completion (Credit) | | (Credit) | |
| | | (Orealt) | | (Credit) | | 1 ost completion (orealt) | | (Orcuit) | |
| EINAL DRO JECTED NET DALANCE | | | | | | | | | |
| FINAL PROJECTED NET BALANCE | | | | | 0 | | 0 | | 0 |
| | | | | | | | | | |
| | | Р | art VI - Mitigation C | Considerations (Incenti | ves) | | | | |
| | | | | ı | | | | | |
| | Extent of Stream Res | storation | | | | Freto and a d | Unland Duffer Zana | | |
| | | orrect Restoration Levels (below) for your pr | oject | | *Noto1: Poforone | Extended ce Instructional handout for the def | Upland Buffer Zone | | s (bolow) |
| *Note2: P | lace an "X" in the appropriate of | category (only select one). | | | Note . Reference | *Note ² : Enter the buffer width for | | | s (below) |
| Restoration Level 1 | | | | | | | e appropriate mitigation | | |
| | | | | | | | | | |
| Restoration Level 2 | | | | | 5 66 180 101 | | Left Bank | | |
| | | | | | Buffer Width | | | | |
| Restoration Level 3 | | | | | | 0-50 | | None | |
| | | | | | | 51-150 | | None | |
| | | | | | Buffer Width | | Right Banl | | |
| | | | | Ī | | 0-50 | | None | |
| Compensatory Mitigation Plan incorpo *Note: HUC 12-based watershed a | | | No | | Average Buffer | 51-150 | | None | |
| Note: NOC 12-based watershed a | approach required to obtain Strea | III Restoration incentive | INO | | Width/Side | 0 | | | |
| | | | | 1 | TTIGUI/OIGE | | | | |
| | | Impact | Mitigation Unit | | | | Strai | ght Preservation Ratio | |
| Site | | Unit Yield (Debit) | Yield (Credit) | | | | | (v2.1, Sept 2015) | |
| | 2 (2.00.0) | (2.24.4) | | | | | , | | |
| S-L61 | | 39.585 | #DIV/0! | | | Final Mitigation Unit Yield | | | |
| | | | | | | | | | |
| | | | | | | #DIV/0! | | | |

| STREAM ID S-L61 | STREAM NAME Crooked Run |
|--|---------------------------|
| LAT 38.880121 LONG -80.563499 | DATE 05/16/2015 |
| PROJEC MVP | CLIENT MVP |
| INVESTIGATORS Sean Kite, Ashley Hatfield | |
| FLOW REGIME Perennial Intermittent ✓ Ephemeral | WATER TYPE TNW RPW_✓ NRPW |

| Perennial _ | _ Intermitter | nt <u> —</u> Ephem | eral TNW | RPW <u>→</u> | NRPW | | |
|------------------------|---------------|---------------------------|---|-------------------|--|-----------------------------------|--|
| | | | _ | | | | |
| | | | /leasurements k Width: <u>10.0 ft</u> | | Stream Erosion None ✓ Moderate | Незуу | |
| | | | | | NoneNoderate | rieavy | |
| | | Top of Ban | ŭ | | Artificial, Modified or Channelized | | |
| | | LB <u>3.0</u> | | <u>π</u> | Yes No | | |
| CHANNEL FE | ATURES | | th: 3.00 in | | Dam PresentYes _ | ✓ No | |
| | | Water Widt | h: 2.0 ft | | _ _ | | |
| | | High Water | Mark: <u>1.0 ft</u> | | Sinuosity Low | Medium High | |
| | | Flow Direct | tion: W | | Gradient | | |
| | | | | | Flat Moderate (2 ft/100 ft) | | |
| | | Water Pres | - ont | | Proportion of Reach Repre | , , | |
| | | | r, stream bed dry | | Morphology Types | ssented by Stream | |
| | | Stream I | | | Riffle 70 % Run 10 | % | |
| FLOW | | Standing | • | | Pool 20 % | | |
| CHARACTER | ISTICS | <u></u> Flowing | water | | Turbidity | | |
| | | Velocity | | | ✓ ClearSlightly | | |
| | | | ✓ Moderate | | OpaqueStained | | |
| | | Slow | | ı | Other | | |
| INOR | | STRATE CO add up to 10 | MPONENTS 0%) | | RGANIC SUBSTRATE CON loes not necessarily add u | | |
| Substrate Type | Diame | ter | % Composition in Sampling Reach | Substrate Type | Characteristic | % Composition ir Sampling Area | |
| Bedrock | | | | Detritus | sticks, wood, coarse | | |
| Boulder | > 256 r | mm (10") | | Detritus | plant materials (CPOM) | 10 | |
| Cobble | 64-256 mi | m (2.5"-10") | 70 | Muck-Mud | black, very fine organic | | |
| Gravel | 2-64 mm | (0.1"-2.5") | 20 | | (FPOM) | | |
| Sand | | nm (gritty) | 5 | | | | |
| Silt | |).06 mm | 5 | Marl | grey, shell fragments | | |
| Clay | < 0.004 r | nm (slick) | | | | | |
| | | Predomina ✓ Forest | ant Surrounding Lar Commer | iduse rcial | Indicate the dominant type ✓ Trees Shrub | | |
| | | _ | astureIndustria | | Grasses Herba | | |
| MATEROUER | | Agricult | tural Residen | | Eleadalain Width | | |
| WATERSHED FEATURES | | Other: | | | Floodplain Width Wide > 30ft ✓ Mode | rate 15-30ft | |
| | | Canopy Co | over | | Narrow <16ft | | |
| | | Partly o | penPartly sh | aded | Wetland Present Yes | √ No | |
| | | <u>✓</u> Shaded | Open | | Wetland ID | <u>v</u> No | |
| | | Indicate th | e dominant type and | d record the d | Iominant species present | | |
| AQUATIC VE | GETATION | | _ | Rooted subme | _ | tingFree floating | |
| | | Floating | g algae | Attached algae | e | | |
| | | 1 | | | | | |
| | | Salamande | ers observed. | | | | |
| MACROINVER | TERRATES | original S-L | .61 | | | | |
| OR OTHER | VIEDKA159 | | | | | | |
| WILDLIFE OBSERVED/C | | | | | | | |
| OBSERVATIONS AND NOTES | | | | | | | |
| | | | | | | | |
| | | | | | | | |

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

To ensure accurate calculations, the <u>UPPERMOST STRATUM</u> 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-L61 (Lewis County)

Sampling Date: 9/7/2016 Project Site Before Project

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR: SAR number:

Tree/Sapling Strata

Functional Results Summary: Enter Results in Section A of the Mitigation Sufficiency Calculator

| Function | Functional Capacity Index |
|------------------------|------------------------------|
| Hydrology | 0.82 |
| Biogeochemical Cycling | 0.86 |
| Habitat | 0.63 |

Variable Measure and Subindex Summary:

| Variable | Name | Average Measure | Subindex |
|------------------------|---|--------------------|----------|
| V _{CCANOPY} | Percent canpoy over channel. | 64.50 | 0.69 |
| V _{EMBED} | Average embeddedness of channel. | 3.28 | 0.92 |
| V _{SUBSTRATE} | Median stream channel substrate particle size. | 1.00 | 0.50 |
| V _{BERO} | Total percent of eroded stream channel bank. | 40.00 | 0.86 |
| V_{LWD} | Number of down woody stems per 100 feet of stream. | 9.00 | 1.00 |
| V _{TDBH} | Average dbh of trees. | 8.40 | 0.94 |
| V _{SNAG} | Number of snags per 100 feet of stream. | 4.00 | 0.90 |
| V _{SSD} | Number of saplings and shrubs per 100 feet of stream. | Not Used | Not Used |
| V _{SRICH} | Riparian vegetation species richness. | 0.00 | 0.00 |
| V _{DETRITUS} | Average percent cover of leaves, sticks, etc. | 16.25 | 0.20 |
| V _{HERB} | Average percent cover of herbaceous vegetation. | Not Used | Not Used |
| V _{WLUSE} | Weighted Average of Runoff Score for Catchment. | 0.84 | 0.88 |

| | High-G | radient l | Headwat | | ms in ea Data She | | | y and west tor | tern Wes | t Virgini | a | |
|--|---|---|---|--------------|-------------------------------|--------------|-----------|---------------------------------------|-----------------|-----------------|---------|--|
| | Team: | C.Vileno, J | . Bittner | | | | | Latitude/UTI | M Northina: | 38.881097° | | |
| Pro | ject Name: | | | | | | | Longitude/U | • | | | |
| | - | S-L61 (Lew | is County) | | | | | - | pling Date: | | | |
| 0.4 | | 0 201 (201 | <u>, , , , , , , , , , , , , , , , , , , </u> | l | 400 | Ot T- | | | - | 0/1/2010 | 12 | |
| SA | R Number: | | Reacn | Length (ft): | 100 | Stream Ty | ype: Ir | ntermittent Strea | m | | | |
| | Top Strata: | Tre | e/Sapling St | rata | (determine | d from perc | ent calcu | lated in V _{CCANC} | _{PY}) | | | |
| Site a | and Timing: | g: 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.) | | | | | | | | | | |
| | | | | | point below: | | 10 | 1 40 | 00 | 00 | | |
| | 50 | 40 | 40 | 60 | 80 | 90 | 40 | 40 | 80 | 80 | | |
| | 90 | 90 | 70 | 60 | 40 | 80 | 80 | 60 | 70 | 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 | | | | | | | | | | | |
| | | | | | posed of be | | | | | • | | |
| | | Embeddedness rating for gravel, cobble and boulder particles (rescaled from Platts, Megahan, and Minshall 1983) | | | | | | | | | | |
| | | Rating | Rating Des | crintion | | | | | | | | |
| | | 5 | | | covered. sur | rounded. or | buried b | y fine sedimen | t (or bedroc | k) | | |
| | | 4 | | | | | | ed by fine sedi | | , | | |
| | | 3 | | | | | | ried by fine sec | | | | |
| | | 2 | | | | | | ried by fine sed | | | | |
| | | 1 | | | covered, su | ırrounded, d | or buried | by fine sedime | nt (or artific | ial surface) | | |
| | | ngs at each | | | | | | | | | 1 | |
| | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 4 | | |
| | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | | |
| | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 3 | 4 | 3 | | |
| | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | |
| | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | | |
| 3 | V _{SUBSTRATE} | | | | particle size pints and pa | | | rer than 30 rouç _{MBED} . | ghly equidis | tant points | 1.00 in | |
| | | | | | inch at eacl | | w (bedro | ck should be c | ounted as 9 | 9 in, | | |
| | 3.00 | 5.00 | 2.00 | 1.00 | 1.00 | 1.00 | 0.50 | 2.00 | 2.00 | 1.00 | | |
| | 1.00 | 0.50 | 0.50 | 0.50 | | 0.25 | 0.25 | 1.00 | | 1.00 | | |
| | 1.00 | 1.00 | 1.00 | 1.00 | 0.50 2.00 | 2.00 | 2.00 | 0.25 | 1.00 0.25 | 0.25 | | |
| | 0.25 | 0.25 | 1.00 | 1.00 | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 | | |
| | | 2.00 | | | | 1.00 | | 2.00 | | | | |
| 4 | 2.00 | | 2.00 | 2.00 | 2.00 | | otal num | 1.00 ber of feet of e | 1.00 | 1.00 on each | | |
| 7 | V_{BERO} | • | e total perce | | | | | eroded, total e | | | 40 % | |
| | | | Left Bank: | 20 |) ft | | Right Baı | nk: 20 |) ft | ı | | |

| Sampl | 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: 9 | | | | | | | | | | | |
| 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. | | | | | | | | | | | |
| | | List the dbh measurements of individual trees (at least 4 in) within the buffer on each side of the stream below: | | | | | | | | | | | |
| | | the stream below: Left Side Right Side | | | | | | | | | | | |
| | 6 | 5 | 8 | 6 | 5 | 24 | 10 | 5 | 10 | 8 | | | |
| | 5 | 7 | 10 | 12 | 5 | 24 | 10 | 3 | 10 | 0 | | | |
| | | • | | | Ů | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | \ / | <u> </u> | (1 1 | | 1.00" (11) | 100 (| 1.6.1 | F . | | | | | |
| 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. | | | | | | | | | 4.0 | | | |
| | Left Side: 2 Right Side: 2 | | | | | | | | | | | | |
| 8 | V_{SSD} | Number of saplings and shrubs (woody stems up to 4 inches dbh) per 100 feet of stream (measure only | | | | | | | | | | | |
| | | | | | per of sapiin e calculated. | | ibs on each | side of the | stream, and | tne | Not Used | | |
| | | аро. | Left Side: | | | | Right Side: | | | ' | | | |
| 9 | V_{SRICH} | | | | | | am reach. C | | | | | | |
| | | | | | | | ive species p from these o | | II strata. Sp | ecies | 0.00 | | |
| | | | p 1 = 1.0 | and the Subi | ndex will be | l | nom these t | | 2 (-1.0) | | | | |
| | Acer rubru | | F 1 - 1.0 | Magnolia ti | rinetala | | nonica | | | | | | |
| - | Acer sacc | | | Nyssa sylv | | ☐ Ailanthus altissima ☐ Lonicera ☐ Albizia julibrissin ✓ Lonicera | | | | Lonicera ta | • | | |
| | Aesculus | | | Oxydendrun | | | | | | Lotus corni | culatus | | |
| 65 | Asimina tr | | | Prunus ser | | | Alternanthe | | | Lythrum sa | licaria | | |
| 8: | Betula alle | | 5 | Quercus al | | | philoxeroid | | ✓ | Microstegiun | | | |
| (5)==3 | Betula len | _ | | Quercus co | | | Aster tatari | | - | Paulownia | | | |
| | Carya alba | | | Quercus in | | | Cerastium | | | Polygonum o | | | |
| | Carya glal | | | Quercus pi | | | Coronilla va | | | Pueraria m | | | |
| | Carya ova | | | Quercus ru | | ~ | Elaeagnus u | | | Rosa multii | | | |
| | Carya ova | | | Quercus ve | | | Lespedeza | | | Sorghum h | | | |
| 4 | Cornus flo | | | Sassafras | | | Lespedeza | | | Verbena br | - | | |
| | Fagus gra | | | Tilia ameri | | | Ligustrum ob | | | | | | |
| | Fraxinus a | | | Tsuga can | | | Ligustrum s | | | | | | |
| 6== | Liriodendro | | | Ulmus ame | | | - | | | | | | |
| 52-5 | Magnolia | | | 2 | | | | | | | | | |
| 27 | wagnona | ucummata | | | | | | | | | | | |
| | | 0 | Species in | Group 1 | | | | 3 | Species in | Group 2 | | | |

| | e Variables The four sul | | | | | | | | | n 25 feet fro | om each | | | |
|----------------|--|------------------|----------------------------|----------------------|-----------------------------|--------------------|---------------------|--------------|-------------------|---------------|----------|--|--|--|
| 10 | | Average pe | rcent cover | of leaves, | sticks, or othercent cove | ner organic r | material. W | oody debris | <4" diamet | er and | 16.25 % | | | |
| | | | Left | Side | | | Righ | t Side | |] | | | | |
| | | 30 | 20 | 10 | 10 | 10 | 20 | 10 | 10 | ļ | | | | |
| 11 | V _{HERB} | 20 Average pe | 30 ercentage co | 10 over of herb | 10 aceous veg | 10 etation (mea | 20 asure only if | tree cover i | 20 is <20%). D | o <i>not</i> | | | | |
| | HERO | include woo | ody stems a percentage: | t least 4" db | oh and 36" ta h 200% are | all. Because | there may | be several l | ayers of gro | ound cover | Not Used | | | |
| | | | Left | Left Side Right Side | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| 01 | - Mariabla 4 | 0 | 4: 4 | | 41 | | | | | <u> </u> | | | | |
| | e Variable 1 | | | | | | | | | | | | | |
| 12 | V_{WLUSE} | vveignted A | verage of F | Runott Score | e for watersl | nea: | | | | | 0.84 | | | |
| | Land Use (Choose From Drop List) Runoff Score % in Catchment | | | | | | | | | | | | | |
| | Forest and native range (>75% ground cover) 1 80 | | | | | | | | | | | | | |
| | Open space | (pasture, lawr | 0.3 | 10 | 90 | | | | | | | | | |
| | Residential c | listricts, 1/4 - | 0.1 | 10 | 100 | | | | | | | | | |
| | | | | | | | | ~ | | | | | | |
| | | | | | | | | ~ | | | | | | |
| | | | | | | | | ~ | | | | | | |
| | | | | | | | | ~ | | | | | | |
| | | | | | | | | _ | | | | | | |
| | Su | mmary | | | | | No | tes: | | | | | | |
| V | ariable | Value | VSI | | | | | | | | | | | |
| Vc | CANOPY | 65 % | 0.69 | | | | | | | | | | | |
| VE | MBED | 3.3 | 0.92 | | | | | | | | | | | |
| Vs | UBSTRATE | 1.00 in | 0.50 | | | | | | | | | | | |
| V _B | ERO | 40 % | 0.86 | | | | | | | | | | | |
| VL | WD | 9.0 | 1.00 | | | | | | | | | | | |
| V _T | DВН | 8.4 | 0.94 | | | | | | | | | | | |
| Vs | NAG | 4.0 | 0.90 | | | | | | | | | | | |
| Vs | SD | Not Used | Not Used | | | | | | | | | | | |
| Vs | RICH | 0.00 | 0.00 | | | | | | | | | | | |
| V _D | ETRITUS | 16.3 % | 0.20 | | | | | | | | | | | |
| V _H | ERB | Not Used | Not Used | | | | | | | | | | | |
| V _w | /LUSE | 0.84 | 0.88 | | | | | | | | | | | |

No / low flow at time of survey. Unable to sample water quality or $\ensuremath{\mathbf{WVSCI}}$.

Stream ID S-L57



Photograph Direction East

Date: 05/15/2015

Comments: 2015 stream identification.



Photograph Direction East

Date: 09/25/2019

Comments: 2019 stream identification confirmation.

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

| USACE FILE NO./ Project Name: (v2.1, Sept 2015) | | Mounta | ain Valley Pipeline Proje SWVM v2.1 | ect | | COORDINATES: cimal Degrees) | Lat. | 38.828304 | Lon. | -80.525748 | WEATHER: | С | Cloudy, 50° | DATE: | September 21, 2016 |
|---|--------------------------------|-----------------------|--|---|-----------------------|--------------------------------|-------------------------------------|---|-------------------------------------|-----------------|---|---|---------------|---|---|
| IMPACT STREAM/SITE ID (watershed size {acreage} | | | | S-L57; UNT to Barbecue 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: | 26 | FORM OF MITIGATION | | ATION (Levels I-III) | | OORDINATES: cimal Degrees) | Lat. | | Lon. | | PRECIPITATION PAST 48 HRS: | | | Mitigation Length: | |
| Column No. 1- Impact Existin | g Condition (Deb | bit) | Column N | o. 2- Mitigation Existing | Condition - Base | eline (Credit) | | Column No. 3- Mitigation Projected at Five Years Post Completion (Credit) | | | | Column No. 4- Mitigation Projected at Ten Years Post Completion (Credit) | | | ted at Maturity (Credit) |
| Stream Classification: | Epher | meral | Stream Classific | Stream Classification: Intermittent | | s | Stream Classification: Intermittent | | Stream Classification: Intermittent | | Stream Classification: | Intermittent | | | |
| Percent Stream Channel S | ercent Stream Channel Slope 15 | | Per | ent Stream Channel S | lope | | | Percent Stream Channe | l Slope | 0 | Percent Stream Channel | Slope | 0 | Percent Stream Channel S | lope 0 |
| HGM Score (attach data forms): | | | HGM Score (attach data forms): | | | HGM Score (atta | ich data forms): | | HGM Score (attach | data forms): | | HGM Score (attach d | ata forms): | | |
| | | Average | | | | Average | | | | Average | | | Average | | Average |
| Hydrology | 0.36 0.65 | 0.41666667 | Hydrology | O P | | 0 | | ydrology | | 0 | Hydrology | | | Hydrology | |
| Biogeochemical Cycling Habitat | 0.65 | 0.4166667 | Biogeochemical Habitat | Cycling | | - ° | | iogeochemical Cycling abitat | | • | Biogeochemical Cycling Habitat | | ١ | Biogeochemical Cycling Habitat | - |
| PART I - Physical, Chemical and | Biological Indic | ators | PART | I - Physical, Chemical a | nd Biological Ind | licators | | PART I - Physical, Chemica | l and Biological | Indicators | PART I - Physical, Chemical a | nd Biological Indic | cators | PART I - Physical, Chemical and | Biological Indicators |
| | Points Scale Range | Site Score | | | Points Scale Range | Site Score | | | Points Scale Rar | nge Site Score | | Points Scale Range | Site Score | | Points Scale Range Site Score |
| PHYSICAL INDICATOR (Applies to all stream | ns classifications) | | PHYSICAL INDIC | CATOR (Applies to all stream | ns classifications) | | P | HYSICAL INDICATOR (Applies to all str | eams classifications | s) | PHYSICAL INDICATOR (Applies to all stre | eams classifications) | | PHYSICAL INDICATOR (Applies to all stream | ns classifications) |
| USEPA RBP (High Gradient Data Sheet) | | | | gh Gradient Data Sheet) | | | | SEPA RBP (High Gradient Data Shee | et) | | USEPA RBP (High Gradient Data Shee | t) | | USEPA RBP (High Gradient Data Sheet) | |
| Epifaunal Substrate/Available Cover | 0-20 | 4 | <u> </u> | trate/Available Cover | 0-20 | | II— | Epifaunal Substrate/Available Cover | 0-20 | | Epifaunal Substrate/Available Cover Example 2 | 0-20 | | Epifaunal Substrate/Available Cover | 0-20 |
| Embeddedness Velocity/ Depth Regime | 0-20 0-20 | 0 | 2. Embeddednes 3. Velocity/ Depth | | 0-20 0-20 | | II— | Embeddedness | 0-20 0-20 | | 2. Embeddedness | 0-20 0-20 | | Embeddedness Velocity/ Depth Regime | 0-20 |
| 4. Sediment Deposition | 0-20 | 10 | 4. Sediment Dept | | 0-20 | | | Velocity/ Depth Regime Sediment Deposition | 0-20 | | Velocity/ Depth Regime Sediment Deposition | 0-20 | | 4. Sediment Deposition | 0-20 |
| 5. Channel Flow Status | 0-20 | 0 | 5. Channel Flow | | 0-20 | | II— | Channel Flow Status | 0-20 | | 5. Channel Flow Status | 0-20 | | 5. Channel Flow Status | 0-20 |
| 6. Channel Alteration | 0-20 0-1 | 6 | 6. Channel Altera | | 0-20 0-1 | | | Channel Alteration | 0-20 | -1 | 6. Channel Alteration | 0-20 0-1 | | 6. Channel Alteration | 0-20 |
| 7. Frequency of Riffles (or bends) | 0-20 | 0 | 7. Frequency of F | 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 | 8 | 8. Bank Stability (| | 0-20 | | | 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 Pro | tection (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) | | 6 | | ative Zone Width (LB & RB) | 0-20 | | |). Riparian Vegetative Zone Width (LB & R | B) 0-20 | | 10. Riparian Vegetative Zone Width (LB & RE | | | 10. Riparian Vegetative Zone Width (LB & RB) | |
| Total RBP Score | Marginal | 42 | Total RBP Score | | Poor | 0 | II— | otal RBP Score | Poor | 0 | Total RBP Score | Poor | 0 | Total RBP Score | Poor 0 |
| Sub-Total | | 0.35 | Sub-Total | | | 0 | | ub-Total | | 0 | Sub-Total | | 0 | Sub-Total | 0 |
| CHEMICAL INDICATOR (Applies to Intermitte | | Streams) | | CATOR (Applies to Intermit | | streams) | | HEMICAL INDICATOR (Applies to Interr | | al Streams) | CHEMICAL INDICATOR (Applies to Intern | | Streams) | CHEMICAL INDICATOR (Applies to Intermitte | |
| WVDEP Water Quality Indicators (General Specific Conductivity | il) | | Specific Conduc | uality Indicators (Generativity | al) | | | VDEP Water Quality Indicators (Gen pecific Conductivity | eral) | | WVDEP Water Quality Indicators (Gene Specific Conductivity | eral) | | WVDEP Water Quality Indicators (General Specific Conductivity | <u>"</u> |
| Specific Conductivity | 0-90 | | Specific Collude | tivity | 0-90 | | 2 | becine conductivity | 0-90 | | Specific Conductivity | 0-90 | | Specific Conductivity | 0-90 |
| 100-199 - 85 points | 0-90 | | | | 0-90 | | | | 0-90 | | | 0-90 | | | 0-90 |
| рН | 0.1 | | рН | | 0-1 | 0 | p | Н | | -1 56 | рН | 0.1 | | рН | 0-1 |
| 5.6-5.9 = 45 points | 0-80 | | | | 5-90 | | | | 5-90 | 5.0 | | 5-90 | | | 5-90 |
| DO | | 53 | DO | | | U U | D | 0 | | | DO | | | DO | |
| | 10-30 | | | | 10-30 | | | | 10-30 | | | 10-30 | | | 10-30 |
| Sub-Total | | | Sub-Total | | | 0 | 9 | ub-Total | | 0 | Sub-Total | | 0 | Sub-Total | |
| BIOLOGICAL INDICATOR (Applies to Interm | ittent and Perennial | l Streams) | | DICATOR (Applies to Intern | nittent and Perennial | l Streams) | | IOLOGICAL INDICATOR (Applies to In | termittent and Per | ennial Streams) | BIOLOGICAL INDICATOR (Applies to Int | ermittent and Perenr | nial Streams) | BIOLOGICAL INDICATOR (Applies to Intern | mittent and Perennial Streams) |
| | | , | | | | , | | | | , | | | | | , |
| WV Stream Condition Index (WVSCI) | 0-100 0-1 | | ww Stream Con | dition Index (WVSCI) | 0-100 0-1 | 0 | V. | V Stream Condition Index (WVSCI) | 0-100 0- | 1 | WV Stream Condition Index (WVSCI) | 0-100 0-1 | | WV Stream Condition Index (WVSCI) | 0-100 0-1 |
| 0 | 0-100 0-1 | 0 | 0.1.7.1.1 | | 0-100 | | | 1. 7.4.1 | 0-100 | | O. T. A. I | 0-100 | | 2.1.7.4.1 | |
| Sub-Total | | 0 | Sub-Total | | | 0 | <u> S</u> | ub-Total | | 0 | Sub-Total | | 0 | Sub-Total | 0 |
| PART II - Index and I | Init Score | _ | | PART II - Index an | d Unit Score | | | PART II - Index | and Unit Score | | PART II - Index and | d Unit Score | | PART II - Index and U | Init Score |
| PACT II - III GEX AND C | J.II. GC0/6 | | | I AIXI II - IIIUEX dii | a Jill ocore | | | FAILT II - IIIUUX | una onit ocore | | FART II - Muex and | 2 Onit Goole | | FAILT II - III.09X and C | 55016 |
| Index | Linear Feet | Unit Score | | Index | Linear Feet | Unit Score | | Index | Linear Fee | et Unit Score | Index | Linear Feet | Unit Score | Index | Linear Feet Unit Score |
| 0.496 | 26 | 12.8916667 | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 0 |

| | | (See instruction p | | - Impact Factors It values for MITIGATIO | N BANKING and I | ILF) | | | |
|--|---|---|-----------------------------------|--|------------------------------|--|-------------------|--|------------|
| Temp | oral Loss-Construction | (| | | | <u> </u> | -term Protection | | |
| *Note: Reflects duration of aquatic function | | an impact (debit) and completion of | | | % Add. Mitigation | on and Monitoring Period | | -Term Protection (Years) | |
| Years | , , | 0 | | | | | | | |
| Sub-Total | | 0 | | | | | | | |
| | mporal Loss-Maturity | | | | 0 + 5/ | 10 Year Monitoring | | 101 | |
| *Note: Period between completion of compensato to function (i.e. maturity of tree stratum to provid | | | | | Sub-Total | | | 0 | |
| to ranction (i.e. maturity of tree stratum to provid | corridor). | within riparian stream of wettand buner | | | | PART IV - Index | to Unit Score Cor | nversion | |
| 2/ 1 1 1 1 1 1 | | 1 - | | | Final Index Score | Linear Feet | Unit Score | ILF Costs | |
| % Add. Mitigation | % Add. Mitigation Temporal Loss-Maturity (Years) (Debit) | | | | | (Debit) | (Offsetting Debit | | |
| | | | | | 0.495833333 | 26 | 12.89166667 | \$10,313.33 | 3 |
| | | | | | | | | | |
| 0% | | 0 | | | | | | | |
| Sub-Total | | U | | | | | | | |
| | | DARTY | | -'' O I D - ' (- | d Delever | | | | |
| | | PARIV | - Comparison of U | nit Scores and Projecte | ed Balance | | | | |
| Final Unit Score (Debit) [No Net Loss Value] | 12.89166667 | 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 |
| | | D | Part VI Mitigation (| Considerations (Incenti | wool | | | | |
| | | | art vi - Miligation C | Considerations (incenti | ves) | | | | |
| | Extent of Stream Renal handout to determine the collace an "X" in the appropriate | correct Restoration Levels (below) for your pr | roject | | *Note ¹ : Referen | ce Instructional handout for the def *Note ² : Enter the buffer width for | | ne Mitigation Extents and Type Bank and Right Bank) | es (below) |
| Restoration Level 2 | | | | - | | | Left Bank | , | |
| | | | | - | Buffer Width | | Leit Dalli | | |
| Restoration Level 3 | | | | | | 0-50 | | None | |
| | | | | | Buffer Width | 51-150 | Right Ban | None | |
| | | | | | Buildi VVIUIII | 0-50 | Nigiit ban | None | |
| Compensatory Mitigation Plan incorpo | | | |] | | 51-150 | | None | |
| *Note: HUC 12-based watershed | approach required to obtain Strea | am Restoration incentive | No | | Average Buffer Width/Side | 0 | | | |
| Site | | Impact Unit Yield (Debit) | Mitigation Unit Yield (Credit) | | | | Stra | ight Preservation Ratio (v2.1, Sept 2015) | |
| S-L57 | | 12.89166667 | #DIV/0! | | | Final Mitigation Unit Yield | | | |
| | | | l | 1 | | #DIV/0! | | | |

| STREAM ID S-L57 | STREAM NAME UNT to Barbecue Run |
|--|---------------------------------|
| LAT 38.828304 LONG -80.525748 | DATE 05/15/2015 |
| PROJEC MVP | CLIENT MVP |
| INVESTIGATORS Sean Kite, Ashley Hatfield | |
| FLOW REGIME Perennial Intermittent Ephemeral ✓ | WATER TYPE TNW RPW NRPW_✓ |

| Perennial_ | Intermitte | nt Epheme | eral √ TNW | RPW | NRPW <u></u> ✓ | | | |
|----------------------|--|---------------------------|-----------------------------|--------------------------------|---|--------------------|--|--|
| | | | | | | | | |
| 1 | ' | | <i>l</i> leasurements | | Stream Erosion | | | |
| | | Top of Ban | k Width: 4.0 ft | | None _ <u>✓</u> Moderate | Heavy | | |
| | | Top of Ban | k Height: | | Artificial, Modified or Char | nnelized | | |
| | | LB <u>8.0</u> | in RB <u>8.0</u> | | Yes ✓ No | | | |
| CHANNEL FE | ATUDES | Water Dept | th: <u>1.00 in</u> | | _ _ | | | |
| CHANNELFE | ATURES | Water Widt | h: 1.0 ft | | Dam PresentYes | <u>/_</u> No | | |
| | | | Mark: <u>4.0 in</u> | | Sinuosity Low | Medium High | | |
| | | Flow Direct | <u></u> | | | | | |
| | | I low blied | | | Gradient Flat✓ Moderate | Severe | | |
| | | | | | | (10 ft/100 ft) | | |
| | | Water Pres | sent | | Proportion of Reach Repre | esented by Stream | | |
| | | | r, stream bed dry | | Morphology Types | 0/ | | |
| | | | bed moist | | Riffle 80 % Run Pool 20 % | % | | |
| FLOW | 107100 | ✓ Standing Flowing | | | 70 70 | | | |
| CHARACTER | ISTICS | | | | Turbidity | | | |
| | | Velocity | | | ✓ Clear — Slightly | | | |
| | | Fast Slow | Moderate | | OpaqueStainedOther | | | |
| | | | | | | | | |
| INOR | | STRATE CO add up to 10 | | | ORGANIC SUBSTRATE COMPONE (does not necessarily add up to 10 | | | |
| Substrate | 1 | <u> </u> | % Composition in | | | % Composition in | | |
| Туре | Diame | ter | Sampling Reach | Туре | Characteristic | Sampling Area | | |
| Bedrock | | | | Detritus | sticks, wood, coarse | | | |
| Boulder | > 256 | mm (10") | | Detritus | plant materials (CPOM) | 10 | | |
| Cobble | 64 - 256 m | m (2.5"-10") | 5 | Muck-Mud | black, very fine organic | | | |
| Gravel | 2-64 mm | (0.1"-2.5") | 10 | IVIUCK-IVIUU | (FPOM) | | | |
| Sand | 0.06-2r | nm (gritty) | 5 | | | | | |
| Silt | 0.004-0 | 0.06 mm | 10 | Marl | grey, shell fragments | | | |
| Clay | < 0.004 | mm (slick) | 70 | | | | | |
| | · | | ant Surrounding Lan | iduse | Indicate the dominant type | | | |
| | | ✓ Forest Field/Pa | Commer asture Industrial | | ✓ Trees — Shrub Grasses — Herba | | | |
| | | Agricult | | | | ocous | | |
| WATERSHED |) | Other: | _ | | Floodplain Width | 45 20 5 | | |
| FEATURES | | | | | Wide > 30ft Mode ✓ Narrow <16ft | rate 15-30ft | | |
| | | Canopy Co ✓ Partly o | | adod | V Nariow Toll | | | |
| | | Shaded | | aucu | Wetland PresentYes | <u>√</u> No | | |
| | | | | | Wetland ID | | | |
| AQUATIC VE | GETATION | | | d record the c Rooted subme | lominant species present ergent Rooted float | ting Free floating | | |
| A QUATIO VE | OLIAIION | | _ | Attached algae | | | | |
| | | | | | | | | |
| | | Information | listed on this form ro | nresents the d | ata collected in 2015. The st | ream was revisited | | |
| | | | | | nnel and OHWM was confirm | | | |
| MACROINVE | RTEBRATES | | - | | | | | |
| OR OTHER WILDLIFE | | | | | | | | |
| OBSERVED/C | WILDLIFE OBSERVED/OTHER OBSERVATIONS AND | | | | | | | |
| NOTES | UNA CNU | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

To ensure accurate calculations, the <u>UPPERMOST STRATUM</u> 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-L57 (Braxton County)

Sampling Date: 11/06/2019 Project Site Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR: SAR number:

Tree/Sapling Strata

Functional Results Summary: Enter Results in Section A of the Mitigation Sufficiency Calculator

| Function | Functional Capacity Index |
|------------------------|------------------------------|
| Hydrology | 0.36 |
| Biogeochemical Cycling | 0.65 |
| Habitat | 0.24 |

Variable Measure and Subindex Summary:

| Variable | Name | Average Measure | Subindex |
|------------------------|---|--------------------|----------|
| V _{CCANOPY} | Percent canpoy over channel. | 27.14 | 0.19 |
| V _{EMBED} | Average embeddedness of channel. | 3.00 | 0.82 |
| 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. | 8.88 | 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. | 1.60 | 0.76 |
| V _{DETRITUS} | | | 0.14 |
| V _{HERB} | V _{HERB} Average percent cover of herbaceous vegetation. | | Not Used |
| V _{WLUSE} | Weighted Average of Runoff Score for Catchment. | 0.62 | 0.65 |

| High-Gradient Headwater Streams in eastern Kentucky and western West Virginia Field Data Sheet and Calculator | | | | | | | | a | | | | |
|--|------------------------|-------------------------|-----------------------------|--------------------------|----------------------|-----------------------|----------|--|--------------------------------------|---|---|---------|
| | Team: | C. Vileno, F | 2 Abor | rielu L | dia Sile | et and C | aicui | | . ₋atitude/UTN | / Northing: | 38 838304 | |
| Pro | oject Name: | | V. Abei | | | | | | | • | -80.525748 | |
| 110 | - | | xton County |) | | | | _ | | | 11/06/2019 | |
| SA | R Number: | 2 20 (210) | | Length (ft): | 100 | Stream Ty | ne. | Enha | meral Stream | | .,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | |
| O, | ar rambor. | | rtodori | Longar (it). | 100 | ou oum 1) | , ρυ. | Ерпе | merai stream | <u> </u> | | |
| | Top Strata: | Tree | e/Sapling St | rata | (determined | d from perce | ent calc | culate | ed in V _{CCANO} | _{PY}) | | |
| Site a | and Timing: | Project Site | A . | | | ~ | Before | Proje | ct | | | • |
| Sample | Variables | 1-4 in strea | m channel | | | | | | | | | |
| 1 | | equidistant | | g the stream | n. Measure | only if tree/ | sapling | cove | asure at no fer is at least choice.) | | | 27.1 % |
| | List the per | cent cover r | measureme | nts at each | point below: | | | | | | | |
| | 60 | 20 | 0 | 0 | 20 | 40 | 50 |) | | | | |
| | | - | | | | | | | | | | |
| 2 | | points along | g the stream | n. Select a _l | particle from | the bed. E | Before r | novir | than 30 roung it, determediment, an | ine the perd | entage of | 3.0 |
| | | | | | | | | | omposed of | | | |
| | | rating score | of 1. If the | bed is com | posed of be | drock, use | a rating | g sco | re of 5. | | | |
| | | Embedded Minshall 19 | | for gravel, c | obb l e and b | ou l der parti | cles (re | escal | ed from Plat | ts, Megahai | n, and | |
| | | Rating | Rating Des | scription | | | | | | | | |
| | | 5 | | | | | | | ne sedimen | | k) | |
| | | 4 | | | | | | | by fine sedi | | | |
| | | 3 2 | | | | | | | d by fine sec | | | |
| | | | | | | | | | fine sedime | | al surface) | |
| | List the rati | | | | | | | <u>, </u> | | (== =================================== | | |
| | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 3 | 3 | 3 | |
| | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 3 | 3 | 3 | |
| | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 3 | 3 | 3 | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 3 | V _{SUBSTRATE} | | eam channe tream; use t | | | | | | | ghly equidist | tant points | 0.25 in |
| | | | ches to the 0.0 in, sand | | | | w (bedı | rock : | should be co | ounted as 9 | 9 in, | |
| | 0.10 | 0.25 | 0.25 | 0.10 | 0.10 | 0.10 | 0.1 | 0 | 0.10 | 0.25 | 1.00 | |
| | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 | 0.1 | | 0.10 | 0.10 | 0.10 | |
| | 0.10 | 0.10 | 0.25 | 0.25 | 0.25 | 0.25 | 0.2 | | 0.25 | 0.25 | 0.25 | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 4 | | | e total perce | | | | | | of feet of er ded, total e | | | 0 % |
| | | ماند د تا ۱ | Left Bank | 0 | ft | ī | Riaht B | ank [.] | 0 | ft | ı | |

| Sampl | 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 wo | oody stems: | | 0 | | |
| 6 | V_{TDBH} | Average dbh of trees (measure only if V _{CCANOPY} tree/sap inches (10 cm) in diameter. Enter tree DBHs in inches. | | | | | ng cover is a | at least 20% | 6). Trees ar | e at least 4 | 8.9 |
| | | List the dbh measurements of individual trees (at least 4 in) within the buffer on each side | | | | | each side of | | | | |
| | | the stream | | | | | | | | | |
| | | _ | Left Side | | | | | Right Side | | | |
| | 8 | 10 | 10 | 7 | | 8 | 10 | 10 | 8 | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | 1.00" (11) | 100.6 | | | | | |
| 7 | V_{SNAG} | | | | and 36" tall) it per 100 fe | | et of stream. alculated. | Enter num | iber of snag | s on each | 0.0 |
| | | | Left Side: | | 0 | | Right Side: | | 0 | | |
| 8 | V_{SSD} | | | | | | hes dbh) pei | | | | |
| | | | | | per of saplin e calculated. | | ubs on each | side of the | stream, and | the | Not Used |
| | | | Left Side: | | | | Right Side: | | | | |
| 9 | V_{SRICH} | | | | | | am reach. C | | | | |
| | | | | | | | ive species from these (| | ill strata. Sp | ecies | 1.60 |
| | | | ip 1 = 1.0 | | | l | | | 2 (-1.0) | | |
| V | Acer rubru | | | Magnolia ti | ripetala | | | | | Lonicera ja | ponica |
| | Acer sacci | harum | | Nyssa sylv | • | | | | Lonicera ta | • | |
| | Aesculus i | flava | | Oxydendrun | | BL | Alliaria peti | | DE | Lotus corni | culatus |
| | Asimina tri | iloba | 1 | Prunus sei | rotina | (H) | Alternanthe | | 0 | Lythrum sa | licaria |
| 2-3 | Betula alleg | | | Quercus a | | | philoxeroid | | V | Microstegiun | |
| | Betula len | = | | Quercus co | | | Aster tatari | cus | DE -3 | Paulownia | |
| | Carya alba | | | Quercus in | | | Cerastium | | H - | Polygonum o | |
| | Carya glal | | | Quercus p | | 634 | Coronilla va | | 04 | Pueraria m | • |
| | Carya ova | | 4 | Quercus ru | | | Elaeagnus u | mbellata | | Rosa multii | |
| | Carya ova | | | Quercus velutina | | 84 | Lespedeza bicolor | | 04 | Sorghum h | |
| | Cornus flo | | | Sassafras albidum | | | Lespedeza bicolor Lespedeza cuneata | | | Verbena br | • |
| ✓ | Fagus gra | | | Tilia ameri | | | Ligustrum ol | | | | |
| | Fraxinus a | | | Tsuga canadensis | | (3) 1 | Ligustrum s | | | | |
| | Liriodendroi | | | Ulmus ame | | | = | | | | |
| | Magnolia a | | | | | | | | | | |
| 13l | .nagriona (| | | | | | | | | | |
| | | 4 | Species in | Group 1 | | | | 2 | Species in | Group 2 | |

| - | | | | - | • | or 1m x 1m) tly along ea | - | | | n 25 feet fro | om each |
|----------------------------------|--|----------------|--------------|---------------|---------------|---------------------------------|---------------|--------------|-----------------|------------------|--------------------|
| 10 | V _{DETRITUS} | | | | | ner organic r r of the detri | | | | er and | 11.67 % |
| | Left Side | | | Righ | t Side | | | | | | |
| | | 15 | 10 | 10 | | 15 | 10 | 10 | | | |
| 11 | V_{HERB} | Average pe | ercentage co | over of herb | aceous veg | etation (mea | asure only it | tree cover | is <20%). [| o not | |
| | TIERO | include woo | ody stems a | t least 4" db | oh and 36" ta | all. Because accepted. E | there may | be several l | layers of gro | und cover | Not Used |
| | | at each sub | | s up tillougi | 11 200 % are | accepted. E | inter the pe | iceni cover | or ground v | egetation - | |
| | | | Left | Side | | | Righ | t Side | | | |
| | | | | | | | | | | | |
| Sample | e Variable 1 | 2 within the | e entire cat | chment of | the stream. | | | | | | |
| 12 | V _{WLUSE} | | | | e for watersl | | | | | | |
| | - WLUSE | | | | | | | | | | 0.62 |
| | | | Land | Use (Choos | se From Dro | p List) | | | Runoff Score | % in Catch- | Running Percent |
| | Forest and native range (50% to 75% ground cover) | | | | | | ~ | 0.7 | ment 80 | (not >100) 80 | |
| | | ative range (< | | n | 9 | | | · | 0.7 | 10 | 90 |
| | | | | | × E 00/ | | | | | | |
| | Open space (pasture, lawns, parks, etc.), grass cover <50% | | | | | | | 0.1 | 10 | 100 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | mmary | | | | | No | tes: | | | |
| Va | ariable | Value | VSI | | | | | | | | |
| V _C | CANOPY | 27 % | 0.19 | | | | | | | | |
| VEI | MBED | 3.0 | 0.82 | | | | | | | | |
| Vsı | JBSTRATE | 0.25 in | 0.13 | | | | | | | | |
| V _{BI} | ERO | 0 % | 1.00 | | | | | | | | |
| V_{LV} | WD | 0.0 | 0.00 | | | | | | | | |
| V_{TDBH} 8.9 1.00 | | | | | | | | | | | |
| Vsı | NAG | 0.0 | 0.10 | | | | | | | | |
| Vs | | Not Used | Not Used | | | | | | | | |
| | RICH | 1.60 | 0.76 | | | | | | | | |
| | ETRITUS | 11.7 % | 0.14 | | | | | | | | |
| | ERB | Not Used | Not Used | | | | | | | | |
| V _w | LUSE | 0.62 | 0.65 | | | | | | | | |

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

| STREAM NAME S-L57 | LOCATION Braxton County | | |
|---|--|-------------------|--|
| STATION # RIVERMILE | STREAM CLASS Ephemeral | | |
| LAT <u>38.828304</u> LONG <u>-80.525748</u> | RIVER BASIN Burnsville Lake-Little Kanawha River | | |
| STORET# | AGENCY Tetra Tech | | |
| INVESTIGATORS CV, RA | | | |
| FORM COMPLETED BY | DATE 11/06/2019 | REASON FOR SURVEY | |
| C.Vileno | TIME 2:15 | Proposed pipeline | |

| | Habitat | Condition Category | | | | | | | | | |
|--|---|---|---|---|---|--|--|--|--|--|--|
| | Parameter | 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 <u>not</u> new fall and <u>not</u> 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 4 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | | | | | |
| Parameters to be evaluated in sampling reach | 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 8 | 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). | | | | | | |
| ıram | score 0 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | | | | | |
| Par | 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 | | | | | | |

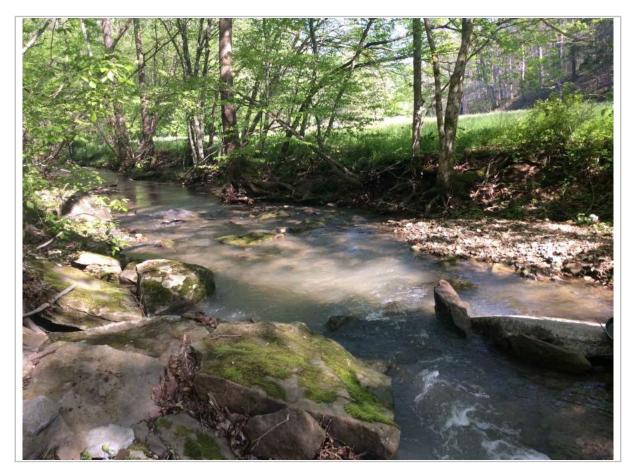
HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

| | Habitat | Condition Category | | | | | | | | |
|--|---|--|--|--|---|--|--|--|--|--|
| | Parameter Parameter | 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} 6 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | | | | |
| ding reach | 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. | | | | | |
| amp | score 0 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | | | | |
| Parameters to be evaluated broader than sampling reach | 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. | | | | | |
| e ev | SCORE 4 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | | | | |
| s to b | SCORE 4 (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | | | | |
| Parameter | 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 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 | | | | | |

| 40 | DO: |
|----------------|-----|
| Total Score 46 | pH: |
| | SC· |

A-8

No / low flow at time of survey. Unable to sample water quality or $\ensuremath{\mathbf{WVSCI}}$.



Photograph Direction NW

Comments:

| STREAM ID S-IJ27-ordinary | | | STREAM | STREAM NAME Little Knawl Creek | | | | | | |
|---------------------------|-----------|---|---|--------------------------------|-------------------|--|--------------------------------------|--|--|--|
| CLIENT MV | Р | | PROJEC | TNAME MV | Р | | | | | |
| LAT 38.808 | | ONG -80.54627 | | | | COUNTY Braxton | | | | |
| INVESTIGATO | ORS E. Fo | oster, S. Therkild | son | | | | | | | |
| WATER TYPE | RPW [| NRPW | FLOW R Perennial | EGIME Inter | mittent | t Ephemeral | | | | |
| | | | | | 1 0: | | 4 8 18 1 | | | |
| CHANNEL FE | ATURES | Top of Bank H LB2.0fl Water Depth: Water Width:_ Ordinary High | Vidth: 20.0 ft Height: t RB 2.0 3.00 in 10.0 ft Water Mark (Wid | th): <u>20.0</u> ft | Gra Str Art - Wif | adient Flat <u>✔</u> Mo | 100 ft) (10 ft/100 ft) Heavy nelized | | | |
| FLOW CHARACTER | ISTICS | Stream bed Standing w Flowing wa Velocity | tream bed dry I moist vater | | Mo Riff Po | pportion of Reach Represorphology Types (Only enternation of the Sound S | r if water present) % | | | |
| INOR | - | UBSTRATE CO | | | | GANIC SUBSTRATE COM es not necessarily add up | | | | |
| Substrate Type | Dia | meter | % Composition Sampling Read | | | Characteristic | % Composition in Sampling Area | | | |
| Bedrock | | | | Detritus | | sticks, wood, coarse | | | | |
| Boulder | | 56 mm (10") | 20 | 200 | | plant materials (CPOM) | | | | |
| Cobble | | 6 mm (2.5"-10") | 30 | Muck-M | lud | black, very fine organic | | | | |
| Gravel | | nm (0.1"-2.5") | 30 | | | (FPOM) | | | | |
| Sand | | -2mm (gritty) | 20 | N41 | | anno alball for our cont | | | | |
| Silt | | 04-0.06 mm | | Marl | | grey, shell fragments | | | | |
| Clay WATERSHED FEATURES | | D4 mm (slick) Predominant ✓ Forest ✓ Field/Past — Agricultura — ROW Canopy Cove — Open ✓ Shaded | Resider Other: | rcial al ntial | Flo | odplain Width Wide > 30ft <u>✓</u> Modera Narrow <15ft | te 15-30ft | | | |
| | | <u> </u> | | | | | | | | |
| | | TEDD ATENIA | UED WILL DUISE O | DOEDVED (| \D | HED NOTES AND SOCIE | 24ATIONS | | | |
| | | | | | | HER NOTES AND OBSER | | | | |
| | | | | | | | | | | |

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

| USACE FILE NO./ Project Name: (v2.1, Sept 2015) | | Mountain | v Valley Pipeline Project SWVM v2.1 | | COORDINATES: cimal Degrees) | Lat. | 38.809619 38.808958 38.808539 | Lon. | -80.541463 -80.543128 -80.547202 | WEATHER: | | Cloudy, 85° | DATE: | September 8, 2016 |
|--|----------------------|------------------------|--|---|--|------|---|---------------------|--|--|---------------------|----------------|---|--|
| IMPACT STREAM/SITE ID (watershed size {acreage} | | | S-IJ27; Little K Multiple stream crossing im See site description for Form of Mitigat | pacts combine additional imp on: Mitigation | ed on SWVM form act locations Bank | | MITIGATION STREAM CLASS./ (watershed size {acreage | | | Additional Impa 38.808242, 38.808197, | -80.546896 | S: | Comments: | |
| STREAM IMPACT LENGTH: | 84 | FORM OF MITIGATION: | RESTORATION (Levels I-III) | | OORDINATES: cimal Degrees) | Lat. | | Lon. | | PRECIPITATION PAST 48 HRS: | | 0 | Mitigation Length: | |
| Column No. 1- Impact Existin | g Condition (Del | bit) | Column No. 2- Mitigation Existing | Condition - Bas | eline (Credit) | • | Column No. 3- Mitigation Pr Post Completio | | Years | Column No. 4- Mitigation Proj Post Completion (| | ears | Column No. 5- Mitigation Project | ed at Maturity (Credit) |
| Stream Classification: | Pere | nnial | Stream Classification: | P | erennial | | Stream Classification: | Pe | erennial | Stream Classification: | Pere | ennial | Stream Classification: | Perennial |
| Percent Stream Channel Si | <u> </u> | 1 | Percent Stream Channel S | · | | | Percent Stream Channel S | | 0 | Percent Stream Channel Si | <u> </u> | 0 | Percent Stream Channel Si | • |
| HGM Score (attach d | lata forms): | | HGM Score (attach | data forms): | | | HGM Score (attach | data forms): | | HGM Score (attach d | ata forms): | | HGM Score (attach da | ata forms): |
| | | Average | | | Average | | | | Average | | | Average | | Average |
| Hydrology | | | Hydrology | | | | Hydrology | | | Hydrology | | | Hydrology | |
| Biogeochemical Cycling | | 0 | Biogeochemical Cycling | | 0 | | Biogeochemical Cycling | | 0 | Biogeochemical Cycling | | 0 | Biogeochemical Cycling | 0 |
| PART I - Physical, Chemical and | l Biological Indic | cators | Habitat PART I - Physical, Chemical a | nd Biological In | dicators | | PART I - Physical, Chemical a | nd Biological In | dicators | Habitat PART I - Physical, Chemical and | Biological Indi | icators | Habitat 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 stream | ns classifications) | | PHYSICAL INDICATOR (Applies to all stream | ns classifications) | | | PHYSICAL INDICATOR (Applies to all stream | ns classifications) | | PHYSICAL INDICATOR (Applies to all stream | ns classifications) | | PHYSICAL INDICATOR (Applies to all stream | s 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) | |
| Epifaunal Substrate/Available Cover | 0-20 | 17 | Epifaunal Substrate/Available Cover | 0-20 | | | Epifaunal Substrate/Available Cover | 0-20 | | Epifaunal Substrate/Available Cover | 0-20 | | Epifaunal Substrate/Available Cover | 0-20 |
| 2. Embeddedness | 0-20 | 15 | 2. Embeddedness | 0-20 | | | 2. Embeddedness | 0-20 | | 2. Embeddedness | 0-20 | | 2. Embeddedness | 0-20 |
| 3. Velocity/ Depth Regime | 0-20 | 3 | 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 | 13 | 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 0-1 | 9 | 5. Channel Flow Status | 0-20 0-1 | | | 5. Channel Flow Status | 0-20 0-1 | | 5. Channel Flow Status | 0-20 0-1 | | 5. Channel Flow Status | 0-20 0-1 |
| 6. Channel Alteration 7. Frequency of Riffles (or bends) | 0-20 | 4 | 6. Channel Alteration | 0-20 | | | 6. Channel Alteration 7. Frequency of Riffles (or bends) | 0-20 | | 6. Channel Alteration 7. Frequency of Riffles (or bends) | 0-20 | | Channel Alteration Frequency of Riffles (or bends) | 0-20 |
| 8. Bank Stability (LB & RB) | 0-20 | 16 | 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) | 0-20 0-20 | | | 8. Bank Stability (LB & RB) | 0-20 | | 8. Bank Stability (LB & RB) | 0-20 0-20 | | 8. Bank Stability (LB & RB) | 0-20 |
| 9. Vegetative Protection (LB & RB) | 0-20 | 12 | 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) | | 14 | 10. Riparian Vegetative Zone Width (LB & RB) | | | | 10. Riparian Vegetative Zone Width (LB & RB) | | | 10. Riparian Vegetative Zone Width (LB & RB) | | | 10. Riparian Vegetative Zone Width (LB & RB) | 0-20 |
| Total RBP Score | Marginal | 107 | Total RBP Score | Poor | 0 | | Total RBP Score | Poor | 0 | Total RBP Score | Poor | 0 | Total RBP Score | Poor 0 |
| Sub-Total | | 0.535 | Sub-Total | _ | 0 | | Sub-Total | | 0 | Sub-Total | • | 0 | Sub-Total | 0 |
| CHEMICAL INDICATOR (Applies to Intermitte | | Streams) | CHEMICAL INDICATOR (Applies to Intermitt | | Streams) | | CHEMICAL INDICATOR (Applies to Intermitte | | Streams) | CHEMICAL INDICATOR (Applies to Intermitte | | Streams) | CHEMICAL INDICATOR (Applies to Intermitte | · · · · · · · · · · · · · · · · · · · |
| WVDEP Water Quality Indicators (General | al) | | WVDEP Water Quality Indicators (General Specific Conductivity | ıl) | | | WVDEP Water Quality Indicators (General Specific Conductivity | <u>.l)</u> | | WVDEP Water Quality Indicators (General Specific Conductivity | ıl) | | WVDEP Water Quality Indicators (General Specific Conductivity | <u>) </u> |
| Specific Conductivity | T | 0.110 | Specific Conductivity | T | | | Specific Conductivity | T | | Specific Conductivity | | | Specific Conductivity | |
| <=99 - 90 points | 0-90 | 0.149 | | 0-90 | | | | 0-90 | | | 0-90 | | | 0-90 |
| рН | | 0.0 | рН | | | | рН | | | рН | | | рН | |
| 6.0-8.0 = 80 points | 0-80 | 6.89 | | 5-90 0-1 | | | | 5-90 0-1 | 5.6 | | 5-90 0-1 | | | 5-90 0-1 |
| 0.0-8.0 – 80 points | | | no | | | | DO | _ | | DO | | | DO. | |
| | 10-30 | 50.08 | | 10-30 | | | | 10-30 | | | 10-30 | | | 10-30 |
| >5.0 = 30 points | 10-30 | 30.00 | | 10-50 | | | | 10-30 | | | 10-30 | | | 10-50 |
| Sub-Total | | 1 | Sub-Total | | 0 | | Sub-Total | | 0 | Sub-Total | | 0 | Sub-Total | 0 |
| BIOLOGICAL INDICATOR (Applies to Interm | nittent and Perennia | il Streams) | BIOLOGICAL INDICATOR (Applies to Interm | ittent and Perenni | al Streams) | | BIOLOGICAL INDICATOR (Applies to Interi | nittent and Pereni | nial Streams) | BIOLOGICAL INDICATOR (Applies to Inter | mittent and Perer | nnial Streams) | BIOLOGICAL INDICATOR (Applies to Intern | ittent and Perennial Streams) |
| WV Stream Condition Index (WVSCI) | 1 1 | | WV Stream Condition Index (WVSCI) | 1 1 | | | WV Stream Condition Index (WVSCI) | | | WV Stream Condition Index (WVSCI) | 1 1 | | WV Stream Condition Index (WVSCI) | |
| Good | 0-100 0-1 | 71.5 | | 0-100 0-1 | | | | 0-100 0-1 | | | 0-100 0-1 | | | 0-100 0-1 |
| Sub-Total | | 0.715 | Sub-Total | | 0 | | Sub-Total | | 0 | Sub-Total | 1 1 | 0 | Sub-Total | 0 |
| | | | | | | | | | | | | | | |
| PART II - Index and l | Unit Score | | PART II - Index an | d Unit Score | | | PART II - Index and | I Unit Score | | PART II - Index and L | Init Score | | PART II - Index and U | nit 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 |
| 0.750 | 84 | 63 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 0 |

| | | (See instruction n | | - Impact Factors It values for MITIGATIO | N RANKING and I | I F) | | | |
|---|--|--|-----------------------|---|---------------------------|---|--------------------------|--------------------------------|-----------|
| Temn | oral Loss-Construction | (See matraction pa | ge to misert delau | it values for will loaf to | | <u> </u> | term Protection | | |
| *Note: Reflects duration of aquatic function | al loss between the time of a | n impact (debit) and completion of | | | % Add. Mitigation | on and Monitoring Period | | Term Protection (Years) | |
| compe | ensatory mitigation (credit). | | | | | | | | |
| Years | | 0 | | | | | | | |
| Sub-Total | | 0 | | | | | | | |
| Tor | nporal Loss-Maturity | | | | 0 + 5/1 | 10 Year Monitoring | | 101 | |
| *Note: Period between completion of compensato | | ne time required for maturity, as it relates | | | Sub-Total | TO Year Monitoring | | 0 | |
| to function (i.e. maturity of tree stratum to provide | e organic matter and detritus corridor). | within riparian stream or wetland buffer | | | | | | | |
| | comaor). | | | | | | to Unit Score Cor | | |
| % Add. Mitigation | | Temporal Loss-Maturity (Years) | | | Final Index Score (Debit) | Linear Feet | Unit Score (Debit) | ILF Costs (Offsetting Debit | |
| 70 Add. Mitigation | | Temporal Loss-Maturity (Tears) | | | 0.75 | 84 | 63 | \$50,400.00 | |
| | | | | | 0.75 | 04 | | \$50,400.00 | , |
| | | | | | | | | | |
| 0% | | 0 | | | | | | | |
| Sub-Total | | 0 | | | | | | | |
| | | | | | | | | | |
| | | PART V | - Comparison of U | nit Scores and Projecte | ed Balance | | | | |
| | | | | Г | ı | T | | | |
| | | Mitigation Existing | | Mitigation Projected at | | Mitigation Projected at | | Mitigation Projected | |
| Final Unit Score (Debit) [No Net Loss Value] | 63 | Condition - Baseline | | Five Years Post Completion | | Ten Years | | At Maturity | |
| [NO Net Loss Value] | | (Credit) | | (Credit) | | Post Completion (Credit) | | (Credit) | |
| | | | | ` ' | | | | | |
| FINAL PROJECTED NET BALANCE | | | | | 0 | | 0 | | 0 |
| | | _ | | | | | | | |
| | | ř | art VI - Mitigation C | Considerations (Incenti | ves) | | | | |
| | Extent of Stream Re | ataration | | | | | | | |
| *Note1: Reference the Instruction | | Storation orrect Restoration Levels (below) for your pr | oject | | 1 | | Upland Buffer Zone | | |
| | Place an "X" in the appropriate | | | | *Note : Reference | ce Instructional handout for the def *Note ² : Enter the buffer width for | | | s (below) |
| Restoration Level 1 | | | | | | | e appropriate mitigation | | |
| Restoration Level 2 | | | | | | | Left Bank | , | |
| | | | | | Buffer Width | | Leit Balli | | |
| Restoration Level 3 | | | | | | 0-50 | | None | |
| | | | | | D. 66 - 1. 141- | 51-150 | Dialet Dan | None | |
| | | | | | Buffer Width | 0-50 | Right Ban | None None | |
| Compensatory Mitigation Plan incorpo | | | |] | | 51-150 | | None | |
| *Note: HUC 12-based watershed | approach required to obtain Strea | m Restoration incentive | No | | Average Buffer Width/Side | 0 | | | |
| | | | | 1 | Width/Side | | | | |
| Site | | Impact | Mitigation Unit | | | | Stra | ight Preservation Ratio | |
| Oite | | Unit Yield (Debit) | Yield (Credit) | | | | | (v2.1, Sept 2015) | |
| S-IJ27 | | 63 | #DIV/0! | | | Final Mitigation Unit Yield | | | |
| | | | | 1 | | #DIV/0! | | | |

| Insects | Count | Tolerance | TV | Insects | Count | Tolerance | TV | Non-Insects | Count | Tolerance | TV | 7 | |
|-------------------|----------------|--------------|-----|------------------|-------|-----------|----|-----------------|---------------|-----------|--------------|---------------------|--------------|
| Ephemeroptera | | | 25 | Odonata | | | 0 | Crustacea | | | 2 | | |
| Ameletidae | | 2 | 0 | Aeshnidae | | 3 | 0 | Asellidae | | 7 | 0 | | |
| Baetidae | | 4 | 0 | Calopterygidae | | 6 | 0 | Cambaridae | 2 | 5 | 10 | | |
| Beatiscidae | | 4 | 0 | Coenagrionidae | | 7 | 0 | Gammaridae | | 5 | 0 | | |
| Caenidae | | 5 | 0 | Cordulegastridae | | 3 | 0 | Palaemonidae | | 5 | 0 | | |
| Ephemerellidae | | 3 | 0 | Gomphidae | | 5 | 0 | Annelida | • | • | 0 | | |
| Ephemeridae | 3 | 5 | 15 | Lestidae | | 7 | 0 | Hirudinea | | 10 | 0 | | |
| Heptageniidae | 18 | 3 | 54 | Libellulidae | | 7 | 0 | Nematoda | | 10 | 0 | | |
| Isonychiidae | | 3 | 0 | Coleoptera | | | 13 | Nematomorpha | | 10 | 0 | | |
| Leptophlebiidae | 4 | 4 | 16 | Chrysomelidae | | 7 | 0 | Oligochaeta | | 10 | 0 | | |
| Potamanthidae | | 5 | 0 | Dryopidae | | 5 | 0 | Turbellaria | • | • | 0 | | |
| Siphlonuridae | | 3 | 0 | Dytiscidae | | 6 | 0 | Turbellaria | | 7 | 0 | | |
| Tricorythidae | | 5 | 0 | Elmidae | 6 | 4 | 24 | Bivalvia | • | • | 0 | | |
| Plecoptera | | | 4 | Gyrinidae | | 5 | 0 | Corbiculidae | | 6 | 0 | | |
| Capniidae | | 2 | 0 | Haliplidae | | 7 | 0 | Sphaeriidae | | 5 | 0 | | |
| Chloroperlidae | | 2 | 0 | Hydrophilidae | | 7 | 0 | Unionidae | | 4 | 0 | | |
| Leuctridae | | 2 | 0 | Psephenidae | 7 | 3 | 21 | Gastropoda | | | 0 | | |
| Nemouridae | | 2 | 0 | Ptilodactylidae | | 5 | 0 | Ancylidae | | 7 | 0 | | |
| Peltoperlidae | | 1 | 0 | Hemiptera | | | 0 | Hydrobiidae | | 4 | 0 | | |
| Perlidae | 4 | 1 | 4 | Belostomatidae | | 8 | 0 | Physidae | | 7 | 0 | | |
| Perlodidae | | 1 | 0 | Corixidae | | 8 | 0 | Planorbidae | | 5 | 0 | | |
| Pteronarcyidae | | 1 | 0 | Gerridae | | 10 | 0 | Pleuroceridae | | 5 | 0 | | |
| Taeniopterygidae | | 2 | 0 | Hydrometridae | | 8 | 0 | Viviparidae | | 5 | 0 | | |
| Trichoptera | | | 6 | Nepidae | | 8 | 0 | Miscellaneous | | | 0 | | |
| Brachycentridae | | 2 | 0 | Notonectidae | | 8 | 0 | Collembola | | 6 | 0 | | |
| Glossosomatidae | | 2 | 0 | Megaloptera | | | 0 | Lepidoptera | | 5 | 0 | | |
| Helicopsychidae | | 3 | 0 | Corydalidae | | 3 | 0 | Neuroptera | | 5 | 0 | | |
| Hydropsychidae | | 5 | 0 | Sialidae | | 6 | 0 | Hydrachnidae | | 6 | 0 | | |
| Hydroptilidae | | 3 | 0 | Diptera | | | 0 | Totals | Totalı | number | 50 | | |
| Lepidostomatidae | 6 | 3 | 18 | Athericidae | | 3 | 0 | Totals | Total f | amilies | 8 | | |
| Leptoceridae | | 3 | 0 | Blephariceridae | | 2 | 0 | | | | calculations | | |
| Limnephilidae | | 4 | 0 | Ceratopogonidae | | 8 | 0 | | Richnes | S | | Additional metri | cs |
| Molannidae | | 3 | 0 | Chironomidae | | 9 | 0 | Total Taxa | | 8 | 36.4 | Ephemeroptera Taxa | 3 |
| Philopotamidae | | 4 | 0 | Culicidae | | 10 | 0 | EPT Taxa | | 5 | 38.5 | Plecoptera Taxa | 1 |
| Phryganeidae | | 4 | 0 | Dixidae | | 6 | 0 | | Toleran | ce | | Trichoptera Taxa | 1 |
| Polycentropodidae | | 5 | 0 | Empididae | | 7 | 0 | Biotic Index | | 3.24 | 96.6 | Long-lived Taxa | 5 |
| Psychomiidae | | 3 | 0 | Psychodidae | | 8 | 0 | % Tolerant | | 0.0 | 100.0 | Odonata Taxa | 0 |
| Rhyacophilidae | | 3 | 0 | Ptychopteridae | | 8 | 0 | | Composit | ion | | Diptera Taxa | 0 |
| Uenoidae | | 2 | 0 | Simuliidae | | 6 | 0 | % EPT Abundance | | 70.0 | 77.8 | COET Taxa | 6 |
| | | erance Value | 162 | Stratiomyidae | | 10 | 0 | % Dominance | | 36.0 | 80.0 | % Sensitive | 70.0 |
| | irginia Save O | | | Syrphidae | | 10 | 0 | % Net-spinners | | 0.0 | NA | % Chironomidae | 0.0 |
| 601 57th Stre | | | 04 | Tabanidae | | 7 | 0 | | Condition Ind | | 71.5 | % Clingers | 90.0 |
| http:/ | /www.dep.w | v.gov/sos | | Tipulidae | | 5 | 0 | Integrity R | ating | Subo | ptimal | More diversity meas | <u>sures</u> |

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.

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

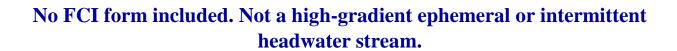
| STREAM NAME S-IJ27 | LOCATION Braxton County, WV | | | | |
|---|------------------------------|---------------------------|--|--|--|
| STATION # RIVERMILE | STREAM CLASS Perennial | | | | |
| Lat <u>38.808539</u> long <u>-80.547202</u> | RIVER BASIN Burnsville I | _ake-Little Kanawha River | | | |
| STORET# | AGENCY Tetra Tech | | | | |
| INVESTIGATORS Jason McGuirk, Cody St | oliker | | | | |
| FORM COMPLETED BY | DATE 09/08/2016 | REASON FOR SURVEY | | | |
| C. Stoliker | TIME 13:00 Proposed Pipeline | | | | |

| | Habitat | Condition Category | | | | | | | | |
|--|---|---|---|---|---|--|--|--|--|--|
| | Parameter | 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 17 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | | | | |
| ı sampling reach | 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. | | | | | |
| ted in | SCORE 15 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | | | | |
| Parameters to be evaluated in sampling reach | 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). | | | | | |
| ıram | SCORE 3 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | | | | |
| Pe | 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 13 | 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 4 | 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 | | Condition | Category | |
|--|--|--|--|--|---|
| | Parameter Parameter | 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 9 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| ling reach | 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. |
| samp | SCORE 4 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| Parameters to be evaluated broader than sampling reach | 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. |
| e eva | SCORE 8 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 |
| to b | SCORE 8 (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 |
| Parameter | 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 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 |
| | 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 107





Photograph Direction SW

Comments:

| STREAM ID | | | STREAM NA | STREAM NAME UNT to Little Knawl Creek | | | | | | |
|--|--|---|--|--|--|---|--|--|--|--|
| CLIENT MV | P | | PROJECT N | | | | | | | |
| LAT 38.8096 | | ONG -80.53723 | 1 DATE 05/07/ | /2016 | COUNTY Braxton | | | | | |
| INVESTIGATO | ORS E. Fo | ster, S. Therkild | son | | | | | | | |
| TNW | RPW [| NRPW [| FLOW REG Perennial | IME Intermitte | ent Ephemeral 🗸 | | | | | |
| CHANNEL FE | ATURES | Top of Bank H LBfl Water Depth: Water Width:_ Ordinary High Ordinary High Flow Direction | Vidth:5.0ft Height: t | ft : 1.0 ft : 6.0 in 1 | Gradient Flat Mo (0.5/100 ft) (2 ft) Stream Erosion ✓ None Moderate Artificial, Modified or Chang ✓ Yes No Within Roadside Ditch — Yes ✓ No Culvert Present Yes Culvert Material: Culvert Size:in | nelized | | | | |
| FLOW CHARACTER | ISTICS | Stream bed Standing w Flowing wa | tream bed dry I moist vater | | Proportion of Reach Repres Morphology Types (Only enter Riffle % Run Pool % Turbidity Clear Slightly to Other | sented by Stream er if water present) % urbidTurbid | | | | |
| INOR | - | JBSTRATE CO | | _ | RGANIC SUBSTRATE COM | IPONENTS | | | | |
| | (shou | ld add up to 100 | 0%) 100 | (0 | does not necessarily add u | p to 100%) | | | | |
| Substrate Type | | ld add up to 100 meter | % Composition in Sampling Reach | Substrate Type | Characteristic | | | | | |
| | Dia | meter | % Composition in | Substrate Type | Characteristic sticks, wood, coarse | % Composition in | | | | |
| Type Bedrock Boulder | Dia > 25 | meter 56 mm (10") | % Composition in | Substrate | Characteristic | % Composition in | | | | |
| Type Bedrock Boulder Cobble | Dia > 29 64-256 | meter 56 mm (10") 5 mm (2.5"-10") | % Composition in Sampling Reach 30 30 | Substrate Type | Characteristic sticks, wood, coarse plant materials (CPOM) black, very fine organic | % Composition in Sampling Area | | | | |
| Type Bedrock Boulder Cobble Gravel | Dia > 28 64-256 2-64 r | meter 56 mm (10") 5 mm (2.5"-10") nm (0.1"-2.5") | % Composition in Sampling Reach 30 30 30 | Substrate Type Detritus | Characteristic sticks, wood, coarse plant materials (CPOM) | % Composition in Sampling Area | | | | |
| Type Bedrock Boulder Cobble Gravel Sand | > 29 64-256 2-64 r | meter 56 mm (10") 5 mm (2.5"-10") mm (0.1"-2.5") -2mm (gritty) | % Composition in Sampling Reach 30 30 | Substrate Type Detritus Muck-Mud | Characteristic sticks, wood, coarse plant materials (CPOM) black, very fine organic (FPOM) | % Composition in Sampling Area | | | | |
| Type Bedrock Boulder Cobble Gravel Sand Silt | > 25 64-256 2-64 r 0.06 0.00 | meter 56 mm (10") 5 mm (2.5"-10") mm (0.1"-2.5") -2mm (gritty) 14-0.06 mm | % Composition in Sampling Reach 30 30 30 | Substrate Type Detritus | Characteristic sticks, wood, coarse plant materials (CPOM) black, very fine organic | % Composition in Sampling Area | | | | |
| Type Bedrock Boulder Cobble Gravel Sand | > 29 64-256 2-64 r 0.06 0.00 < 0.00 | meter 56 mm (10") 5 mm (2.5"-10") nm (0.1"-2.5") -2mm (gritty) 14-0.06 mm 14 mm (slick) | % Composition in Sampling Reach 30 30 30 10 Surrounding Landu — Commercia ure — Industrial al — Residential — Other: | Substrate Type Detritus Muck-Mud Marl | Characteristic sticks, wood, coarse plant materials (CPOM) black, very fine organic (FPOM) grey, shell fragments | % Composition in Sampling Area | | | | |
| Type Bedrock Boulder Cobble Gravel Sand Silt Clay | > 29 64-256 2-64 r 0.06 0.00 < 0.00 | meter 56 mm (10") 5 mm (2.5"-10") nm (0.1"-2.5") -2mm (gritty) 14-0.06 mm 14 mm (slick) Predominant Forest Field/Past Agricultura ROW Canopy Cove | % Composition in Sampling Reach 30 30 30 10 Surrounding Landu — Commercia — Industrial — Residential — Other: | Substrate Type Detritus Muck-Mud Marl | Characteristic sticks, wood, coarse plant materials (CPOM) black, very fine organic (FPOM) grey, shell fragments Floodplain Width Wide > 30ft Modera | % Composition in Sampling Area 40 | | | | |

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

| USACE FILE NO./ Project Name: Mountai (v2.1, Sept 2015) | n Valley Pipeline Project IMPACT COORDINATES SWVM v2.1 (in Decimal Degrees) | S: Lat. | 38.809457 | Lon. | -80.537428 | WEATHER: | Cloudy, 85° | DATE: | September 8, 2016 |
|---|---|---------|--|----------------|------------------|--|-------------------------------|--|---|
| IMPACT STREAM/SITE ID AND SITE DESCRIPTION: (watershed size {acreage}, unaltered or impairments) | S-IJ32; UNT to Little Knawl Creek; 7.35ac Form of Mitigation: Mitigation Bank | | MITIGATION STREAM CLASS./ (watershed size {acreage | | | | | Comments: | No/low water flow at time of survey. Unable to sample water quality or WVSCI |
| STREAM IMPACT LENGTH: 26 FORM OF MITIGATION | I: 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 Pr Post Completion | | ve Years | Column No. 4- Mitigation Proje Post Completion (C | | Column No. 5- Mitigation Project | ted at Maturity (Credit) |
| Stream Classification: Ephemeral | Stream Classification: Ephemeral | | Stream Classification: | | Ephemeral | Stream Classification: | Ephemeral | Stream Classification: | Ephemeral |
| Percent Stream Channel Slope 15 | Percent Stream Channel Slope | | Percent Stream Channel SI | ope | 0 | Percent Stream Channel Slo | pe 0 | Percent Stream Channel S | Slope 0 |
| HGM Score (attach data forms): | HGM Score (attach data forms): | | HGM Score (attach | data forms |): | HGM Score (attach da | ta forms): | HGM Score (attach | data forms): |
| Average | Hydrology Biogeochemical Cycling Habitat PART I - Physical, Chemical and Biological Indicators | | Hydrology Biogeochemical Cycling Habitat PART I - Physical, Chemical ar | | 0 | Hydrology Biogeochemical Cycling Habitat PART I - Physical, Chemical and E | 0 | Hydrology Biogeochemical Cycling Habitat PART I - Physical, Chemical an | 0 |
| 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 | classification | 5) | PHYSICAL INDICATOR (Applies to all streams | classifications) | PHYSICAL INDICATOR (Applies to all stream | ns classifications) |
| 1. Epifaunal Substrate/Available Cover | USEPA RBP (High Gradient Data Sheet) 1. Epifaunal Substrate/Available Cover | | USEPA RBP (High Gradient Data Sheet) 1. Epifaunal Substrate/Available Cover 2. Embeddedness 3. Velocity/ Depth Regime 4. Sediment Deposition 5. Channel Flow Status 6. Channel Alteration 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) 9. Vegetative Protection (LB & RB) 10. Riparian Vegetative Zone Width (LB & RB) Total RBP Score Sub-Total CHEMICAL INDICATOR (Applies to Intermitter WYDEP Water Quality Indicators (General Specific Conductivity DO Sub-Total | | 0 | USEPA RBP (High Gradient Data Sheet) 1. Epifaunal Substrate/Available Cover 2. Embeddedness 3. Velocity/ Depth Regime 4. Sediment Deposition 5. Channel Flow Status 6. Channel Alteration 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) 9. Vegetative Protection (LB & RB) 10. Riparian Vegetative Zone Width (LB & RB) Total RBP Score Sub-Total CHEMICAL INDICATOR (Applies to Intermitten WYDEP Water Quality Indicators (General) Specific Conductivity DO Sub-Total | | USEPA RBP (High Gradient Data Sheet) 1. Epifaunal Substrate/Available Cover 2. Embeddedness 3. Velocity/ Depth Regime 4. Sediment Deposition 5. Channel Flow Status 6. Channel Alteration 7. Frequency of Riffles (or bends) 8. Bank Stability (LB & RB) 9. Vegetative Protection (LB & RB) 10. Riparian Vegetative Zone Width (LB & RB) Total RBP Score Sub-Total CHEMICAL INDICATOR (Applies to Intermitt WYDEP Water Quality Indicators (General Specific Conductivity PH DO Sub-Total | |
| BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams) | BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams) | | BIOLOGICAL INDICATOR (Applies to Intern | nittent and Pe | rennial Streams) | BIOLOGICAL INDICATOR (Applies to Intermi | ittent and Perennial Streams) | BIOLOGICAL INDICATOR (Applies to Inter | mittent and Perennial Streams) |
| WV Stream Condition Index (WVSCI) 0 0-100 0-1 Sub-Total 0 | WV Stream Condition Index (WVSCI) 0-100 0-1 Sub-Total 0 | | WV Stream Condition Index (WVSCI) Sub-Total | 0-100 | 0-1 | WV Stream Condition Index (WVSCI) Sub-Total | 0-100 0-1 | WV Stream Condition Index (WVSCI) Sub-Total | 0-100 0-1 |
| PART II - Index and Unit Score | PART II - Index and Unit Score | | PART II - Index and | I Unit Score | | PART II - Index and Ur | nit Score | PART II - Index and | Unit Score |
| Index Linear Feet Unit Score | Index Linear Feet Unit Score | | Index | Linear F | eet Unit Score | Index | Linear Feet Unit Score | Index | Linear Feet Unit Score |
| 0.670 26 17.42 | 0 0 0 | | 0 | 0 | 0 | 0 | 0 0 | 0 | 0 0 |

| | | (See instruction page | | - Impact Factors It values for MITIGATIO | N BANKING and II | _F) | | | |
|--|--|--|-----------------------|---|-------------------|---|--------------------------|--------------------------|------------|
| Temp | poral Loss-Construction | | | | | Long | term Protection | | |
| *Note: Reflects duration of aquatic functional loss | between the time of an impac mitigation (credit). | ct (debit) and completion of compensatory | | | % Add. Mitigation | on and Monitoring Period | | -Term Protection (Years) | |
| | miligation (credit). | | | | | | | | |
| Years | | 0 | | | | | | | |
| Sub-Total | | 0 | | | | | | | |
| Tei | mporal Loss-Maturity | | | | 0 + 5/1 | 10 Year Monitoring | | 101 | |
| *Note: Period between completion of compensator | ry mitigation measures and the | | | | Sub-Total | | | 0 | |
| function (i.e. maturity of tree stratum to provide | e organic matter and detritus w corridor). | within riparian stream or wetland buffer | | | | DADT IV Indox | to Unit Score Cor | wordion | |
| | comacij. | | | | Final Index Score | | | ILF Costs | |
| % Add. Mitigation | | Temporal Loss-Maturity (Years) | | | (Debit) | Linear Feet | Unit Score (Debit) | (Offsetting Debit | |
| | | . , | | | 0.67 | 26 | 17.42 | \$13,936.00 | |
| | | | | | | | | | |
| | | | | | | | | | |
| 0% | | 0 | | | | | | | |
| Sub-Total Sub-Total | | U | | | | | | | |
| | | | | | | | | | |
| | | PART V | - Comparison of U | nit Scores and Projecte | ed Balance | | | | |
| | | | | | | | | | |
| Final Unit Score (Debit) | 47.40 | Mitigation Existing | | Mitigation Projected at | | Mitigation Projected at Ten | | Mitigation Projected At | |
| [No Net Loss Value] | 17.42 | Condition - Baseline (Credit) | | Five Years Post Completion (Credit) | | Years Post Completion (Credit) | | Maturity (Credit) | |
| | | (Credit) | | Fost Completion (Credit) | | Post Completion (Credit) | | (Gredit) | |
| FINAL PROJECTED NET BALANCE | | | | | 0 | | 0 | | 0 |
| | | | | • | • | | | | |
| | | P | art VI - Mitigation (| Considerations (Incentiv | ves) | | | | |
| | Extent of Stream Re | estoration | | | | E to the | | | |
| | | correct Restoration Levels (below) for your pr | oject | | *Note1: Referen | Extended ce Instructional handout for the def | Upland Buffer Zone | | s (below) |
| *Note2: F | Place an "X" in the appropriate | category (only select one). | | | Note : Neicron | *Note ² : Enter the buffer width for | | | is (below) |
| Restoration Level 1 | | | | | | *Note ³ : Select th | e appropriate mitigation | ı type | |
| Restoration Level 2 | | | | 1 | Buffer Width | | Left Bank | (| |
| Restoration Level 3 | | | | 1 | | | | | |
| | | | | J | | 0-50 51-150 | | None None | |
| | | | | | Buffer Width | 31-130 | Right Ban | | |
| | | | | | | 0-50 | | None | |
| Compensatory Mitigation Plan incorport *Note: HUC 12-based watershed | | | No | | Average Buffer | 51-150 | | None | |
| Note: FIGU 12-based watershed | approach required to obtain offer | an restoration incentive | NO | | Width/Side | 0 | | | |
| | | Impact | Mitigation Unit | | | | Stra | ight Preservation Ratio | |
| Site | | Unit Yield (Debit) | Yield (Credit) | | | | Stra | (v2.1, Sept 2015) | |
| S-IJ32 | | 17.42 | #DIV/0! | 1 | | Final Mitigation Unit Yield | | | |
| 0 1032 | | 11.72 | #DIV/0: | | | #DIV/0! | | | |
| | | | | | | #DIV/0: | | | |

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

To ensure accurate calculations, the <u>UPPERMOST STRATUM</u> 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-IJ32 (Braxton County, WV)

Sampling Date: 09/08/2016 Project Site Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR: SAR number:

Tree/Sapling Strata

Functional Results Summary: Enter Results in Section A of the Mitigation Sufficiency Calculator

| Function | Functional Capacity Index |
|------------------------|------------------------------|
| Hydrology | 0.65 |
| Biogeochemical Cycling | 0.68 |
| Habitat | 0.79 |

Variable Measure and Subindex Summary:

| Variable | Name | Average Measure | Subindex |
|------------------------|---|--------------------|----------|
| V _{CCANOPY} | Percent canpoy over channel. | 93.50 | 1.00 |
| V _{EMBED} | Average embeddedness of channel. | 2.40 | 0.60 |
| V _{SUBSTRATE} | Median stream channel substrate particle size. | 13.35 | 0.53 |
| V _{BERO} | Total percent of eroded stream channel bank. | 70.00 | 0.70 |
| V _{LWD} | Number of down woody stems per 100 feet of stream. | 8.00 | 1.00 |
| V _{TDBH} | Average dbh of trees. | 13.20 | 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. | 88.44 | 1.00 |
| V _{HERB} | Average percent cover of herbaceous vegetation. | Not Used | Not Used |
| V _{WLUSE} | Weighted Average of Runoff Score for Catchment. | 0.51 | 0.54 |

| | High-G | radient l | Headwat | | ms in ea Data She | | | _ | | tern Wes | st Virgini | a |
|--------|---|--------------|-----------------------------|---------------|----------------------|--------------|---|----------|--------------------------------|-----------------|--------------|----------|
| | Team: | J. McGuirk | C. Stoliker | i ieiu L | Jala Sile | et and C | aicu | | ∎ Latitude/UTI | M Northing: | 38 809457 | |
| Pro | ject Name: | | O. Otolikoi | | | | • | | | • | | |
| 110 | • | | xton County | /. WV) | | | Longitude/UTM Easting: -80.537428 Sampling Date: 09/08/2016 | | | | | |
| 67 | R Number: | 2 .002 (2.0 | | | 100 | Stroom Ti | , ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | | . • | 00/00/2010 | |
| SA | ik Number. | | Reacii | Length (ft): | 100 | Stream Ty | /pe. | Ephe | meral Stream | | | |
| | Top Strata: | Tre | e/Sapling St | rata | (determine | d from perce | ent cal | culate | ed in V _{CCANO} | _{PY}) | | |
| | and Timing: | Project Site | 5 | | | ~ | Before | e Proje | ct | | | • |
| Sample | | | m channel | | | | | | | | 40 11 | |
| 1 | 20%, enter at least one value between 0 and 19 to trigger Top Strata choice.) | | | | | | | | | | 93.5 % | |
| ĺ | List the percent cover measurements at each point below: | | | | | | | | | | | |
| | 95 | 95 | 100 | 100 | 100 | 100 | 6 | | 70 | 70 | 95 | |
| 2 | 100 | 100 | 95 | 100 | 90 | 100 | at no | | 100 than 30 rou | 100 | 100 | |
| 2 | V_{EMBED} | points alon | g the stream | n. Select a | particle from | n the bed. E | Before | movir | ng it, determ sediment, an | ine the per | centage of | 2.4 |
| | | | | | | | | | omposed of | | | |
| | | rating score | of 1. If the | bed is com | posed of be | edrock, use | a ratin | g sco | re of 5. | | | |
| | | | • | for gravel, c | obble and b | oulder parti | cles (r | escal | ed from Plat | tts, Megaha | n, and | |
| | | Minshall 19 | 183) | | | | | | | | | |
| | | Rating | Rating Des | | | | | | | | | |
| | | 5 4 | | | | | | | ne sedimen by fine sedi | | k) | |
| | | 3 | | | | | | | d by fine sec | | | |
| | | 2 | | | | | | | d by fine sec | | | |
| | | 1 | >75 percen | t of surface | covered, su | ırrounded, c | r burie | ed by | fine sedime | nt (or artific | ial surface) | |
| ı | List the rati | ngs at each | point below | | | | | | | | | |
| | 3 | 2 | 3 | 3 | 3 | 1 | 2 | 2 | 1 | 1 | 1 | |
| | 3 | 3 | 3 | 2 | 2 | 1 | 1 | <u> </u> | 2 | 2 | 3 | |
| | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |
| | | | | | | | | | | | | |
| _ | \/ | Maralian atu | | ll44- | 4:-1: | M | - 4 | | 41 00 | | 4 4 4 | |
| 3 | V _{SUBSTRATE} | | eam cnanne tream; use t | | | | | | than 30 rouզ _D . | gniy equidis | tant points | 13.35 in |
| | | | ches to the 0.0 in, sand | | | | w (bed | lrock | should be co | ounted as 9 | 9 in, | |
| | 32.70 | 7.10 | 48.50 | 21.00 | 5.10 | 0.08 | 2.3 | 30 | 7.50 | 14.80 | 31.20 | |
| | 1.70 | 0.01 | 0.01 | 8.50 | 14.10 | 12.60 | 25. | | 28.20 | 0.08 | 8.70 | |
| | 99.00 | 99.00 | 99.00 | 42.00 | 39.10 | 8.70 | 3.2 | | 24.30 | 99.00 | 3.30 | |
| | | | | | | | | | | | | |
| _ | | | | | | | | | | | | |
| 4 | V_{BERO} | • | e total perce | | | | | | of feet of er oded, total e | | | 70 % |
| | | ,/P | Left Bank | 3(|) ft | I | Riaht F | Rank: | 40 |) ft | ı | |

| Samp | le Variables | s 5-9 within | the entire r | iparian/buf | fer zone ad | jacent to t | he stream c | hannel (25 | feet from e | ach bank). | | |
|-------|--------------|--------------|---------------------------------|---------------|---------------|---|--------------------------------|--------------|--------------|-------------------|------------|--|
| 5 | V_{LWD} | stream rea | | ne number f | rom the enti | | eter and 36 ir buffer and w | | | | 8.0 | |
| | | • | Number of downed woody stems: 8 | | | | | | | | | |
| 6 | V_{TDBH} | | oh of trees (cm) in diam | | | | ing cover is a | at least 20% | 6). Trees ar | e at least 4 | 13.2 | |
| | | | | nents of indi | vidual trees | (at least 4 | in) within the | buffer on e | each side of | | | |
| | | the stream | Left Side | | | 1 | | Diaht Cida | | | i | |
| | 21 | 4 | 36 | 4 | 4 | 4 | 4 | Right Side | 28 | 18 | ł | |
| | 21 | 4 | 30 | 4 | 4 | 4 | + | 9 | 20 | 10 | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 7 | V_{SNAG} | Number of | snags (at le | ast 4" dbh | and 36" tall) | per 100 fe | et of stream. | Enter num | hber of snag | s on each | | |
| | SINAG | | stream, and | | | | | | | | 0.0 | |
| | | | Left Side: | | 0 | | Right Side: | | 0 | | | |
| 8 | V_{SSD} | | | | | | hes dbh) per ubs on each | | | | Not Used | |
| | | | r 100 ft of st | | | | ubs on each | side of the | Stream, and | ı uı c | Not Osed | |
| | | | Left Side: | | | | Right Side: | | | | | |
| 9 | V_{SRICH} | | | | | | am reach. C sive species p | | | | 0.70 | |
| | | | | | | | from these of | | an suata. Op | Jecies | 2.70 | |
| | | Grou | ıp 1 = 1.0 | | | Group 2 (-1.0) | | | | | | |
| 1 | Acer rubru | ım | (a) (| Magnolia ti | ripetala | 20 to 10 to | Ailanthus a | Itissima | | Lonicera ja | ponica | |
| | Acer sacc | harum | | Nyssa sylv | atica | | Albizia julib | rissin | | Lonicera ta | tarica | |
| | Aesculus | flava | | Oxydendrun | n arboreum | | Alliaria peti | olata | | Lotus corni | iculatus | |
| | Asimina tı | riloba | | Prunus ser | otina | 7,5 | Alternanthe | era | | Lythrum sa | licaria | |
| | Betula alle | ghaniensis | | Quercus a | 'ba | | philoxeroid | | 1 | Microstegiur | n vimineum | |
| | Betula len | ta | | Quercus co | occinea | | Aster tatari | cus | | Paulownia | tomentosa | |
| | Carya alb | а | | Quercus in | nbricaria | | Cerastium | fontanum | | Polygonum (| cuspidatum | |
| | Carya gla | bra | | Quercus pi | rinus | | Coronilla va | aria | | Pueraria m | ontana | |
| 3.000 | Carya ova | alis | 1 | Quercus ru | ıbra | | Elaeagnus u | mbellata | | Rosa multi | flora | |
| 1 | Carya ova | ata | | Quercus ve | elutina | | Lespedeza | bicolor | | Sorghum h | alepense | |
| (A) | Cornus flo | | | Sassafras | albidum | | Lespedeza | | | Verbena bi | - | |
| ~ | Fagus gra | | | Tilia ameri | | | Ligustrum ob | | _ | | | |
| | Fraxinus a | | | Tsuga can | adensis | | Ligustrum s | | | | | |
| | Liriodendro | n tulipifera | | Ulmus ame | | | | | | | | |
| | | acuminata | | | | | | | | | | |
| | - 5 | | | | | | | | | | | |
| | | 4 | Species in | Group 1 | | | | 1 | Species in | Group 2 | | |

| Compl | e Variables | 10 11 withi | n at lagat 9 | oubplote / | /40" v 40" / | v 1m v 1m) | in the rine | rian/huffar | zono withi | n 25 foot fre | m oooh |
|----------------|---|----------------|-----------------|----------------|------------------------------|---------------|-------------|-------------|-----------------|----------------|-----------------------|
| - | e variables The four su | | | - | • | - | - | | | ii 25 leet iid | Jili eacii |
| 10 | V _{DETRITUS} | Average pe | rcent cover | of leaves, | sticks, or oth | ner organic r | naterial. W | oody debris | <4" diamet | er and | 88.44 % |
| | | | Left | Side | | | Right | t Side | |] | |
| | | 70 | 90 | 65 | 100 | 70 | 90 | 95 | 90 | | |
| | | 100 | 90 | 95 | 80 | 100 | 80 | 100 | 100 | | |
| 11 | V_{HERB} | | | | aceous vego oh and 36" ta | | | | | | |
| | | | | | h 200% are | | | | | | Not Used |
| | | at each sub | <u> </u> | <u> </u> | | 1 | | | | • | |
| | | | Left | Side | | | Right | t Side | | | |
| | | | | | | | | | | · | |
| Compl | e Variable 1 | 2 within the | o ontiro oot | obmont of | the etreem | | | | | | |
| _ | | | | | | | | | | | |
| 12 | V _{WLUSE} | vveignted A | Average of F | Runott Score | e for watersl | nea: | | | | | 0.51 |
| | | | | | | | | | | % in | Running |
| | | | Land | Use (Choos | se From Dro | p List) | | | Runoff Score | Catch- ment | Percent (not >100) |
| | Open space | (pasture, lawr | ns, parks, etc. |), grass cover | 50% - 75% | | | - | 0.2 | 15 | 15 |
| | Forest and n | ative range (< | <50% ground | cover) | | | | ~ | 0.5 | 60 | 75 |
| | Forest and native range (50% to 75% ground cover) | | | | | | | | | 25 | 100 |
| | | | | | | | | ~ | | | |
| | | | | | | | | ~ | | | |
| | | | | | | | | ~ | | | |
| | | | | | | | | ~ | | | |
| | | | | | | | | - | | | |
| | Su | mmary | | | | | No | tes: | | | |
| V | ariable | Value | VSI | | | | | | | | |
| Vc | CANOPY | 94 % | 1.00 | | | | | | | | |
| VE | MBED | 2.4 | 0.60 | | | | | | | | |
| Vs | SUBSTRATE | 13.35 in | 0.53 | | | | | | | | |
| V _B | BERO | 70 % | 0.70 | | | | | | | | |
| VL | .WD | 8.0 | 1.00 | | | | | | | | |
| V _T | V _{TDBH} 13.2 1.00 | | | | | | | | | | |
| Vs | NAG | 0.0 | 0.10 | | | | | | | | |
| Vs | SD | Not Used | Not Used | | | | | | | | |
| Vs | RICH | 2.70 | 1.00 | | | | | | | | |
| V _D | ETRITUS | 88.4 % | 1.00 | | | | | | | | |
| V _H | IERB | Not Used | Not Used | | | | | | | | |
| V _v | VLUSE | 0.51 | 0.54 | | | | | | | | |

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

| STREAM NAME S-IJ32 | LOCATION Braxton County, WV | | | |
|---|-----------------------------|--|--|--|
| STATION # RIVERMILE | STREAM CLASS Ephemeral | | | |
| Lat <u>38.809457</u> long <u>-80.537428</u> | RIVER BASIN Burnsville I | RIVER BASIN Burnsville Lake-Little Kanawha River | | |
| STORET# | AGENCY Tetra Tech | | | |
| INVESTIGATORS J. McGuirk, C. Stoliker | | | | |
| FORM COMPLETED BY | DATE 09/08/2016 | REASON FOR SURVEY | | |
| J. McGuirk | TIME Proposed Pipeline | | | |

| | Habitat | | Condition | ı Category | |
|--|---|---|---|---|---|
| | Parameter | 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 0 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| n sampling reach | 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. |
| ted in | score 0 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| Parameters to be evaluated in sampling reach | 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). |
| ıram | score 0 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 |
| P ₂ | 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 11 | 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 | | Condition | ı Category | | |
|--|--|--|--|--|---|--|
| | Parameter Parameter | 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 9 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | |
| ding reach | 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. | |
| samp | score 0 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | |
| Parameters to be evaluated broader than sampling reach | 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. | |
| e eva | SCORE 5 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | |
| to b | SCORE 5 (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | |
| Parameters | 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 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 | |
| | 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 8 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | |
| | SCORE 8 (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | |

Total Score 56

No / low flow at time of survey. Unable to sample water quality or $\ensuremath{\mathbf{WVSCI}}$.



Photograph Direction SW

Comments:

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

| (v2.1, Sept 2015) | | Mountaii | n Valley Pipeline Project SWVM v2.1 | (in Decimal Degrees) | Lat. | 38.642046 | Lon. | -80.484571 | WEATHER: | Sunny, 55° | DATE: | November 10, 2016 |
|--|----------------------|-----------------------|---|--|------|---|---------------------|-----------------|--|-------------------------------|--|--------------------------------|
| IMPACT STREAM/SITE ID (watershed size {acreage}, | | | S-B62; UNT to Right Fork Hol | y River; 1013.24 ac watershed Bank | | MITIGATION STREAM CLASS (watershed size {acrea | | | | | Comments: | |
| STREAM IMPACT LENGTH: | 29 | FORM OF MITIGATION | : RESTORATION (Levels I-III) | MIT COORDINATES: (in Decimal Degrees) | Lat. | | Lon. | | PRECIPITATION PAST 48 HRS: | 0.40" | Mitigation Length: | |
| Column No. 1- Impact Existing | g Condition (Deb | pit) | Column No. 2- Mitigation Existing Co | ondition - Baseline (Credit) | | Column No. 3- Mitigation F Post Completi | | e Years | Column No. 4- Mitigation Project Post Completion (C | | Column No. 5- Mitigation Project | ted at Maturity (Credit) |
| Stream Classification: | Pere | nnial | Stream Classification: | Intermittent | | Stream Classification: | lr | ntermittent | Stream Classification: | Intermittent | Stream Classification: | Intermittent |
| Percent Stream Channel SI | lope | 2 | Percent Stream Channel Slo | ре | | Percent Stream Channel | Slope | 0 | Percent Stream Channel Slo | pe 0 | Percent Stream Channel S | lope 0 |
| HGM Score (attach d | lata forms): | | HGM Score (attach o | lata forms): | | HGM Score (attac | ch data forms): | | HGM Score (attach dat | a forms): | HGM Score (attach d | ata forms): |
| | | Average | | Average | | | | Average | | Average | | Average |
| Hydrology | | | Hydrology | 1 | | Hydrology | 1 | | Hydrology | 1 | Hydrology | 1 |
| Biogeochemical Cycling | | 0 | Biogeochemical Cycling | 1 0 | | Biogeochemical Cycling | 1 | 0 | Biogeochemical Cycling | 1 0 | Biogeochemical Cycling | 1 0 |
| Habitat | | | Habitat | 1 | | Habitat | 1 | | Habitat | 1 | Habitat | 1 |
| PART I - Physical, Chemical and | l Biological Indic | ators | PART I - Physical, Chemical and | Biological Indicators | | PART I - Physical, Chemical | and Biological | ndicators | PART I - Physical, Chemical and B | iological Indicators | PART I - Physical, Chemical and | Biological Indicators |
| | Points Scale Range | Site Score | | Points Scale Range Site Score | | | Points Scale Ran | ge Site Score | | Points Scale Range Site Score | | Points Scale Range Site Score |
| PHYSICAL INDICATOR (Applies to all stream | ns classifications) | | PHYSICAL INDICATOR (Applies to all streams | classifications) | | PHYSICAL INDICATOR (Applies to all stream | ams classifications |) | PHYSICAL INDICATOR (Applies to all streams | classifications) | PHYSICAL INDICATOR (Applies to all stream | ns 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) | |
| Epifaunal Substrate/Available Cover | 0-20 | 17 | Epifaunal Substrate/Available Cover | 0-20 | | Epifaunal Substrate/Available Cover | 0-20 | 0 | Epifaunal Substrate/Available Cover | 0-20 | Epifaunal Substrate/Available Cover | 0-20 |
| 2. Embeddedness | 0-20 | 17 | 2. Embeddedness | 0-20 | | 2. Embeddedness | 0-20 | 0 | 2. Embeddedness | 0-20 | 2. Embeddedness | 0-20 |
| 3. Velocity/ Depth Regime | 0-20 | 13 | 3. Velocity/ Depth Regime | 0-20 | | 3. Velocity/ Depth Regime | 0-20 | 0 | Velocity/ Depth Regime | 0-20 | Velocity/ Depth Regime | 0-20 |
| 4. Sediment Deposition | 0-20 | 11 | 4. Sediment Deposition | 0-20 | | 4. Sediment Deposition | 0-20 | 0 | 4. Sediment Deposition | 0-20 | 4. Sediment Deposition | 0-20 |
| 5. Channel Flow Status | 0-20 0-1 | 14 19 | 5. Channel Flow Status | 0-20 0-1 0 | | 5. Channel Flow Status | 0-20 0- | 1 0 | 5. Channel Flow Status | 0-20 0-1 0 | 5. Channel Flow Status | 0-20 0-1 |
| 6. Channel Alteration | 0-20 | 16 | 6. Channel Alteration | <u> </u> | | 6. Channel Alteration | 0-20 | 0 | 6. Channel Alteration | | 6. Channel Alteration | 0-20 |
| 7. Frequency of Riffles (or bends) | 0-20 | 18 | 7. Frequency of Riffles (or bends) | 020 | | 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 | 18 | 8. Bank Stability (LB & RB) | V-20 | | 8. Bank Stability (LB & RB) | 0-20 | 0 | 8. Bank Stability (LB & RB) | , _, | 8. Bank Stability (LB & RB) | 0-20 |
| Vegetative Protection (LB & RB) Riparian Vegetative Zone Width (LB & RB) | 0-20 0-20 | 14 | Vegetative Protection (LB & RB) Region 10. Riparian Vegetative Zone Width (LB & RB) | 0-20 0 0 | | Vegetative Protection (LB & RB) Regetative Zone Width (LB & RB) | 0-20 | 0 | Vegetative Protection (LB & RB) Riparian Vegetative Zone Width (LB & RB) | 0-20 0 0-20 0 | Vegetative Protection (LB & RB) Riparian Vegetative Zone Width (LB & RB) | 0-20 |
| Total RBP Score | Suboptimal | 157 | Total RBP Score | Poor 0 | | Total RBP Score | Poor | 0 | Total RBP Score | Poor 0 | Total RBP Score | Poor 0 |
| Sub-Total | | 0.785 | Sub-Total | 0 | | Sub-Total | | 0 | Sub-Total | 0 | Sub-Total | 0 |
| CHEMICAL INDICATOR (Applies to Intermitte | ent and Perennial S | treams) | CHEMICAL INDICATOR (Applies to Intermitten | t and Perennial Streams) | | CHEMICAL INDICATOR (Applies to Intermi | ittent and Perennia | l Streams) | CHEMICAL INDICATOR (Applies to Intermitten | t and Perennial Streams) | CHEMICAL INDICATOR (Applies to Intermitte | ent and Perennial Streams) |
| WVDEP Water Quality Indicators (Genera | al) | | WVDEP Water Quality Indicators (General) | | | WVDEP Water Quality Indicators (Gene | ral) | | WVDEP Water Quality Indicators (General) | | WVDEP Water Quality Indicators (Genera | an a |
| Specific Conductivity | | | Specific Conductivity | 0 | | Specific Conductivity | , | | Specific Conductivity | | Specific Conductivity | ., |
| <=99 - 90 points | 0-90 | 0.038 | | 0-90 | | | 0-90 | 0 | - | 0-90 | | 0-90 |
| pH | | | рН | | | рН | | | рН | | рН | |
| 6080-00 | 0-80 | 7.12 | | 5-90 O-1 O | | | 5-90 | 1 0 | | 5-90 0-1 0 | | 5-90 0-1 |
| 6.0-8.0 = 80 points | | | DO | | | DO | | | DO | | DO | |
| B0 | 10.00 | 45 | 50 | 0 | | <u> </u> | 40.00 | 0 | | 40.00 | B0 | 10.00 |
| >5.0 = 30 points | 10-30 | 15 | | 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 Interm | ittent and Perennial | l Streams) | BIOLOGICAL INDICATOR (Applies to Intermitt | ent and Perennial Streams) | | BIOLOGICAL INDICATOR (Applies to Inte | ermittent and Pere | ennial Streams) | BIOLOGICAL INDICATOR (Applies to Intermi | ttent and Perennial Streams) | BIOLOGICAL INDICATOR (Applies to Interr | mittent 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) | |
| 01 | 0-100 0-1 | 72.8 | | 0-100 0-1 | | | 0-100 0- | 1 0 | | 0-100 0-1 0 | | 0-100 0-1 |
| Good Sub-Total | | 0.728 | Sub-Total | 0 | | Sub-Total | | 0 | Sub-Total | 0 | Sub-Total | 0 |
| | | <u>"</u> | | " | | | | <u>'</u> | | <u> </u> | <u> </u> | |
| PART II - Index and L | Jnit Score | | PART II - Index and | Unit Score | | PART II - Index a | nd Unit Score | | PART II - Index and Un | it Score | PART II - Index and L | Jnit Score |
| Index | Linear Feet | Unit Score | Index | Linear Feet Unit Score | | Index | Linear Fee | unit Score | Index | Linear Feet Unit Score | Index | Linear Feet Unit Score |
| 0.838 | 29 | 24.2923333 | 0 | 0 0 | | 0 | 0 | 0 | 0 | 0 0 | 0 | 0 0 |
| | | | | | | | | | | | | |

| | | (See instruction p | | - Impact Factors It values for MITIGATIO | N BANKING and I | ILF) | | | |
|--|---|---|-----------------------------------|--|------------------------------|--|-------------------|--|------------|
| Temp | oral Loss-Construction | (| | | | <u> </u> | -term Protection | | |
| *Note: Reflects duration of aquatic function | | an impact (debit) and completion of | | | % Add. Mitigation | on and Monitoring Period | | -Term Protection (Years) | |
| Years | , , | 0 | | | | | | | |
| Sub-Total | | 0 | | | | | | | |
| | mporal Loss-Maturity | | | | 0 + 5/ | 10 Year Monitoring | | 101 | |
| *Note: Period between completion of compensato to function (i.e. maturity of tree stratum to provid | | | | | Sub-Total | | | 0 | |
| to ranction (i.e. maturity of tree stratum to provid | corridor). | within riparian stream of wettand buller | | | | PART IV - Index | to Unit Score Cor | nversion | |
| 2/ 1 1 1 1 1 1 | | 1 - | | | Final Index Score | Linear Feet | Unit Score | ILF Costs | |
| % Add. Mitigation | | Temporal Loss-Maturity (Years) | | | (Debit) | 00 | (Debit) | (Offsetting Debit | |
| | | | | | 0.837666667 | 29 | 24.29233333 | \$19,433.87 | / |
| | | | | | | | | | |
| 0% Sub-Total | | 0 | | | | | | | |
| Sub-1 otal | | U | | | | | | | |
| | | DARTV | . Composicon of II | nit Coores and Drainate | nd Dolongo | | | | |
| | | PARIV | - Companson of U | nit Scores and Projecte | eu Dalalice | | | | |
| Final Unit Score (Debit) [No Net Loss Value] | 24.29233333 | 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 |
| | | D | Part VI Mitigation (| Considerations (Incenti | wool | | | | |
| | | | art vi - Miligation C | Considerations (Incenti | ves) | | | | |
| | Extent of Stream Renal handout to determine the collace an "X" in the appropriate | correct Restoration Levels (below) for your pr | roject | | *Note ¹ : Referen | ce Instructional handout for the def *Note ² : Enter the buffer width for | | ne Mitigation Extents and Type Bank and Right Bank) | es (below) |
| Restoration Level 2 | | | | | | | Left Bank | <u> </u> | |
| Restoration Level 3 | | | | - | Buffer Width | | | | |
| 10301au011 Level 3 | | | |] | | 0-50 51-150 | | None None | |
| | | | | | Buffer Width | 51-150 | Right Ban | | |
| | | | | _ | _ 3.1.0. | 0-50 | 7.1.g.1.t Dull | None | |
| Compensatory Mitigation Plan incorpo | | | | | | 51-150 | | None | |
| *Note: HUC 12-based watershed | approach required to obtain Strea | am Restoration incentive | No | I | Average Buffer Width/Side | 0 | | | |
| Site | | Impact Unit Yield (Debit) | Mitigation Unit Yield (Credit) | | | | Stra | ight Preservation Ratio (v2.1, Sept 2015) | |
| S-B62 | | 24.29233333 | #DIV/0! | | | Final Mitigation Unit Yield | | | |
| | | | l | 1 | | #DIV/0! | | | |

| STREAM ID S-B62 | STREAM NAME Narrows Run | | | | | | | | | |
|--|---|--|--|--|--|--|--|--|--|--|
| LAT 38.642046 LONG -80.484571 | DATE 05/06/2015 | | | | | | | | | |
| CLIENT MVP | PROJECT NAME Mountain Valley Pipeline | | | | | | | | | |
| INVESTIGATORS E. Foster, K. Lamontagne, C | INVESTIGATORS E. Foster, K. Lamontagne, C. Ansari | | | | | | | | | |
| FLOW REGIME Perennial Intermittent Ephemeral | WATER TYPE TNW RPW ⊻ NRPW | | | | | | | | | |

| i elelillai = | _ 11110111111110 | nt <u> — Epnem</u> | erai INVV | RPW — | NRPW — | |
|------------------------|------------------|---------------------------|-------------------------------|----------------|---|-------------------|
| _ | | | | | | |
| | | | Measurements | | Stream Erosion ✓ None Moderate | Цооли |
| | | · | k Width: 30.0 ft | | <u>✓ None</u> Moderate | пеачу |
| | | Top of Ban | = | | Artificial, Modified or Char | nnelized |
| | | LB <u>5.0</u> | ft RB <u>15.0</u> | <u>ft</u> | Yes _ <u>✔</u> No | |
| CHANNEL FE | ATURES | Water Dep | th: 3.00 in | | Dam PresentYes _ | ✓ No |
| | | Water Widt | th: 15.0 ft | | | _ |
| | | High Water | Mark: <u>7.0 in</u> | | Sinuosity <u>v</u> Low | Medium High |
| | | Flow Direct | tion: Northeast | | Gradient | |
| | | | | | | ✓ Severe |
| | | \\/-4 D | 4 | | (0.5/100 ft (2 ft/100 ft) | , |
| | | Water Pres No wate | senτ r, stream bed dry | | Proportion of Reach Repre Morphology Types | esented by Stream |
| | | | bed moist | | Riffle 40 % Run 40 | % |
| FLOW | | Standin | • | | Pool 20 % | |
| CHARACTER | ISTICS | <u>✓</u> Flowing | water | | Turbidity | |
| | | Velocity | | | <u>✓</u> ClearSlightly | turbidTurbid |
| | | Fast | ✓ Moderate | | OpaqueStained | |
| | | Slow | | | Other | |
| INOR | | STRATE CO add up to 10 | MPONENTS | _ | MPONENTS p to 100%) | |
| Substrate | ` | | % Composition in | Substrate | | % Composition in |
| Туре | Diame | ter | Sampling Reach | | Characteristic | Sampling Area |
| Bedrock | | | 70 | Detritus | sticks, wood, coarse | |
| Boulder | | mm (10") 10 | | Dountad | plant materials (CPOM) | 10 |
| Cobble | | nm (2.5"-10") 10 | | Muck-Mud | black, very fine organic | |
| Gravel | | (0.1"-2.5") | 10 | | (FPOM) | |
| Sand | | nm (gritty) | | | | |
| Silt | | 0.06 mm | | Marl | grey, shell fragments | |
| Clay | < 0.004 1 | mm (slick) | | | In all a set a file and a section and to see | (2) |
| | | ✓ Forest | ant Surrounding Lar Commer | | Indicate the dominant type ✓ Trees Shrub | |
| | | Field/Pa | | | | iceous |
| WATERCHER | | Agricult | tural Residen | tial | Floodplain Width | |
| WATERSHED FEATURES | | Other: | | | | rate 15-30ft |
| | | Canopy Co | over | | Narrow <16ft | |
| | | Partly o | | aded | Wetland PresentYes | ✓ No |
| | | Shaded | Open | | Wetland ID | <u> </u> |
| | | Indicate th | e dominant type and | d record the d | lominant species present | |
| AQUATIC VE | GETATION | | _ | Rooted subme | <u> </u> | tingFree floating |
| | | Floating | g algae | Attached algae | e | |
| | | 1 | | | | |
| | | | | | | |
| MACROINVERTEBRATE: | | | | | | |
| OR OTHER | DIVA153 | | | | | |
| WILDLIFE OBSERVED/C | | | | | | |
| OBSERVATION NOTES | NS AND | | | | | |
| | | | | | | |
| | | | | | | |

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

| STREAM NAME W-B62 | LOCATION Webster County, WV | | | | |
|---|---|------------------------|--|--|--|
| STATION # RIVERMILE | STREAM CLASS Perennial | | | | |
| LAT <u>38.643910</u> LONG <u>-80.485213</u> | RIVER BASIN Outlet Right Fork Holly River | | | | |
| STORET# | AGENCY Tetra Tech | | | | |
| INVESTIGATORS C. Vileno, C. Stoliker | | | | | |
| FORM COMPLETED BY C. Vileno | DATE 11/10/2016 TIME 12:15pm | REASON FOR SURVEY SWVM | | | |

| | Habitat | | Condition | ı Category | | |
|--|---|---|---|---|---|--|
| | Parameter | 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 <u>not</u> new fall and <u>not</u> 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 17 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | |
| ı sampling reach | 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. | |
| ted in | SCORE 17 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | |
| Parameters to be evaluated in sampling reach | 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). | |
| ıram | SCORE 13 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | |
| P ₂ | 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 11 | 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 14 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | |

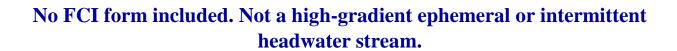
HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

| | II-1:4-4 | | Condition | Category | | | |
|--|--|--|--|--|---|--|--|
| | Habitat Parameter | 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 19 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| ding reach | 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. | | |
| amp | SCORE 16 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | | |
| Parameters to be evaluated broader than sampling reach | 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. | | |
| e ev | SCORE 9 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |
| to p | SCORE 9 (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | | |
| Parameters | 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 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 | | |
| | 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 157

| Insects | Count | Tolerance | TV | Insects | Count | Tolerance | TV | Non-Insects | Count | Tolerance | TV | 1 | |
|-------------------|--|--------------|----|------------------|-------|-----------|----|-----------------|--------------------|-----------|--------------|---------------------|-------|
| Ephemeroptera | • | • | 11 | Odonata | • | • | 1 | Crustacea | | • | 0 | | |
| Ameletidae | | 2 | 0 | Aeshnidae | | 3 | 0 | Asellidae | | 7 | 0 | 1 | |
| Baetidae | | 4 | 0 | Calopterygidae | | 6 | 0 | Cambaridae | | 5 | 0 | 1 | |
| Beatiscidae | | 4 | 0 | Coenagrionidae | | 7 | 0 | Gammaridae | | 5 | 0 | Ī | |
| Caenidae | | 5 | 0 | Cordulegastridae | | 3 | 0 | Palaemonidae | | 5 | 0 | | |
| Ephemerellidae | | 3 | 0 | Gomphidae | 1 | 5 | 5 | Annelida | | | 0 | | |
| Ephemeridae | 3 | 5 | 15 | Lestidae | | 7 | 0 | Hirudinea | | 10 | 0 | | |
| Heptageniidae | 6 | 3 | 18 | Libellulidae | | 7 | 0 | Nematoda | | 10 | 0 | | |
| Isonychiidae | | 3 | 0 | Coleoptera | | | 0 | Nematomorpha | | 10 | 0 | | |
| Leptophlebiidae | 2 | 4 | 8 | Chrysomelidae | | 7 | 0 | Oligochaeta | | 10 | 0 | | |
| Potamanthidae | | 5 | 0 | Dryopidae | | 5 | 0 | Turbellaria | | | 0 | | |
| Siphlonuridae | | 3 | 0 | Dytiscidae | | 6 | 0 | Turbellaria | | 7 | 0 | | |
| Tricorythidae | | 5 | 0 | Elmidae | | 4 | 0 | Bivalvia | | | 0 | | |
| Plecoptera | | | 1 | Gyrinidae | | 5 | 0 | Corbiculidae | | 6 | 0 | 1 | |
| Capniidae | | 2 | 0 | Haliplidae | | 7 | 0 | Sphaeriidae | | 5 | 0 | 1 | |
| Chloroperlidae | | 2 | 0 | Hydrophilidae | | 7 | 0 | Unionidae | | 4 | 0 | | |
| Leuctridae | | 2 | 0 | Psephenidae | | 3 | 0 | Gastropoda | | | 0 | 1 | |
| Nemouridae | | 2 | 0 | Ptilodactylidae | | 5 | 0 | Ancylidae | | 7 | 0 | | |
| Peltoperlidae | | 1 | 0 | Hemiptera | | | 0 | Hydrobiidae | | 4 | 0 | | |
| Perlidae | | 1 | 0 | Belostomatidae | | 8 | 0 | Physidae | | 7 | 0 | | |
| Perlodidae | | 1 | 0 | Corixidae | | 8 | 0 | Planorbidae | | 5 | 0 | | |
| Pteronarcyidae | 1 | 1 | 1 | Gerridae | | 10 | 0 | Pleuroceridae | | 5 | 0 | | |
| Taeniopterygidae | | 2 | 0 | Hydrometridae | | 8 | 0 | Viviparidae | | 5 | 0 | | |
| Trichoptera | | | 2 | Nepidae | | 8 | 0 | Miscellaneous | | | 0 | | |
| Brachycentridae | | 2 | 0 | Notonectidae | | 8 | 0 | Collembola | | 6 | 0 | | |
| Glossosomatidae | | 2 | 0 | Megaloptera | | | 0 | Lepidoptera | | 5 | 0 | | |
| Helicopsychidae | | 3 | 0 | Corydalidae | | 3 | 0 | Neuroptera | | 5 | 0 | | |
| Hydropsychidae | | 5 | 0 | Sialidae | | 6 | 0 | Hydrachnidae | | 6 | 0 | | |
| Hydroptilidae | 2 | 3 | 6 | Diptera | | | 1 | Totals | Total r | number | 16 | | |
| Lepidostomatidae | | 3 | 0 | Athericidae | | 3 | 0 | Totals | Total f | amilies | 7 | | |
| Leptoceridae | | 3 | 0 | Blephariceridae | | 2 | 0 | | | Metric | calculations | | |
| Limnephilidae | | 4 | 0 | Ceratopogonidae | | 8 | 0 | | Richnes | SS | | Additional metri | cs |
| Molannidae | | 3 | 0 | Chironomidae | | 9 | 0 | Total Taxa | | 7 | 31.8 | Ephemeroptera Taxa | 3 |
| Philopotamidae | | 4 | 0 | Culicidae | | 10 | 0 | EPT Taxa | | 5 | 38.5 | Plecoptera Taxa | 1 |
| Phryganeidae | | 4 | 0 | Dixidae | | 6 | 0 | | Toleran | ce | | Trichoptera Taxa | 1 |
| Polycentropodidae | | 5 | 0 | Empididae | | 7 | 0 | Biotic Index | | 3.63 | 91.1 | Long-lived Taxa | 4 |
| Psychomiidae | | 3 | 0 | Psychodidae | | 8 | 0 | % Tolerant | | 0.0 | 100.0 | Odonata Taxa | 1 |
| Rhyacophilidae | | 3 | 0 | Ptychopteridae | | 8 | 0 | | Composit | ion | | Diptera Taxa | 1 |
| Uenoidae | | 2 | 0 | Simuliidae | | 6 | 0 | % EPT Abundance | | 87.5 | 97.2 | COET Taxa | 5 |
| | Total To | erance Value | 58 | Stratiomyidae | | 10 | 0 | % Dominance | | 37.5 | 78.1 | % Sensitive | 56.3 |
| West Vi | rginia Save O | ur Streams | | Syrphidae | | 10 | 0 | % Net-spinners | % Net-spinners 0.0 | | NA | % Chironomidae | 0.0 |
| 601 57th Stre | 601 57th Street, SE, Charleston WV 25304 | | | Tabanidae | | 7 | 0 | Stream (| Condition Ind | ex | 72.8 | % Clingers | 56.3 |
| http:// | /www.dep.w | v.gov/sos | | Tipulidae | 1 | 5 | 5 | Integrity Ra | ating | Subo | ptimal | More diversity meas | sures |

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.



S-H107

Stream ID S-H107



Photograph Direction West

Date: 05/02/2015

Comments: 2015 stream identification.



Photograph Direction North

Date: 10/08/2019

Comments: 2019 stream identification confirmation.

| STREAM ID S-H107 | STREAM NAME UNT to Camp Creek |
|--|-------------------------------|
| LAT 38.548459 LONG -80.540022 | DATE 05/02/2015 |
| CLIENT MVP | PROJECT NAME MVP |
| INVESTIGATORS A. Grech, S. Kelly, M. Whitte | en |
| FLOW REGIME Perennial — Intermittent ✓ Ephemeral — | WATER TYPE TNW — RPW ✓ NRPW — |

| Perennial _ | Intermitte | nt <u> </u> | eral TNW | RPW <u>✓</u> | NRPW | | | | |
|---|--------------------------------|-----------------------|------------------------------------|------------------------------|-----------------------------------|-----------------------------------|--|--|--|
| | | | | | | | | | |
| | 1 | | leasurements | | Stream Erosion | | | | |
| | | Top of Bank | k Width: 1.5 ft | | ✓ NoneModerate | Heavy | | | |
| | | Top of Bank | k Height: | | Artificial, Modified or Char | nnelized | | | |
| | | LB <u>6.0</u> i | n RB <u>6.0</u> | <u>in</u> | Yes _ <u>✓</u> No | | | | |
| CHANNEL FE | ATURES | Water Dept | h: <u>0.50 in</u> | | | c No | | | |
| | | Water Widtl | n: <u>1.0 ft</u> | | Dam PresentYes | <u>/_</u> No | | | |
| | | High Water | Mark: 3.0 in | | Sinuosity ✓ Low | Medium High | | | |
| | | Flow Direct | ion: Northwest | | Gradient | | | | |
| | | | | | | ✓ Severe | | | |
| | | | | | (0.5/100 ft (2 ft/100 ft) | (10 ft/100 ft) | | | |
| | · | Water Pres | | | Proportion of Reach Repre | sented by Stream | | | |
| | | No water Stream b | r, stream bed dry | | Morphology Types Riffle 90 % Run | % | | | |
| | | Standing | | | Pool 10 % | ,, | | | |
| FLOW CHARACTER | ISTICS | ✓ Flowing \ | • | | | | | | |
| O I A I A I A I A I A I A I A I A I A I | 101100 | | | | Turbidity Clear✓_Slightly | turbidTurbid | | | |
| | | Velocity Fast | Moderate | | OpaqueStained | | | | |
| | | ✓ Slow | Woderate | | Other | | | | |
| INOR | GANIC SUB | STRATE COI | MPONENTS | ORGANIC SUBSTRATE COMPONENTS | | | | | |
| | | add up to 100 | | _ | does not necessarily add u | | | | |
| Substrate Type | Diame | ter | er % Composition in Sampling Reach | | Characteristic | % Composition in Sampling Area | | | |
| Bedrock | | | | Detritus | sticks, wood, coarse | | | | |
| Boulder | > 256 | mm (10") | | Detilius | plant materials (CPOM) | 20 | | | |
| Cobble | 64-256 m | m (2.5"-10") | 5 | Muck-Mud | black, very fine organic | 10 | | | |
| Gravel | 2-64 mm | 1 (0.1"-2.5") | 10 | Widok Wida | (FPOM) | 10 | | | |
| Sand | 0.06-2n | nm (gritty) | 35 | Marl | | | | | |
| Silt | | 0.06 mm | 30 | | grey, shell fragments | | | | |
| Clay | < 0.004 | mm (slick) | 20 | | | | | | |
| | | Predomina ✓ Forest | nt Surrounding Lar Commer | | Indicate the dominant type | t type (Check one) | | | |
| | | Field/Pa | | | Trees Shrubs Herbaceous | | | | |
| | | Agricult | | tial | | | | | |
| WATERSHED FEATURES |) | Other: | | | Floodplain Width Wide > 30ft Mode | rate 15-30ft | | | |
| 1 2711 61126 | | Canany Ca | | | ✓ Narrow <16ft | rate to con | | | |
| | | Canopy Co Partly o | | aded | _ | | | | |
| | | Shaded | | | Wetland PresentYes Wetland ID | <u>√</u> No | | | |
| | | Indicate the | a dominant type an | d record the c | dominant species present | | | | |
| AQUATIC VE | GETATION | | | Rooted subme | | ting Free floating | | | |
| | | Floating | algae | Attached alga | e | <u> </u> | | | |
| | | | | | | | | | |
| | | Information | listed on this form re | presents the d | ata collected in 2015. The st | ream was revisited | | | |
| | MACROINVERTEBRATES OR OTHER | on 10/08/20 | 119. The presence of | a stream char | nnel and OHWM was confirm | ied. | | | |
| | | | | | | | | | |
| WILDLIFE | | | | | | | | | |
| OBSERVED/C | | | | | | | | | |
| NOTES | _ | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

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

| JSACE FILE NO./ Project Name: v2.1, Sept 2015) | | Mount | tain Valley Pipeli SWVM v2.1 | | | COORDINATES: imal Degrees) | | | -80.540050 | WEATHER: | WEATHER: Rain, 50° | | | DATE: | November 9, 2 | <u>!</u> 016 | |
|---|---|---------------------|---------------------------------|---|----------------------|-------------------------------|--|--|-----------------|--|--|---|--|--------------------------------|---|---|------------|
| IMPACT STREAM/SITE ID A (watershed size {acreage}, u | | | | S-H107; UNT to Camp Form of Mitigation | Ť | | | MITIGATION STREAM CLASS./S (watershed size (acreage | | | | | | | Comments: | No/low water flow of survey. Unab sample water qua WVSCI | ole to |
| TREAM IMPACT LENGTH: | 30 | FORM O MITIGATIO | | RESTORATION (Levels I-III) | | ORDINATES: imal Degrees) | Lat. | | Lon. | | PRECIPITATION PAST 48 | HRS: | 0.40" | | Mitigation Length: | | |
| Column No. 1- Impact Existing | lumn No. 1- Impact Existing Condition (Debit) | | | Column No. 2- Mitigation Existing Condition - Baseline (Credit) | | | | Column No. 3- Mitigation Pro Post Completion | | ve Years | | ation Projected at Ten Y mpletion (Credit) | ears | | Column No. 5- Mitigation Projecte | d at Maturity (Credit) | |
| Stream Classification: | Interm | ittent | Stream | Classification: | Inte | rmittent | | Stream Classification: | | Intermittent | Stream Classification: | Inte | rmittent | Stre | eam Classification: | Intermittent | |
| Percent Stream Channel Slo | ре | 8 | | Percent Stream Channel Slo | ppe | | | Percent Stream Channel Slo | pe | 0 | Percent Stream C | hannel Slope | 0 | | Percent Stream Channel Slo | рре | 0 |
| HGM Score (attach da | ta 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 | . | | | verage |
| lydrology | 0.24 0.26 | 0.40666667 | Hydrolo | gy | | 0 | | Hydrology | | 0 | Hydrology | | 0 | | drology | | 0 |
| Biogeochemical Cycling Habitat | 0.26 | 0.196666667 | Habitat | chemical Cycling | | U | | Biogeochemical Cycling Habitat | | • | Biogeochemical Cycling Habitat | | • | Habi | ogeochemical Cycling bitat | | U |
| PART I - Physical, Chemical and E | Biological Indica | ators | | PART I - Physical, Chemical an | | cators | | PART I - Physical, Chemical an | _ | Indicators | PART I - Physical, Che | mical and Biological Inc | icators | | PART I - Physical, Chemical and | _ | |
| | Points Scale Range | Site Score | | | Points Scale Range | Site Score | | | Points Scale R | ange Site Score | | Points Scale Range | ge Site Score | | | Points Scale Range S | Site Score |
| PHYSICAL INDICATOR (Applies to all streams of | classifications) | | PHYSIC | AL INDICATOR (Applies to all streams | classifications) | | | PHYSICAL INDICATOR (Applies to all streams | classifications |) | PHYSICAL INDICATOR (Applies to | o all streams classifications) | | PHY | YSICAL INDICATOR (Applies to all streams | classifications) | |
| SEPA RBP (High Gradient Data Sheet) | | | | RBP (High Gradient Data Sheet) | | | | USEPA RBP (High Gradient Data Sheet) | | | USEPA RBP (High Gradient Dat | | | | EPA RBP (High Gradient Data Sheet) | | |
| . Epifaunal Substrate/Available Cover | 0-20 | 8 | | unal Substrate/Available Cover | 0-20 | | | Epifaunal Substrate/Available Cover | 0-20 | | Epifaunal Substrate/Available C | | | | pifaunal Substrate/Available Cover | 0-20 | |
| . Embeddedness . Velocity/ Depth Regime | 0-20 | 2 | | ity/ Depth Regime | 0-20 | | | Embeddedness Velocity/ Depth Regime | 0-20 | | Embeddedness Velocity/ Depth Regime | 0-20 0-20 | | | Embeddedness /elocity/ Depth Regime | 0-20 0-20 | |
| . Sediment Deposition | 0-20 | 6 | | nent Deposition | 0-20 | | | Velocity/ Depth Regime Sediment Deposition | 0-20 | | 4. Sediment Deposition | 0-20 | | | Sediment Deposition | 0-20 | |
| . Channel Flow Status | 0-20 | 7 | | nel Flow Status | 0-20 | | | 5. Channel Flow Status | 0-20 | | 5. Channel Flow Status | 0-20 | | | Channel Flow Status | 0-20 | |
| . Channel Alteration | 0-20 0-1 | 8 | | nel Alteration | 0-20 | | | 6. Channel Alteration | 0-20 | 0-1 | 6. Channel Alteration | 0-20 | | | Channel Alteration | 0-20 | |
| . Frequency of Riffles (or bends) | 0-20 | 6 | 7. Frequ | ency of Riffles (or bends) | 0-20 | | | 7. Frequency of Riffles (or bends) | 0-20 | | 7. Frequency of Riffles (or bends) | | | 7. Fr | requency of Riffles (or bends) | 0-20 | |
| . Bank Stability (LB & RB) | 0-20 | 10 | | Stability (LB & RB) | 0-20 | | | 8. Bank Stability (LB & RB) | 0-20 | | 8. Bank Stability (LB & RB) | 0-20 | | | Bank Stability (LB & RB) | 0-20 | |
| . Vegetative Protection (LB & RB) | 0-20 | 9 | 9. Veget | tative Protection (LB & RB) | 0-20 | | | 9. Vegetative Protection (LB & RB) | 0-20 | | Vegetative Protection (LB & RE | | | | /egetative Protection (LB & RB) | 0-20 | |
| Riparian Vegetative Zone Width (LB & RB) | 0-20 | 9 | | rian Vegetative Zone Width (LB & RB) | 0-20 | | | 10. Riparian Vegetative Zone Width (LB & RB) | 0-20 | | Riparian Vegetative Zone Width | | | | Riparian Vegetative Zone Width (LB & RB) | 0-20 | |
| otal RBP Score | Marginal | 72 | | BP Score | Poor | 0 | | Total RBP Score | Poor | 0 | Total RBP Score | Poor | 0 | | al RBP Score | Poor | 0 |
| Sub-Total CHEMICAL INDICATOR (Applies to Intermittent | and Perennial Stre | 0.36 eams) | Sub-Tot CHEMIC | al CAL INDICATOR (Applies to Intermitter | t and Perennial Stre | eams) | | Sub-Total CHEMICAL INDICATOR (Applies to Intermitter | t and Perennia | l Streams) | Sub-Total CHEMICAL INDICATOR (Applies | to Intermittent and Perennial | Streams) | | p-Total EMICAL INDICATOR (Applies to Intermitten | and Perennial Streams) | 0 |
| WDEP Water Quality Indicators (General) | | | WVDER | Water Quality Indicators (General) | | | WVDEP Water Quality Indicators (General) | | | WVDEP Water Quality Indicators (General) | | | WVDEP Water Quality Indicators (General) | | | | |
| Specific Conductivity | | | | Conductivity | | | | Specific Conductivity | | | Specific Conductivity | s (General) | | | ecific Conductivity | | |
| ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | 0-90 | | | , | 0-90 | | | | 0-90 | | ., | 0.00 | | | , | 0-90 | |
| 100-199 - 85 points • H | | | рН | | 0-90 | | | рН | | | рН | 0-90 | | pH | | | |
| 5.6-5.9 = 45 points | 0-80 | | 20 | | 5-90 0-1 | | | DO. | 5-90 | 0-1 5.6 | DO. | 5-90 | | - | | 5-90 0-1 | |
| | 10-30 | | טט | | 10-30 | | | <u> Бо</u> | 10-30 | | DO | 10-30 | | סם | | 10-30 | |
| Sub-Total | | | Sub-Tot | al | 1 | 0 | | Sub-Total | | 0 | Sub-Total | | 0 | Sub- | o-Total | | 0 |
| BIOLOGICAL INDICATOR (Applies to Intermitte | ent and Perennial S | Streams) | BIOLOG | GICAL INDICATOR (Applies to Intermit | tent and Perennial S | Streams) | | BIOLOGICAL INDICATOR (Applies to Interm | ittent and Per | ennial Streams) | BIOLOGICAL INDICATOR (Appl | es to Intermittent and Pere | nnial Streams) | ВЮ | DLOGICAL INDICATOR (Applies to Interm | ttent and Perennial Stre | eams) |
| / Stream Condition Index (WVSCI) | | WV Stre | eam Condition Index (WVSCI) | | | | WV Stream Condition Index (WVSCI) | | | WV Stream Condition Index (W | /SCI) | | wv | Stream Condition Index (WVSCI) | | | |
| 0 | 0-100 0-1 | | | | 0-100 0-1 | | | | 0-100 | 0-1 | | 0-100 0- | | | | 0-100 0-1 | |
| Sub-Total | l l | 0 | Sub-Tot | al | 1 | 0 | | Sub-Total | 1I | 0 | Sub-Total | 1 1 | 0 | Sub- | o-Total | | 0 |
| | | | | | | _ | | | | | | | | - | | | |
| PART II - Index and Ur | it Score | | | PART II - Index and | Unit Score | | | PART II - Index and | Unit Score | | PART II - Ir | PART II - Index and Unit Score | | | PART II - Index and Unit Score | | |
| Index | Linear Feet | Unit Score | | Index | Linear Feet | Unit Score | | Index | Linear Fe | eet Unit Score | Index | Linear Fee | Unit Score | | Index | Linear Feet Uni | nit Score |
| 0.388 | 30 | 11.65 | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 |

| | | (See instruction page | | Impact Factors It values for MITIGATIO | N BANKING and I | LF) | | | |
|---|-----------------------------------|--|---------------------|---|------------------------------|---|---------------------------|-------------------------------------|-----------|
| Temp | oral Loss-Construction | | | | | Long | term Protection | | |
| *Note: Reflects duration of aquatic functional loss | | ct (debit) and completion of compensatory | | | % Add. Mitigati | ion and Monitoring Period | | -Term Protection (Years) | |
| Years | | | | | | | | | |
| Sub-Total | | 0 | | | | | | | |
| | mporal Loss-Maturity | | | | 0 + 5/ | 10 Year Monitoring | | 101 | |
| *Note: Period between completion of compensator function (i.e. maturity of tree stratum to provide | | | Sub-Total | | | 0 | | | |
| lunction (i.e. maturity of tree stratum to provide | corridor). | within riparian stream of wettand burier | | | | PART IV - Index | to Unit Score Cor | nversion | |
| | | | | | Final Index Score | Linear Feet | Unit Score | ILF Costs | |
| % Add. Mitigation | | Temporal Loss-Maturity (Years) | | | (Debit) | | (Debit) | (Offsetting Debit | |
| | | | | | 0.388333333 | 30 | 11.65 | \$9,320.00 | |
| | | | | | | | | | |
| 0% | | 0 | | | | | | | |
| Sub-Total | | 0 | | | | | | | |
| | | | | | | | | | |
| | | PART V | - Comparison of U | nit Scores and Projecte | ed Balance | | | | |
| | | Mitigation Eviating | | Mitigation Deciseted at | | Mitigation Drainated at Tan | | Mitigation Drainated At | |
| Final Unit Score (Debit) | 11.65 | Mitigation Existing Condition - Baseline | | Mitigation Projected at Five Years | | Mitigation Projected at Ten Years | | Mitigation Projected At Maturity | |
| [No Net Loss Value] | | (Credit) | | Post Completion (Credit) |) | Post Completion (Credit) | | (Credit) | |
| FINAL PROJECTED MET DALANCE | | | | | | | | | |
| FINAL PROJECTED NET BALANCE | | | | | 0 | | 0 | | 0 |
| | | Р | art VI - Mitigation | Considerations (Incentiv | ves) | | | | |
| | Extent of Stream Re | estoration | | | | Fistended | Upland Buffer Zon | | |
| | | correct Restoration Levels (below) for your pr | oject | | *Note ¹ : Referen | Extended note Instructional handout for the de | | | s (below) |
| | Place an "X" in the appropriate | category (only select one). | | | | *Note ² : Enter the buffer width for | | | |
| Restoration Level 1 | | | | | | *Note*: Select ti | ne appropriate mitigation | i type | |
| Restoration Level 2 | | | | | Buffer Width | | Left Banl | < | |
| Restoration Level 3 | | | | | | 0-50 | | None | |
| | | | | • | D (6 MC H) | 51-150 | 51.175 | None | |
| | | | | | Buffer Width | 0-50 | Right Ban | None | |
| Compensatory Mitigation Plan incorpo | | | | | | 51-150 | | None | |
| *Note: HUC 12-based watershed | approach required to obtain Strea | am Restoration incentive | No | J | Average Buffer Width/Side | 0 | | | |
| Impact | | | Mitigation Unit |] | | | Stra | ight Preservation Ratio | |
| Site | | Unit Yield (Debit) | Yield (Credit) | | | | Otra | (v2.1, Sept 2015) | |
| 0.114.07 | | 44.05 | #DIV/01 | • | | Final Mitiration Unit Vist | | | |
| S-H107 11.65 | | | #DIV/0! |] | | Final Mitigation Unit Yield | | | |
| | | | | | | #DIV/0! | | | |

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

To ensure accurate calculations, the <u>UPPERMOST STRATUM</u> 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-H107 Sampling Date: 11/9/2016

Project Site Before Project

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR: SAR number:

Shrub/Herb Strata

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

| Function | Functional Capacity Index |
|------------------------|------------------------------|
| Hydrology | 0.24 |
| Biogeochemical Cycling | 0.26 |
| Habitat | 0.09 |

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. | 1.93 | 0.44 |
| V _{SUBSTRATE} | Median stream channel substrate particle size. | 0.10 | 0.05 |
| V _{BERO} | Total percent of eroded stream channel bank. | 40.00 | 0.86 |
| 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. | 15.00 | 0.23 |
| V _{SRICH} | Riparian vegetation species richness. | 3.00 | 1.00 |
| V _{DETRITUS} | Average percent cover of leaves, sticks, etc. | 20.00 | 0.24 |
| V_{HERB} | Average percent cover of herbaceous vegetation. | 12.22 | 0.16 |
| V _{WLUSE} | Weighted Average of Runoff Score for Catchment. | 0.44 | 0.46 |

| | High-G | Gradient | Headwat | | | | entucky a alculator | | tern Wes | t Virgini | a |
|--------|----------------|--|---------------|---------------|--------------|--------------|---|--------------------------|-----------------------------|-------------|---------|
| | Team: | C. Vileno, C | C. Stoliker | | 3.10. 0.10 | | | | M Northing: | 38.548463 | |
| Pro | oject Name: | | | | | | • | | TM Easting: | | |
| | Location: | | | | | | | - | npling Date: | | |
| SA | AR Number: | | Reach | Length (ft): | 100 | Stream Ty | /pe: Interi | mittent Stream | | | • |
| | Top Strata: | Shi | rub/Herb Str | rata | (determined | d from perce | ent calculate | d in V _{CCANOI} | _{PY}) | | |
| Site a | and Timing: | Project Site | | | | | Before Proje | ct | | | • |
| Sample | Variables • | 1-4 in strea | m channel | | | | | | | | |
| 1 | | 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.) To cent cover measurements at each point below: | | | | | | | | | |
| | List the per | | | | oint below: | | | | | 1 | |
| | 10 | 20 | 20 | 20 | 10 | 10 | 20 | 10 | 20 | 20 | |
| | | | | | | | | | | | |
| 2 | V_{EMBED} | | | | | | | | ghly equidist percentage | | 1.9 |
| | | | | | | | | | ter the rating | | |
| | | | | | | | | | ents, use a r | | |
| | | | - | osed of bed | | | | | • | J | |
| | | | | | | _ | | d from Platt | s, Megahan, | , and | |
| | | Minshall 19 | 83) | | | · | | | | | |
| | | Rating | Rating Des | cription | | | | | | | |
| | | 5 | <5 percent | of surface c | overed, suri | rounded, or | buried by fir | e sediment | (or bedrock |) | |
| | | 4 | | | | | d, or buried b | | | | |
| | | 3 | | | | | ed, or buried | | | | |
| | | 2 | | | | | ed, or buried | | | l ourfood) | |
| | List the ratio | ngs at each | | | covered, su | rrounaea, o | r buried by i | ine seaimer | nt (or artificia | ii suriace) | |
| | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | |
| | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | |
| | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | |
| | 3 | 3 | | | | | | | | ' | |
| | | | | | | | | | | | |
| 3 | | | | | | | it no fewer the ed in V _{EMBED} | | hly equidista | ant points | 0.10 in |
| | Enter partic | le size in ind | ches to the r | nearest 0.1 i | inch at each | point below | / (bedrock sl | hould be co | unted as 99 | in, asphalt | |
| | | as 0.0 in, sa | | | | | (| | | ,, | |
| | 1.00 | 0.08 | 0.20 | 0.10 | 0.10 | 0.08 | 0.08 | 0.25 | 0.08 | 0.20 | |
| | 0.20 | 0.20 | 0.20 | 0.20 | 0.10 | 0.10 | 0.08 | 0.08 | 0.25 | 0.25 | |
| | 0.25 | 0.25 | 0.10 | 0.10 | 0.08 | 0.08 | 0.08 | 0.05 | 0.05 | 0.25 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 4 | V_{BERO} | Total perce | nt of eroded | stream cha | nnel bank. | Enter the to | tal number o | of feet of erd | oded bank o | n each side | |
| | BLIVO | | al percentag | | | | | | for the stream | | 40 % |
| | | | Left Bank: | 20 |) ft | | Right Bank: | 20 |) ft | | |

| Sampl | e Variables | 5-9 within t | he entire r | iparian/buff | fer zone adj | acent to th | e stream cha | annel (25 f | eet from ea | ch bank). | | | |
|-------|--------------------|------------------------------------|---------------------------|---------------|----------------|----------------|-----------------|--------------|--------------|---------------|------------|--|--|
| 5 | V_{LWD} | stream read | ch. Enter th | ne number f | rom the entir | | ter and 36 inc | | | | 0.0 | | |
| | | per 100 ree | t or stream | will be calcu | | f downed w | oody stems: | | 0 | | | | |
| 6 | V_{TDBH} | Average db | h of trees (| measure on | | | ng cover is at | least 20%) | . Trees are | at least 4 | NetHead | | |
| | | inches (10 | cm) in diam | neter. Enter | tree DBHs in | n inches. | | | | | Not Used | | |
| | | | | nents of indi | vidual trees | (at least 4 ir | n) within the b | ouffer on ea | ach side of | | | | |
| | | the stream | below: Left Side | | | Right Side | | | | | | | |
| | | | Leit Side | | | 4 | 4 | 3 | 3 | 0 | | | |
| | | | | | | 7 | 7 | | J | 0 | | | |
| | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| 7 | V_{SNAG} | Number of | snags (at le | east 4" dbh a | and 36" tall) | per 100 fee | t of stream. | Enter numb | er of snags | on each | | | |
| | 011/10 | | | | it per 100 fee | | | | · · | | 0.0 | | |
| | | | Left Side | | 0 | | Right Side: | | 0 | | | | |
| 8 | V_{SSD} | Number of | | | - | up to 4 inch | nes dbh) per | | ~ | asure only if | | | |
| | | | | | | and shrubs | s on each sid | e of the str | eam, and the | e amount | 15.0 | | |
| | | per 100 ft o | it stream wi Left Side | Il be calcula | ted. | | Right Side: | | 15 | | | | |
| 9 | V _{SRICH} | Riparian ve | | | ess per 100 f | eet of strea | m reach. Ch | | - | from | | | |
| | | | | | | | ve species pr | | strata. Spe | cies | 3.00 | | |
| | | | p 1 = 1.0 | and the subi | ndex will be | calculated | from these da | | 2 (1 0) | | | | |
| 2 | Acer rubru | | p i = i.u | Magnolia t | rinetala | | Ailanthus ai | | 2 (-1.0) | Lonicera ja | nonica | | |
| | Acer sacc | | | _ | | | | | | Lonicera ta | | | |
| | Acer sacc | | | Nyssa sylv | n arboreum | | Albizia julib | | | | | | |
| Ш | | | | , | | | Alliaria petid | Jiala | | Lotus corni | | | |
| | Asimina tr | | | Prunus se | | | Alternanthe | | | Lythrum sa | | | |
| | | ghaniensis | | Quercus a | | | philoxeroide | | | Microstegiun | | | |
| Ш | Betula len | ta | | Quercus c | occinea | | Aster tatario | cus | | Paulownia | tomentosa | | |
| Ш | Carya alba | а | | Quercus ir | mbricaria | Ш | Cerastium f | ontanum | | Polygonum (| cuspidatum | | |
| | Carya gla | bra | | Quercus p | rinus | | Coronilla va | aria | | Pueraria m | ontana | | |
| | Carya ova | Carya ovalis 🖳 Quercus rubra | | \Box | Elaeagnus ui | mbellata | | Rosa multi | flora | | | | |
| | Carya ova | Carya ovata Quercus velutina | | | Lespedeza | bicolor | | Sorghum h | alepense | | | | |
| | Cornus flo | Cornus florida Sassafras albidum | | | Lespedeza | cuneata | | Verbena bi | asiliensis | | | | |
| 4 | Fagus gra | gus grandifolia L Tilia americana | | Ш | Ligustrum ob | tusifolium | | | | | | | |
| Ш | Fraxinus a | americana | | Tsuga can | adensis | | Ligustrum s | inense | | | | | |
| | Liriodendro | n tulipifera | | Ulmus am | ericana | | - | | | | | | |
| | | acuminata | _ | | | | | | | | | | |
| _ | | | | | | | | | | | | | |
| | | 3 | Species in | Group 1 | | | | 0 | Species in | Group 2 | | | |

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

| STREAM NAME S-H107 | LOCATION Webster Co., WV | | | | |
|---|--------------------------------|-------------------|--|--|--|
| STATION # RIVERMILE | STREAM CLASS Intermittent | | | | |
| Lat <u>38.548463</u> long <u>-80.540050</u> | RIVER BASIN Elk River | | | | |
| STORET# | AGENCY Tetra Tech | | | | |
| INVESTIGATORS C. Vileno, C. Stoliker | | | | | |
| FORM COMPLETED BY C. Stoliker | DATE 11/09/2016 TIME 5:30pm | REASON FOR SURVEY | | | |

| | Habitat | Condition Category | | | | |
|--|---|---|---|---|---|--|
| Parameters to be evaluated in sampling reach | Parameter Parameter | 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 8 | 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). | |
| ıram | SCORE 7 | 20 19 18 17 16 | 15 14 13 12 11 | 10 9 8 7 6 | 5 4 3 2 1 0 | |
| Pa | 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 6 | 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 7 | 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 | | Condition Category | | | |
|--|---|--|--|--|---|--|
| Parameters to be evaluated broader than sampling reach | Parameter | Optimal | Suboptimal | Marginal | Poor | |
| | 6. Channel Alteration | Channelization or dredging absent or minimal; stream with normal pattern. | Some channelization present, usually in area 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} 8 | 20 19 18 17 16 | 15 14 13 12 | 1 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 the width of the stream between 7 to 15. | | 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 6 | 20 19 18 17 16 | 15 14 13 12 | 1 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 erosion mostly healed over. 5-30% of bank in reach has areas of erosi | areas of erosion; high erosion potential during | Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars. | |
| eva | SCORE 5 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | |
| to be | SCORE 5 (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | |
| Parameters | 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 clas of plants is not well-represented; disruption evident but not affectin full plant growth poten to any great extent; mo than one-half of the potential plant stubble height remaining. | patches of bare soil or closely cropped vegetation common; less than one- ial half of the potential plant | 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 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 impacte 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 1 (LB) | Left Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | |
| | SCORE 8 (RB) | Right Bank 10 9 | 8 7 6 | 5 4 3 | 2 1 0 | |

Total Score 72

No / low flow at time of survey. Unable to sample water quality or $\ensuremath{\mathbf{WVSCI}}$.