

JURISDICTIONAL WATERS DELINEATION REPORT AMERICAN ELECTRIC POWER CO., INC. PROPOSED MITCHELL LANDFILL PROJECT CRESAP, MARSHALL COUNTY, WEST VIRGINIA

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1.0 INTRODUCTION

1.1 GENERAL INFORMATION

This report presents the findings of a wetland and stream delineation conducted at the American Electric Power Company, Inc. (AEP) proposed Mitchell Landfill Project Area (the Project Area) located in Cresap, Marshall County, West Virginia. The Project Area is located on Gatts Ridge Road west of its intersection with Taylors Ridge Road (Figure 1) and consists of a proposed coal combustion byproducts landfill and adjacent areas that may be impacted by soil borrow and other construction and operation activities. The Project Area includes two possible configurations for the proposed landfill, Option 1 that encompasses one valley and has limits of disturbance that are approximately 131 acres in size, and Option 2 that encompasses the Option 1 valley and a second valley for limits of disturbance that are approximately 216 acres in size.

Civil & Environmental Consultants, Inc. (CEC) conducted the field reconnaissance portion of the wetland and stream delineation on August 11 through 15 and on September 27 and 28, 2011.

1.2 METHODOLOGY

This report identifies delineated wetlands, streams (ephemeral, intermittent, and perennial), and other waters within the Project Area. The methodology for conducting the wetland and stream delineation is presented below.

1.2.1 Wetlands

The delineation was based on CEC's professional judgment and interpretation of the technical criteria presented in the 1987 *Corps of Engineers Wetlands Delineation Manual* (USACE Manual) and the 2008 *Corps of Engineers Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont* (Eastern Mountain and Piedmont Supplement). The wetland boundaries, where present, were delineated using the routine onsite determination method described in the USACE Manual and Eastern Mountains



and Piedmont Supplement, supplemented by the *National List of Plant Species That Occur in Wetlands: Northeast (Region 1)* (Reed 1988) and *Hydric Soils of the United States* (USDA 1991). CEC completed the following scope of services to identify and delineate wetland boundaries within the Project Area:

- 1. <u>Office Data Review</u>: CEC personnel reviewed the U.S. Geological Survey (USGS) topographic map (Figure 1), U.S. Department of Agriculture (USDA) Soil Survey of Marshall County, West Virginia (Figure 2), U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) map (Figure 3), and the corresponding county hydric soils list. These resources were used to identify potential wetland areas prior to conducting the site reconnaissance.
- 2. Site Reconnaissance: CEC performed the field reconnaissance portion of the wetland and stream delineation on August 11 through August 15 and on September 27 and 28, 2011. First, plant communities present within the Project Area were identified. The dominant plant species within each community were identified and a determination was made on whether the plant community was dominated by hydrophytic (wetland) plants. If areas that appeared to be dominated by hydrophytic plants were identified within the Project Area, a representative test site was located within the plant community and soils were sampled using a spade shovel to determine if hydric soil indicators were present. Lastly, the test site was inspected to determine if indicators of wetland hydrology (ponding, soil saturation, etc.) were present. If a test site was determined to be within a wetland, further testing was performed to locate the wetland/non-wetland boundary and a second test site was established outside the wetland boundary to document conditions in the non-wetland area. If found, the boundaries of areas having the three necessary criteria were marked in the field with consecutively numbered plastic flagging tape and subsequently located using a sub-meter accuracy Trimble Geo-XT Global Positioning System (GPS) unit.
- 3. <u>Data Collection</u>: Eastern Mountain and Piedmont Supplement wetland determination data forms for the routine onsite determination method were completed for four representative locations within the site boundaries (see Figure 4 for test site locations and Appendix A for the wetland determination data forms). The wetland determination data forms provide a record of the vegetation, soils, and hydrology observations used in making the wetland determinations.

CEC photographed the test site locations and wetland areas located within the Project Area; representative photographs are included in Appendix B.

1.2.2 Streams

In addition to the identification of wetlands, CEC identified streams within the Project Area that would likely be considered jurisdictional by the USACE and the West Virginia Department of Environmental Protection (WVDEP). Using professional judgment and field indicators such as



flow, substrate composition, embeddedness, defined bed and bank, vegetation, and benthic macroinvertebrates, CEC classified on-site stream segments into one of three stream types: ephemeral, intermittent, and perennial. The following descriptions are provided to clarify the different stream classifications.

- <u>Ephemeral Stream</u> An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.
- <u>Intermittent Stream</u> An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow. Intermittent streams have also been defined as those streams which have no flow during sustained periods of no precipitation and which do not support life whose life history requires residence in flowing waters for a continuous period of at least 6 months.
- <u>Perennial Stream</u> A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

The uppermost limit of an ephemeral stream is determined at the point where the stream loses its defined "bed and bank" or ordinary high water mark (OHWM) and a predominance of upland vegetation occurs in the channel. Under natural, undisturbed conditions, streams generally originate as headwater ephemeral drainages along the tops of ridges, transition into intermittent stream systems, and eventually transition into perennial stream systems. CEC placed blue flagging tape with the words "Beginning of Stream X" at the locations where a defined bed and bank/OHWM began within streams within the Project Area. In order to determine the locations where ephemeral streams transitioned to intermittent streams, where applicable, CEC walked downstream until pooled or flowing water was observed in the stream channel. At the point where flowing water or a pool was observed, CEC excavated a test pit approximately 12 to 16 inches deep in the streambed outside of the area of the pool or flowing water in order to determine if groundwater was present. If groundwater was present within the test pit, CEC recorded the location of the test pit with the Trimble Geo-XT GPS unit and placed blue flagging tape with the words "Stream X Ephemeral/Intermittent Break Point" at this location.



Following the methodology outlined in the U.S. Environmental Protection Agency's (USEPA) *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Edition* (Barbour et al. 1999), CEC completed the following forms for each intermittent stream identified within the Project Area (see Appendix C):

- Habitat Assessment Field Data Sheet High Gradient Streams
- Physical Characterization/Water Quality Field Data Sheet
- Benthic Macroinvertebrate Field Data Sheet

Within the intermittent streams identified within the Project Area, CEC also used a Horiba U-52 multiparameter water quality meter to measure temperature, specific conductivity, dissolved oxygen, pH, and turbidity.

In addition to the above outlined forms, CEC also completed field data sheets for intermittent streams following the methodology outlined in the USACE's *Operational Draft Regional Guidebook for the Functional Assessment of High-gradient Ephemeral and Intermittent Headwater Streams in Western West Virginia and Eastern Kentucky*. These forms are provided in Appendix D.

For each ephemeral stream identified within the Project Area, CEC completed the USEPA's Habitat Assessment Field Data Sheet – High Gradient Streams. In addition to these forms, CEC documented the average OHWM width, average bankfull width, average depth of flowing water and/or pools (if present), and dominant substrates for each stream. CEC also evaluated the ephemeral streams that are located within the minimum degradation alternative limits of disturbance using the USACE's *Functional Assessment of High-gradient Ephemeral and Intermittent Headwater Streams in Western West Virginia and Eastern Kentucky* (Appendix D).

The limit of each distinct stream segment was located in the field using a Trimble GeoXT GPS unit. The total stream segment lengths and stream designations are summarized in Section 2.6



and Table 3 of this report. Representative photographs of the streams are included in Appendix B. Additionally, scores assigned to each stream segment sampled following the USEPA and/or USACE high gradient stream sampling methodology are provided in Table 3.



2.0 FINDINGS

2.1 NATIONAL WETLANDS INVENTORY MAPS

NWI maps have been prepared by the USFWS based on high altitude infrared aerial photography and limited ground truthing. Wetlands and deep water habitats are identified on these maps and classified according to the system developed by Cowardin and co-workers (1979). The aerial photographs reflect conditions during the specific year and season the data were acquired and all wetlands may not be indicated.

The NWI maps for the Glen Easton, WV and the Powhatan Point, WV topographic quadrangles (Figure 3) do not identify waterbodies within the Project Area. One NWI mapped waterbody is shown as being present just south of the Project Area. The NWI maps identify this waterbody as a palustrine, unconsolidated bottom, semi-permanently flooded, diked/impounded wetland (PUBFh). CEC investigated this mapped NWI wetland during the field surveys in order to determine if it was a potential wetland and in order to verify that it is not within the boundary of the Project Area. The waterbody appears to be an old farm pond that has become silted in. Its location on the NWI map is accurate and it is located outside of the limits of the Project Area. CEC did not excavate test pits within this waterbody, but it had wetland delineation flags around its perimeter from what is assumed to be a previous wetland delineation study by others. The pond was dominated by cattails (*Typha* spp.) and other hydrophytic vegetation and appears to be a palustrine emergent wetland. Representative photographs of this waterbody are provided in Appendix B.

As noted in the following sections of this report, the NWI map does not accurately depict the current wetland conditions observed by CEC within the Project Area.

2.2 SITE SOILS

Soils information for Marshall County, WV is available online via the Web Soil Survey through the USDA Natural Resources Conservation Service (NRCS). The NRCS (USDA 2010)



identifies six soil types within the Project Area (Table 1, Figure 2). The NRCS does not list the six soil types as having hydric components.

TABLE 1 SOILS INFORMATION					
Soil Mapping Unit Symbol	Soil Mapping Unit Name	Drainage Class	Hydric Component		
CmC	Culleoka-Dormont complex, 8 to 15 percent slopes	Well drained	Not hydric		
CmD	Culleoka-Dormont complex, 15 to 25 percent slopes	Well drained	Not hydric		
СрЕ	Culleoka-Dormont-Peabody complex, 25 to 35 percent slops	Well drained	Not Hydric		
CrF	Culleoka-Dormont-Peabody complex, 35 to 65 percent slopes, very stony	Well drained	Not hydric		
DoD	Dormont silt loam, 15 to 25 percent slopes	Moderately well drained	Not Hydric		
DrE	Dormont-Culleoka complex, 25 to 35 percent slopes	Moderately well drained	Not Hydric		

The Project Area is mapped to consist of well drained to moderately well drained soils. Some of the soils within the Project Area have been disturbed by agricultural activities. Therefore, some of the soils within the Project Area may no longer reflect the characteristics of the soil mapping units in the NRCS Web Soil Survey.

2.3 PLANT COMMUNITIES

The plant communities present within the Project Area consist of mixed second growth/early successional forest, second growth forest, old field habitat, mixed old field/early successional forest, riparian forest, agricultural row crop fields, palustrine emergent wetland, and hay fields. Additionally, areas of residential lawn habitats with scattered trees were also identified within the Project Area. Riparian forest was present in limited areas along the bottom of slopes adjacent to intermittent streams. Dominant plant species comprising these plant communities were identified and the USFWS wetland plant indicator status was determined according to Reed (1988). The USFWS has defined five wetland plant indicator categories, which include:



- Obligate Wetland (OBL has >99% probability of occurring in wetlands);
- Facultative Wetland (FACW has 66% to 99% chance of occurring in wetlands);
- Facultative (FAC has 33% to 66% chance of occurring in wetlands);
- Facultative Upland (FACU has 1 to 33% chance of occurring in wetlands); and
- Upland (UPL has <1% chance of occurring in wetlands).

Plants classified as OBL, FACW, or FAC are considered to be wetland plants (hydrophytes) by the USFWS and USACE.

Agricultural fields were present in the vicinity of the Gatts farmstead and, at the time of the site visits, consisted of either soybean (*Glycine max*) or corn (*Zea mays*).

Old field vegetation was located primarily within an existing natural gas pipeline right-of-way, electric transmission powerline rights-of-way, and pastures. Dominant species included the following: Allegheny blackberry (*Rubus allegheniensis*), deertongue (*Dichanthelium clandestinum*), giant ironweed (*Vernonia gigantea*), spotted trumpetweed (*Eupatoriadelphus maculatus*), indianhemp (*Apocynum cannabinum*), hedge false bindweed (*Calystegia sepium*), flattop goldentop (*Euthamia graminifolia*), Queen Anne's lace (*Daucus carota*), common yarrow (*Achillea millefolium*), wildgrape (*Vitis sp.*), white ash (*Fraxinus americana*) saplings, multiflora rose (*Rosa multiflora*), wingstem (*Verbesina alternifolia*), Nepalese browntop (*Microstegium vimineum*), poison ivy (*Toxicodendron radicans*), tall goldenrod (*Solidago altissima*), black raspberry (*Rubus occidentalis*), Canadian horseweed (*Conyza canadensis*), red maple (*Acer rubrum*) saplings, Canadian blacksnakeroot (*Sanicula canadensis*), Christmas fern (*Polystichum acrostichoides*), ticktrefoil (*Desmodium sp.*), orchardgrass (*Dactylis glomerata*), eastern hayscented fern (*Dennstaedtia punctiloba*), and tulip poplar (*Liriodendron tulipifera*) saplings.

Second growth forest is present within the central portions of both the Option 1 and Option 2 limits of disturbance. These areas are located primarily on the steeper slopes and do not appear to have been logged recently. Dominant canopy species included the following: sugar maple (*Acer saccharum*), red maple, hickory (*Carya* spp.), white ash, American beech (*Fagus grandifolia*), northern red oak (*Quercus rubra*), tulip poplar, American elm (*Ulmus americana*),



American basswood (*Tilia americana*), white oak (*Quercus alba*), black cherry (*Prunus serotina*), and hophornbeam (*Ostrya virginiana*). Dominant shrub and herbaceous species included pawpaw (*Asimina triloba*), American hornbeam (*Carpinus caroliniana*), American witchhazel (*Hamamelis virginiana*), hawthorn (*Crataegus sp.*), spicebush (*Lindera benzoin*), multiflora rose, Christmas fern, white snakeroot (*Ageratina altissima*), Canadian woodnettle (*Laportea canadensis*), jumpseed (*Polygonum virginianum*), Nepalese browntop, Virginia creeper (*Parthenocissus quinquefolia*), mayapple (*Podophyllum peltatum*), Canadian clearweed (*Pilea pumila*), jewelweed (*Impatiens capensis*), and common blue wood aster (*Symphyotrichum cordifolium*).

Mixed second growth/early successional forest is present throughout much of the Project Area, within areas that have been logged or selectively logged relatively recently. Dominant plant species within these habitats were similar to those found within the second growth forest habitats within the Project Area. However, the understory was significantly more dense with multiflora rose and Allegheny blackberry.

Riparian forest was located along the base of slopes adjacent to portions of the intermittent streams present within the Project Area. Dominant canopy species in the riparian forest included the following: American elm, American sycamore (*Platanus occidentalis*), boxelder, sugar maple, American basswood, and American beech. The understory included species found in the canopy as well as American hornbeam, spicebush, and multiflora rose. Herbaceous species and vines common in these areas consisted of wingstem, Virginia creeper, Canadian woodnettle, jewelweed, pale touch-me-not (*Impatiens pallida*), and smartweed (*Polygonum* sp.).

Hay field habitats were present near Gatts Ridge Road and in a portion of the Gatts Farmstead. Dominant species in the hay fields included yellow foxtail (*Setaria glauca*), red clover (*Trifolium pratense*), tall fescue (*Schedonorus phoenix*), narrowleaf plantain (*Plantago lanceolata*), common yarrow, white clover (*Trifolium repens*), Queen Anne's lace, giant ironweed, purpletop tridens (*Tridens flavus*), common dandelion (*Taraxacum officinale*), horsenettle (*Solanum carolinense*), barnyardgrass (*Echinochloa crus-galli*), orchardgrass, yellow nutsedge (*Cyperus esculentus*), curly dock (*Rumex crispus*), and common milkweed (*Asclepias syriaca*),



Two small palustrine emergent wetlands were identified within the Project Area. Dominant species in these areas included the following: rice cutgrass (*Leersia oryzoides*), fowl mannagrass (*Glyceria striata*), Frank's sedge (*Carex frankii*), jewelweed (*Impatiens capensis*), clearweed, swamp milkweed, smartweed, purplestem aster (*Symphyotrichum puniceum*), broadleaf cattail (*Typha latifolia*), swamp dock (*Rumex verticillatus*), and field horsetail (*Equisetum arvense*).

The locations of plant communities identified within the Project Area are shown on Figure 5. Individual wetland areas and their characteristics are listed in Table 2 in Section 2.5 of this report. In addition, dominant plant species observed in the wetlands and their indicator status are recorded on the wetland determination data forms included in Appendix A.

2.4 HYDROLOGY

The Glen Easton, WV and the Powhatan Point, WV topographic quadrangle maps (1978) indicate that the majority of the Project Area is located within relatively steep terrain. Portions of the Project Area are located along ridgetops and consist of gently rolling and/or relatively flat areas. Ground surface elevations within the Project Area are mapped to range from approximately 800 feet to 1,300 feet above mean sea level (AMSL). CEC assumes groundwater flow in the vicinity western portion of the Project Area follows regional topography and generally flows south towards Fish Creek. CEC also assumes groundwater flow within the Project Area follows regional topography and generally flows south towards Fish Creek.

It is of note that the hydrology of the streams within the Project Area was likely affected by the increased amount of rainfall that has occurred in Marshall County, West Virginia during 2011, as compared to the 30-year average. According to the National Oceanic and Atmospheric Administration's (NOAA) National Climatic Data Center, the average precipitation for Moundsville, West Virginia, for the period from January 1 through July 31 is 24.84 inches (NOAA 2011). According to NOAA (2011), Moundsville received 30.23 inches of precipitation during that time period in 2011, an increase of 5.39 inches compared to normal years. The



Weather Channel (TWC 2011) lists the amount of rainfall that fell in Moundsville from August 1 through August 10, 2011, as 0.74 inches. Additionally, precipitation occurred in Moundsville during the days the site visits were conducted for the delineation, as follows: August 13 - 0.34 inches; August 14 - 0.12 inches; and August 15 - 0.12 inches (TWC 2011).

2.5 WETLANDS

Two wetlands (Wetlands A and B) were identified in the Project Area (Figure 4). Eastern Mountains and Piedmont Supplement Wetland Determination Data Forms are provided in Appendix A and photographs of the wetlands are provided in Appendix B. Photograph locations are depicted on Figure 5. A field survey of the delineated wetland boundaries (Figure 4) was completed by CEC using a Trimble Geo-XT GPS unit. The wetland identifier, acreage, CEC's interpretation of the USFWS classification, and hydrological characteristics are summarized for each wetland in Table 2.

TABLE 2 WETLAND CHARACTERISTICS						
Wetland IdentifierAcreageUSFWS ClassificationHydrological Status			Hydrological Status ¹			
А	0.01	Palustrine Emergent Wetland	Connected/Adjacent			
В	0.01	Palustrine Emergent Wetland	Connected/Adjacent			
Total	0.02					

¹ The determinations of hydrologically connected/adjacent and isolated wetlands outlined in this report are preliminary, based on the boundary delineations and have not been formally approved by the USACE.

The hydrological status of each wetland relates to the possible jurisdictional authority by the USACE and WVDEP (Table 2). Wetlands that are hydrologically connected or adjacent to a stream are likely to be classified by the USACE as waters of the United States and, thus, regulated by both the USACE and WVDEP under the Clean Water Act (CWA). Wetlands that are hydrologically isolated and not adjacent to a stream are likely to be classified as isolated waters and not regulated by the USACE or WVDEP.



Wetland A is located in the northwestern portion of the Project Area (Figure 4). CEC classified this approximately 0.01-acre wetland as a palustrine, emergent, seasonally flooded/saturated (PEM1E) wetland (Cowardin 1979). Dominant species included the following: rice cutgrass, fowl mannagrass, Frank's sedge, clearweed, swamp milkweed, and dotted smartweed (*Polygonum punctatum*). No surface water or saturated soils were present within Wetland A during the site visit. Wetland A is located within an existing natural gas pipeline right-of-way. It is located adjacent to Streams 10 and 10a and is therefore likely to be classified by the USACE as a water of the United States.

Wetland B is located in the southeastern portion of the Option 1 Limits of Disturbance, southeast of the Gatts Farmstead (Figure 4). CEC classified this approximately 0.01-acre wetland as a palustrine, emergent, seasonally flooded/saturated (PEM1E) wetland (Cowardin 1979). Dominant species included the following: jewelweed, clearweed, Pennsylvania smartweed (*Polygonum pensylvanicum*), purplestem aster, swamp dock, broadleaf cattail, and field horsetail. A spring was observed on the north side of Wetland B and was flowing at the time of the site visit. Stream 16 begins at the downstream end of Wetland B and is hydrologically connected to it. Therefore, this wetland is likely to be classified by the USACE as a water of the United States.

2.6 OTHER WATERS

In addition to the aforementioned wetland areas, 30 interpreted ephemeral and intermittent streams were identified within the Project Area (Figure 4). The entire reach of some streams identified within the Project Area were interpreted as being ephemeral, while the upper reaches of some streams were interpreted as being ephemeral and the lower reaches were interpreted as being intermittent. Table 3 contains information on each stream documented within the Project Area. Following Table 3 are narrative summaries of each stream. Representative photographs of each of the streams can be found in Appendix B, with photograph locations depicted on Figure 5. USEPA Rapid Bioassessment Protocol stream forms are provided in Appendix C, while USACE High-gradient Headwater Stream forms are provided in Appendix D.



TABLE 3								
	STREAM CHARACTERISTICS Stream Approximate USEPA High USACE Functional Capacity Units (FCU)							
Stream Segment Identifier	Classification	Length Within Project Area	High Gradient Stream Score	Hydrology	Biogeo- chemical Cycyling	Habitat		
Stream 1	Intermittent		131	97	93	88		
Stream 1	Intermittent	3,465	146	95	90	89		
Stream 1	Intermittent		154	98	93	94		
Stream 1	Ephemeral	78	96	93	85	74		
Stream 1a	Ephemeral	327	103	98	96	97		
Stream 1b	Ephemeral	70	75	94	85	61		
Stream 1c	Ephemeral	79	73	67	48	42		
Stream 1d	Ephemeral	151	102	93	92	73		
Stream 2	Intermittent	372	130	98	94	89		
Stream 2a	Ephemeral	70	92	92	88	71		
Stream 2a	Intermittent	413	82	93	80	61		
Stream 2a-1	Ephemeral	298	82	98	91	74		
Stream 2a-2	Ephemeral	51	89	66	63	63		
Stream 2a-3	Ephemeral	92	86	74	84	81		
Stream 2b	Ephemeral	550	109	94	85	75		
Stream 3	Ephemeral	375	103	94	85	84		
Stream 3	Intermittent	216	118	100	94	82		
Stream 3a	Ephemeral	178	109	89	85	77		
Stream 3b	Ephemeral	119	103	93	81	79		
Stream 4	Ephemeral	495	111	91	78	85		
Stream 5	Ephemeral	383	110	87	89	78		
Stream 6	Ephemeral	51	77	79	89	92		
Stream 6	Intermittent	292	116	92	90	87		
Stream 7	Ephemeral	394	107	94	84	72		
Stream 8	Ephemeral	82	97					
Stream 8	Intermittent	2744	138	97	94	96		
Stream 8	Intermittent	2744	153	91	75	79		
Stream 8a	Ephemeral	181	101					
Stream 8a	Intermittent	95	127	65	58	62		
Stream 8b	Ephemeral	201	113					
Stream 9	Ephemeral	89	107					
Stream 9	Intermittent	210	125	96	88	86		
Stream 10	Ephemeral	199	92					
Stream 10	Intermittent	395	137	96	92	86		
Stream 10a	Ephemeral	160	103					
Stream 11	Ephemeral	289	124					



TABLE 3 STREAM CHARACTERISTICS							
Stream		Approximate Length Within Project Area	USEPA High Gradient Stream Score	USACE Functional Capacity Units (FCU)			
Stream Segment Identifier	Classification			Hydrology	Biogeo- chemical Cycyling	Habitat	
Stream 12	Ephemeral	439	111				
Stream 13	Ephemeral	202	129				
Stream 13	Intermittent	333	125	94	82	79	
Stream 14	Ephemeral	194	109				
Stream 14	Intermittent	179	140	78	76	62	
Stream 15	Ephemeral	290	112				
Stream 16	Intermittent	39	91	59	72	55	
Stream 16	Intermittent	152	91			55	
Total	14,992						

Stream 1 consists of an unnamed intermittent stream, which originates as an ephemeral stream in the western (Option 1) portion of the Project Area, as shown on Figure 4. Stream 1 flows south within the Project Area. Approximately 78 linear feet of Stream 1 were interpreted as being ephemeral, while approximately 3,465 linear feet of Stream 1 were interpreted as being intermittent. During the site visits, CEC sampled one reach within the ephemeral portion of Stream 1 and three reaches within the intermittent portion of Stream 1.

The ephemeral portion of Stream 1 did not have pools or flowing water during the site visit and was characterized by an average OHWM width of approximately 4 feet and an average bankfull width of 6 to 8 feet. Substrates within the ephemeral portion of Stream 1 consisted of flat boulders, cobble, gravel, and clay. The USEPA High Gradient Stream score for the Stream 1 ephemeral sample reach was 96 (see Appendix C). A representative photograph of the ephemeral portion of Stream 1 is provided in Appendix B.

The upper/upstream sample reach of the intermittent portion of Stream 1 was located upstream of its confluence with Stream 2. CEC observed the upstream sample reach of Stream 1 as characterized by an average OHWM width of approximately 6 feet and an average bankfull width of approximately 8 to 10 feet. Flowing water was observed within this sample reach,



within an average depth of approximately 1 inch, and pools of water up to 6 inches deep were also present. The substrates of the upstream sample reach of Stream 1 consisted of cobble, flat boulders, bedrock, silt, and gravel. The USEPA High Gradient Stream score for this representative reach of Stream 1 was 131. Northern dusky salamander (*Desmognathus fuscus*) larvae were observed within this sample reach, but no fish were observed. Overall, benthic macroinvertebrates were rare within this sample reach, with taxa observed including Decapoda (crayfish), Coleoptera (aquatic beetles), Corydalidae (dobsonfly larvae), Tipulidae (crane fly larvae) and Ephemeroptera (mayfly larvae).

The second/middle sample reach of the intermittent portion of Stream 1 was located at the confluence of Stream 1 and Stream 4. CEC observed Stream 1 within this sample reach as characterized by a width at the OWHM of approximately 10 feet and an average bankfull width of approximately 12 to 14 feet. Flowing water was present, with an average depth of approximately 1 to 2 inches deep. Bedrock pools up to 16 inches deep were also present within this sample reach. The substrates of the middle sample reach of Stream 1 consisted of cobble, bedrock, boulders, and gravel. The USEPA High Gradient Stream score for this representative reach of Stream 1 was 146. Benthic macroinvertebrate taxa were common within this sample reach but diversity was limited, with only crayfish and mayfly larvae being abundant. Other macroinvertebrate taxa were rare in the sample reach and included Hemiptera (water striders), aquatic beetles, and Trichoptera (caddisfly larvae). Adult northern dusky salamanders and green frogs (*Rana clamitans*) were observed, but no fish were present within this sample reach.

The third/lower sample reach of the intermittent portion of Stream 1 was located directly upstream from the southern edge of the Project Area boundary in the Option 1 limits of disturbance. CEC observed Stream 1 within the lower sample reach as characterized by an OHWM width of approximately 10 to 12 feet and an average bankfull width of approximately 15 to 20 feet. Flowing water was present within the sample reach, with an average depth of approximately 1 to 3 inches. Pools up to 12 inches deep were also present within this sample reach. Substrates present within the lower sample reach of Stream 1 consisted of small flat boulders, large boulders, gravel, and cobble. The USEPA High Gradient Stream score for this representative reach of Stream 1 was 154. Benthic macroinvertebrates were rare overall within



this sample reach and diversity was limited, with only crayfish and mayfly larvae being observed. Adult and larval northern dusky salamanders and green frogs (*Rana clamitans*) were observed, but no fish were present within this sample reach.

No fish or species of salamanders dependent upon a perennial source of water were observed within the three reaches sampled within Stream 1. Additionally, benthic macroinvertebrates were rare overall and of limited diversity. Benthic macroinvertebrate taxa observed within the Stream 1 sample reaches also are not dependent upon a perennial source of water, other than dobsonfly larvae, which are sometimes dependent upon water being available for a year or more. Dobsonfly larvae were rare within Stream 1 and can be assumed to be present due to the availability of water for longer periods of time within the deeper pools in Stream 1. Representative photographs of Stream 1 can be found in Appendix B, with photograph locations depicted on Figure 5. The USEPA Rapid Bioassessment Protocol High Gradient Stream forms for Stream 1 are provided in Appendix C and the USACE High-gradient Stream forms are provided in Appendix D.

Stream 1a consists of an unnamed ephemeral stream that originates in the northeastern portion the Option 1 Project Area. Stream 1a flows southwest to Stream 1. Approximately 327 linear feet of Stream 1a were identified within the Project Area. During the August 12, 2011, site visit, Stream 1a was characterized by an OHWM width of approximately 2 to 3 feet and an average bankfull width of approximately 5 to 6 feet. No flowing water or pools were observed within Stream 1a during the site visit. The substrates of Stream 1a consisted primarily of cobble, gravel, and flat boulders, with clay, silt and leaf pack/woody debris also being present to a lesser extent. No fish or amphibians were observed within Stream 1a during the field survey. The USEPA High Gradient Stream score for this representative reach sampled within Stream 1a was 103. A representative photograph of Stream 1a can be found in Appendix B, with the photograph location depicted on Figure 5. USEPA High Gradient Stream forms for Stream 1a are provided in Appendix C.

Stream 1b consists of an unnamed ephemeral stream that originates within a powerline right-ofway in the northeastern portion the Option 1 Project Area. Stream 1b flows south to Stream 1.



Approximately 70 linear feet of Stream 1b were identified within the Project Area. Stream 1b was characterized by a width at the OWHM of approximately 1.5 to 2 feet and an average bankfull width of approximately 4 feet. No flowing water was observed during the site visit, but a few shallow pools were present. The substrates of Stream 1b consisted of silt, clay, cobble and gravel. No fish or amphibians were observed within Stream 1b during the field survey. The USEPA High Gradient Stream score for Stream 1b was 75. A representative photograph of Stream 1b channel can be found in Appendix B, with the photograph location depicted on Figure 5. USEPA High Gradient Stream forms for Stream 1b are provided in Appendix C.

Stream 1c consists of an unnamed ephemeral stream that originates within a powerline right-ofway in the northern portion the Option 1 Project Area. Stream 1c flows southeast to Stream 1. Approximately 79 linear feet of Stream 1c were identified within the Project Area. During the site visit, Stream 1c was characterized by an OHWM width of approximately 1 foot and an average bankfull width of approximately 2 to 3 feet. No flowing water or pools were observed within Stream 1c during the site visit. The substrates of Stream 1c consisted of silt, clay, cobble and gravel. The USEPA High Gradient Stream score for this representative reach of Stream 1b was 73. A representative photograph Stream 1c can be found in Appendix B, with photograph locations depicted on Figure 5. USEPA High Gradient Stream forms for Stream 1c are provided in Appendix C.

Stream 1d consists of an unnamed ephemeral stream that originates in the northern portion of the Option 1 Project Area. Stream 1d flows southeast to Stream 1. Approximately 151 linear feet of Stream 1d were identified within the Project Area. During the site visit, Stream 1d was characterized by a width at the OWHM of approximately 3 feet and an average bankfull width of approximately 5 to 6 feet. No flowing water or pools were observed during the site visit. The substrates of Stream 1d consisted of flat boulders, cobble, gravel, clay, and leaf pack/woody debris. No fish or amphibians were observed within Stream 1d during the field survey. The USEPA High Gradient Stream score for this representative reach of Stream 1d was 102. A representative photograph of Stream 1d can be found in Appendix B, with the photograph location depicted on Figure 5. USEPA High Gradient Stream forms for Stream 1d are provided in Appendix C.



Stream 2 consists of an unnamed intermittent stream, which originates at the confluence of an ephemeral stream (Stream 2b) and intermittent stream (Stream 2a) in the western (Option 1) portion of the Project Area, as shown on Figure 4. Stream 2 flows southwest within Project Area to Stream 1. Approximately 372 linear feet of Stream 2 were identified within the Project Area. Stream 2 was characterized by an average OHWM width of approximately 5 to 6 feet and an average bankfull width of approximately 8 to 10 feet. Slowly flowing water was observed within Stream 2, within an average depth of approximately 1 inch, and pools of water up to 4 inches deep were also present. Portions of Stream 2 were observed to be without flowing water at the surface during the site visit. The substrates of Stream 2 primarily consisted of cobble, gravel, flat boulders, and silt, with small areas of bedrock also being present. The USEPA High Gradient Stream score for this representative reach of Stream 2 was 130 (see Appendix C). No stream salamanders, frogs, or fish were observed within this sample reach. Overall, benthic macroinvertebrates were common within this sample reach. However, the diversity was very low, with only one species of mayfly larvae and crayfish observed within the sample reach. Benthic macroinvertebrate taxa observed within the Stream 2 sample reach also are not dependent upon a perennial source of water. The USEPA High Gradient Stream forms and the USACE High-gradient Stream Forms for Stream 2 are provided in Appendix C and Appendix D, respectively. Representative photographs of the intermittent portion of Stream 2 are provided in Appendix B.

Stream 2a consists of an unnamed intermittent stream, which originates as an ephemeral stream in the western (Option 1) portion of the Project Area, as shown on Figure 4. Stream 2a flows southwest within the Project Area to Stream 2. Approximately 70 linear feet of Stream 2a were interpreted as being ephemeral, while approximately 413 linear feet of Stream 2a were interpreted as being intermittent. During the site visits, CEC sampled one reach within the ephemeral portion of Stream 2a and one reach within the intermittent portion of Stream 2a.

The ephemeral portion of Stream 2a did not have flowing water during the site visit, but one small pool was present. The average OHWM width of this portion of Stream 2a was approximately 1.5 feet and the average bankfull width was approximately 3 feet. Substrates



within the ephemeral portion of Stream 2a consisted of silt, clay, gravel, and cobble, with a few flat boulders and areas of woody debris also present. The USEPA High Gradient Stream score for the Stream 2a ephemeral sample reach was 92 (see Appendix C). A representative photograph of the ephemeral portion of Stream 2a is provided in Appendix B.

The intermittent portion of Stream 2a was characterized by an average OHWM width of approximately 3 feet and an average bankfull width of approximately 7 feet. Slowly flowing water was observed within Stream 2a, within an average depth of approximately 1 inch, and pools of water up to 6 inches deep were also present. The substrates of Stream 2a primarily consisted of clay, silt, gravel, and cobble, with small areas of leaf pack and woody debris also being present. The USEPA High Gradient Stream score for this representative reach of the intermittent portion of Stream 2a was 82. No stream salamanders, frogs, or fish were observed within this sample reach. Overall, benthic macroinvertebrates were rare and diversity was very low, with only one species of mayfly larvae and one species of aquatic beetles observed within the sample reach. Benthic macroinvertebrate taxa observed within the Stream 2a sample reach also are not dependent upon a perennial source of water. The USEPA High Gradient Stream forms and the USACE High-gradient Stream Forms are provided in Appendix C and Appendix D, respectively. Representative photographs of the intermittent portion of Stream 2a are provided in Appendix B.

Stream 2a-1 consists of an unnamed ephemeral stream that originates in the northeastern portion the Option 1 Limits of Disturbance portion of the Project Area. Stream 2a-1 flows south/southwest to Stream 2a. Approximately 298 linear feet of Stream 2a-1 were identified within the Project Area. During the site visit, Stream 2a-1 was characterized by a width at the OWHM of approximately 2.5 feet and an average bankfull width of approximately 5 feet. No flowing water or pools were observed with this stream during the site visit. The substrates of Stream 2a-1 consisted primarily of silt, with some gravel, cobble, and leaf pack/woody debris also present. No fish or amphibians were observed within Stream 2a-1 during the field survey. The USEPA High Gradient Stream score for this representative reach of Stream 2a-1 was 82. Representative photographs of Stream 2a-1 can be found in Appendix B, with photograph



locations depicted on Figure 5. USEPA High Gradient Stream forms for Stream 2a-1 are provided in Appendix C.

Stream 2a-2 consists of an unnamed ephemeral stream that originates in the northeastern portion the Option 1 Limits of Disturbance portion of the Project Area. Stream 2a-2 flows west/southwest to Stream 2a. Approximately 51 linear feet of Stream 2a-2 were identified within the Project Area. During the site visit, Stream 2a-2 was characterized by an average OHWM width of approximately 1.5 feet and an average bankfull width of approximately 2.5 feet. No flowing water or pools were observed during the site visit. The substrates of Stream 2a-2 consisted primarily of silt and clay, with some gravel, cobble, and a few flat boulders also present. No fish or amphibians were observed within Stream 2a-2 during the field survey. The USEPA High Gradient Stream score for Stream 2a-2 was 89. A representative photograph of Stream 2a-2 can be found in Appendix B, with the photograph location depicted on Figure 5. USEPA High Gradient Stream forms for Stream 2a-2 are provided in Appendix C.

Stream 2a-3 consists of an unnamed ephemeral stream that originates in the northeastern portion the Option 1 Project Area. Stream 2a-3 flows southwest to Stream 2a. Approximately 92 linear feet of Stream 2a-3 were identified within the Project Area. During the site visit, Stream 2a-3 was characterized by an average width at the OWHM of approximately 2 feet and an average bankfull width of approximately 5 feet. No flowing water or pools were observed during the site visit. The substrates of Stream 2a-3 consisted primarily of silt and clay, with some gravel, cobble, and a leaf pack/woody debris also present. No fish or amphibians were observed within Stream 2a-3 during the field survey. The USEPA High Gradient Stream score for Stream 2a-3 was 86. A representative photograph of Stream 2a-3 can be found in Appendix B, with the photograph location depicted on Figure 5. USEPA High Gradient Stream forms for Stream 2a-3 are provided in Appendix C.

Stream 2b consists of an unnamed ephemeral stream that originates in the eastern portion the Option 1 Limits of Disturbance portion of the Project Area. Stream 2b flows generally west to Stream 2. Approximately 550 linear feet of Stream 2b were identified within the Project Area. During the site visit, Stream 2b was characterized by an average OHWM width of approximately



3 feet and an average bankfull width of approximately 6 feet. No flowing water was observed during the site visit; however, a few small pools were present. The substrates of Stream 2b consisted of cobble, gravel, silt, flat boulders, and some leaf pack/woody debris. No fish or amphibians were observed within Stream 2b during the field survey. The USEPA High Gradient Stream score for this representative reach of Stream 2b was 109. Representative photographs of Stream 2b can be found in Appendix B, with photograph locations depicted on Figure 5. USEPA High Gradient Stream forms for Stream 2b are provided in Appendix C.

Stream 3 consists of an unnamed intermittent stream, which originates as an ephemeral stream in the northwestern (Option 1) portion of the Project Area, as shown on Figure 4. Stream 3 flows southeast within the Project Area to Stream 1. Approximately 375 linear feet of Stream 3 were interpreted as being ephemeral, while approximately 216 linear feet of Stream 3 were interpreted as being intermittent. During the site visits, CEC sampled one reach within the ephemeral portion of Stream 3 and one reach within the intermittent portion of Stream 3.

The ephemeral portion of Stream 3 did not have flowing water or pools present during the site visit. The average OHWM width of this portion of Stream 3 was approximately 4 to 5 feet and the average bankfull width was approximately 8 to 10 feet. Substrates within the ephemeral portion of Stream 3 consisted primarily of flat boulders, cobble, and gravel, with a few areas of silt, clay, bedrock, and leaf pack/woody debris also present. The USEPA High Gradient Stream score for the Stream 3 ephemeral sample reach was 103 (see Appendix C). Representative photographs of the ephemeral portion of Stream 3 are provided in Appendix B and the photograph locations are shown on Figure 5.

The intermittent portion of Stream 3 was characterized by an average OHWM width of approximately 5 to 6 feet and an average bankfull width of approximately 8 to 10 feet. Slowly flowing water was observed within Stream 3, within an average depth of approximately 1 inch, and pools of water up to 3 to 4 inches deep were also present but uncommon. The substrates of Stream 3 primarily consisted of flat boulders, cobble, and gravel, with small areas of bedrock, clay, and silt also being present. The USEPA High Gradient Stream score for this representative reach of the intermittent portion of Stream 3 was 118. One adult northern dusky salamander was



observed, but no frogs or fish were observed, within this sample reach. Overall, benthic macroinvertebrates were rare and diversity was very low within this sample reach. Benthic macroinvertebrate taxa observed within the sample reach included Hirundinea (leeches), Amphipoda (scuds), crayfish, mayfly larvae, and caddisfly larvae. Benthic macroinvertebrate taxa observed within the Stream 3 sample reach also are not dependent upon a perennial source of water for completion of their life cycles. The USEPA High Gradient Stream forms and the USACE High-gradient Stream Forms are provided in Appendix C and Appendix D, respectively. Representative photographs of the intermittent portion of Stream 3 are provided in Appendix B.

Stream 3a consists of an unnamed ephemeral stream that originates in the western portion the Option 1 Project Area. Stream 3a flows generally northeast to Stream 3. Approximately 178 linear feet of Stream 3a were identified within the Project Area. During the site visit, Stream 3a was characterized by an average OHWM width of approximately 3 feet and an average bankfull width of approximately 6 to 8 feet. No flowing water was observed during the site visit; however, a couple small shallow pools were present in the channel. The substrates of Stream 3a primarily consisted of clay, cobble, gravel, and flat boulders, with some leaf pack/woody debris and bedrock also present to a lesser degree. No fish or amphibians were observed within Stream 3a during the site visit. The USEPA High Gradient Stream 3a can be found in Appendix B, with the photograph location depicted on Figure 5. USEPA High Gradient Stream forms for Stream 3a are provided in Appendix C.

Stream 3b consists of an unnamed ephemeral stream that originates in the western portion of the Option 1 Limits of disturbance within the Project Area. Stream 3b flows generally south to Stream 3. Approximately 119 linear feet of Stream 3b were identified within the Project Area. During the site visit, Stream 3b was characterized by an average OHWM width of approximately 2 to 3 feet and an average bankfull width of approximately 5 to 6 feet. No flowing water or pools were observed within Stream 3b during the site visit. The substrates of Stream 3b consisted primarily of gravel, cobble, and flat boulders, with some clay, silt and leaf pack/woody debris also present. No fish or amphibians were observed within Stream 3b during the field survey. The USEPA High Gradient Stream score for this representative reach of Stream 3b was



103. A representative photograph of Stream 3b can be found in Appendix B, with the photograph location depicted on Figure 5. USEPA High Gradient Stream forms for Stream 3b are provided in Appendix C.

Stream 4 consists of an unnamed ephemeral stream that originates in the eastern portion the Option 1 Limits of Disturbance within the Project Area. Stream 4 flows generally west to Stream 1. Approximately 495 linear feet of Stream 4 were identified within the Project Area. During the site visit, Stream 4 was characterized by an average OHWM width of approximately 4 to 5 feet and an average bankfull width of approximately 6 to 8 feet. No flowing water or pools were observed within Stream 4 during the site visit. The substrates of Stream 4 consisted primarily of gravel, cobble, and flat boulders. Some clay and bedrock substrates were also present within Stream 4. No fish or amphibians were observed within Stream 4 during the site visit. The USEPA High Gradient Stream score for this representative reach of Stream 4 was 111. Representative photographs of Stream 4 can be found in Appendix B, with photograph locations depicted on Figure 5. USEPA High Gradient Stream forms for Stream 4 are provided in Appendix C.

Stream 5 consists of an unnamed ephemeral stream that originates in the southwestern portion of the Option 1 Limits of Disturbance within the Project Area. Stream 5 flows generally east to Stream 1. Approximately 383 linear feet of Stream 5 were identified within the Project Area. During the site visit, Stream 5 was characterized by an average OHWM width of approximately 2 to 3 feet and an average bankfull width of approximately 6 feet. No flowing water or pools were observed with this stream during the site visit. The substrates of Stream 5 consisted primarily of gravel, cobble, and flat boulders, with clay and leaf pack/woody debris substrates also present to a lesser degree. No fish or amphibians were observed within Stream 5 during the field survey. The USEPA High Gradient Stream score for the representative sample reach within Stream 5 was 110. A representative photograph of Stream 5 can be found in Appendix B, with photograph locations depicted on Figure 5. USEPA High Gradient Stream forms for Stream 5 are provided in Appendix C.



Stream 6 consists of an unnamed intermittent stream, which originates as an ephemeral stream in the southwestern (Option 1) portion of the Project Area, as shown on Figure 4. Stream 6 flows east/southeast within the Project Area to Stream 1. Approximately 51 linear feet of Stream 6 were interpreted as being ephemeral, while approximately 292 linear feet of Stream 6 were interpreted as being intermittent. During the site visits, CEC sampled one reach within the ephemeral portion of Stream 6 and one reach within the intermittent portion of Stream 6.

The ephemeral portion of Stream 6 did not have flowing water or pools present during the site visit. The average OHWM width of this portion of Stream 6 was approximately 1 foot and the average bankfull width was approximately 1.5 to 2 feet. Substrates within the ephemeral portion of Stream 6 consisted primarily of cobble and clay, with a few flat boulders also present. The USEPA High Gradient Stream score for the Stream 6 ephemeral sample reach was 77 (see Appendix C). A representative photograph of the ephemeral portion of Stream 6 is provided in Appendix B and the photograph location is shown on Figure 5.

The intermittent portion of Stream 6 was very steep overall and was characterized by an average OHWM width of approximately 3 feet and an average bankfull width of approximately 5 to 6 feet. Slowly flowing water was observed within Stream 6, within an average depth of approximately 0.5 to 1 inch, and pools of water up to 3 inches deep were also present. The substrates of Stream 6 primarily consisted of flat boulders, bedrock, cobble, gravel, clay and silt, with small areas of leaf pack/woody debris also being present. The USEPA High Gradient Stream score for this representative reach of the intermittent portion of Stream 6 was 116. One adult northern dusky salamander was observed, but no frogs or fish were observed, within this sample reach. Overall, benthic macroinvertebrates were rare and diversity was very low within this sample reach, as larvae of one species of mayfly was the only benthic macroinvertebrate taxa observed within the sample reach. Mayfly taxa are not dependent upon a perennial source of water for completion of their life cycle. The USEPA High Gradient Stream forms and the USACE High-gradient Stream Forms are provided in Appendix C and Appendix D, respectively. Representative photographs of the intermittent portion of Stream 6 are provided in Appendix B.



Stream 7 consists of an unnamed ephemeral stream that originates in the western (Option 1) portion of the Project Area. Stream 7 flows generally northeast to Stream 1. Approximately 394 linear feet of Stream 7 were identified within the Project Area. During the site visit, Stream 7 was characterized by an average width at the OWHM of approximately 3 to 4 feet and an average bankfull width of approximately 6 to 7 feet. No flowing water or pools were observed within Stream 7 during the site visit. The substrates of Stream 7 consisted primarily of flat boulders, cobble, gravel, and clay. Heavy growth of clearweed, jewelweed, and pale touch-menot was present within portions of the stream channel. No fish or amphibians were observed within Stream 7 during the field survey. The USEPA High Gradient Stream score for the representative sample reach of Stream 7 was 107. Representative photographs of Stream 7 can be found in Appendix B, with photograph locations depicted on Figure 5. USEPA High Gradient Stream forms for Stream 7 are provided in Appendix C.

Stream 8 consists of an unnamed intermittent stream, which originates as an ephemeral stream in the eastern (Option 2) portion of the Project Area, as shown on Figure 4. Stream 8 flows south and southeast within the Project Area. Approximately 82 linear feet of Stream 1 were interpreted as being ephemeral, while approximately 2,744 linear feet of Stream 8 were interpreted as being intermittent. During the site visits, CEC sampled one reach within the ephemeral portion of Stream 8 and two reaches within the intermittent portion of Stream 8.

The ephemeral portion of Stream 8 did not have pools or flowing water during the site visit and was characterized by an average OHWM width of approximately 1 foot and an average bankfull width of 2 to 3 feet. Substrates within the ephemeral portion of Stream 8 primarily consisted of clay and cobble, with some flat boulders present to a lesser degree. The USEPA High Gradient Stream score for the Stream 8 ephemeral sample reach was 97 (see Appendix C). A representative photograph of the ephemeral portion of Stream 8 is provided in Appendix B.

The upper/upstream sample reach of the intermittent portion of Stream 8 was located upstream of its confluence with Stream 10. CEC observed the upstream sample reach of Stream 8 as characterized by an average OHWM width of approximately 6 feet and an average bankfull width of approximately 8 to 10 feet. Flowing water was observed within this sample reach,



within average depths of approximately 0.5 to 3 inches, and pools of water up to 6 inches deep were also present. The substrates of the upstream sample reach of Stream 8 primarily consisted of cobble, flat boulders, and gravel, with some large boulders and silt present to a lesser degree. The USEPA High Gradient Stream score for this representative reach of Stream 8 was 138. Northern dusky salamander adults were observed within this sample reach, but no fish or other amphibians were observed. Overall, benthic macroinvertebrates were relatively abundant within this sample reach, but the diversity of taxa observed was very low and included only larvae of one species of mayfly and larvae of one species of caddisfly.

The second/lower sample reach of the intermittent portion of Stream 8 was located approximately halfway between the confluence with Stream 14 and the southern edge of the Project Area boundary in the Option 2 limits of disturbance. CEC observed Stream 8 within the lower sample reach as characterized by an OHWM width of approximately 10 to 15 feet and an average bankfull width of approximately 15 to 20 feet. Flowing water was present within the sample reach, with an average depth of approximately 1 to 4 inches. Pools up to 16 inches deep were also present within this sample reach. Substrates present within the lower sample reach of Stream 8 consisted of small flat boulders, large boulders, gravel, and cobble. The USEPA High Gradient Stream score for this representative reach of Stream 1 was 153. Benthic macroinvertebrates were abundant overall within this sample reach but diversity was limited, with only one species of crayfish and larvae of one species of mayfly being observed as abundant. Dobsonfly larvae and caddisfly larvae were the only other taxa observed within the sample reach. The vast majority of benthic macroinvertebrates observed within the sample reach were present in the areas of deeper pools. Adult northern dusky salamanders and green frogs were observed, but no fish were present within this sample reach.

No fish or species of salamanders dependent upon a perennial source of water were observed within either of the two reaches sampled within Stream 8. Additionally, benthic macroinvertebrates were rare overall and of limited diversity. Benthic macroinvertebrate taxa observed within the Stream 8 sample reaches also are not dependent upon a perennial source of water, other than dobsonfly larvae, which are sometimes dependent upon water being available for a year or more. Dobsonfly larvae were rare within Stream 8 and can be assumed to be



present due to the availability of water for longer periods of time within the deeper pools in Stream 8. Representative photographs of Stream 8 can be found in Appendix B, with photograph locations depicted on Figure 5. The USEPA Rapid Bioassessment Protocol High Gradient Stream forms for Stream 8 are provided in Appendix C and the USACE High-gradient Stream forms are provided in Appendix D.

Stream 8a consists of an unnamed intermittent stream, which originates as an ephemeral stream in the northeastern (Option 2) portion of the Project Area, as shown on Figure 4. Stream 8a flows generally south/southeast within the Project Area to Stream 8. Approximately 181 linear feet of Stream 8a were interpreted as being ephemeral, while approximately 95 linear feet of Stream 8a was interpreted as being intermittent. During the site visits, CEC sampled one reach within the ephemeral portion of Stream 8a and one reach within the intermittent portion of Stream 8a.

The ephemeral portion of Stream 8a did not have flowing water or pools present during the site visit. The average OHWM width of this portion of Stream 8a was approximately 3 feet and the average bankfull width was approximately 5 to 6 feet. Substrates within the ephemeral portion of Stream 8a consisted primarily of clay and cobble, with flat boulders and gravel also present to a lesser extent. The USEPA High Gradient Stream score for the Stream 8a ephemeral sample reach was 101 (see Appendix C). A representative photograph of the ephemeral portion of Stream 8a is provided in Appendix B and the photograph location is shown on Figure 5.

The intermittent portion of Stream 8a was characterized by an average OHWM width of approximately 4 to 5 feet and an average bankfull width of approximately 6 to 8 feet. Slowly flowing water was observed within Stream 8a, with an average depth of approximately 0.5 to 1 inch. No deep pools were observed within the intermittent portion of Stream 8a during the site visit. The substrates of Stream 8a primarily consisted of bedrock, but also consisted of flat boulders, cobble, and gravel to a lesser extent. The USEPA High Gradient Stream score for the intermittent portion of Stream 8a was 127. No stream salamanders, frogs, or fish were observed within this sample reach. Overall, benthic macroinvertebrates were rare and diversity was very low within this sample reach. Benthic macroinvertebrate taxa observed within the sample reach



included one species of Oligochaeta (aquatic worms), one aquatic beetle species, larvae of one mayfly species, and larvae of one dobsonfly species. Benthic macroinvertebrate taxa observed within the Stream 3 sample reach also are not dependent upon a perennial source of water, other than dobsonfly larvae, which are sometimes dependent upon water being present within a stream for more than a year at a time. The presence of the dobsonfly larvae could be assumed to be the result of the overall wetter conditions and continued presence of water in the shallow bedrock pools in 2011. The USEPA High Gradient Stream forms and the USACE High-gradient Stream Forms are provided in Appendix C and Appendix D, respectively. A representative photograph of the intermittent portion of Stream 8a is provided in Appendix B.

Stream 8b consists of an unnamed ephemeral stream that originates in the eastern (Option 2) portion of the Project Area. Stream 8b flows generally southeast to Stream 8. Approximately 201 linear feet of Stream 8b were identified within the Project Area. During the site visit, Stream 8b was characterized by an average width at the OWHM of approximately 1.5 to 2 feet and an average bankfull width of approximately 3 to 4 feet. No flowing water or pools were observed within Stream 8b during the site visit. The substrates of Stream 8b consisted primarily of bedrock, cobble, and clay, with flat boulders, gravel, and leaf pack/woody debris present to a lesser extent. No fish or amphibians were observed within Stream 8b during the field survey. The USEPA High Gradient Stream score for the representative sample reach of Stream 8b was 113. A representative photograph of Stream 8b can be found in Appendix B, with the photograph location depicted on Figure 5. USEPA High Gradient Stream forms for Stream 8b are provided in Appendix C.

Stream 9 consists of an unnamed intermittent stream, which originates as an ephemeral stream in the northeastern (Option 2) portion of the Project Area, as shown on Figure 4. Stream 9 flows west within the Project Area to Stream 8. Approximately 89 linear feet of Stream 9 were interpreted as being ephemeral, while approximately 210 linear feet of Stream 9 were interpreted as being intermittent. During the site visits, CEC sampled one reach within the ephemeral portion of Stream 9 and one reach within the intermittent portion of Stream 9.



The ephemeral portion of Stream 9 did not have flowing water or pools present during the site visit conducted on August 13, 2011. On August 14, 2011, no flowing water was present, but some small/shallow pools were observed, presumably from the significant rainfall that had fallen overnight. The average OHWM width of this portion of Stream 9 was approximately 1.5 feet and the average bankfull width was approximately 2 to 3 feet. Substrates within the ephemeral portion of Stream 9 consisted primarily of cobble, gravel, and clay, with a few flat boulders and areas of leaf pack/woody debris also present. The USEPA High Gradient Stream score for the Stream 9 ephemeral sample reach was 107 (see Appendix C). Representative photographs of the ephemeral portion of Stream 9 are provided in Appendix B and the photograph locations are shown on Figure 5.

The intermittent portion of Stream 9 was very steep overall and was characterized by an average OHWM width of approximately 3 feet and an average bankfull width of approximately 4 to 5 feet. Slowly flowing water was observed within this portion of Stream 9, within an average depth of approximately 0.5 to 1 inch. No deep pools were observed. The substrates within this portion of Stream 9 primarily consisted of bedrock, cobble, and leaf pack/woody debris, with small areas of flat boulders and leaf pack/woody debris also being present. The USEPA High Gradient Stream score for this representative reach of the intermittent portion of Stream 9 was 125. Adult northern dusky salamanders were observed, but no frogs or fish were observed within this sample reach. Overall, benthic macroinvertebrates were rare and diversity was very low within this sample reach, as larvae of one species of mayfly and one species of dobsonfly larvae were the only benthic macroinvertebrate taxa observed within the sample reach. The USEPA High Gradient Stream forms and the USACE High-gradient Stream Forms are provided in Appendix D, respectively. Representative photographs of the intermittent portion of Stream 9 are provided in Appendix B.

Stream 10 consists of an unnamed intermittent stream, which originates as an ephemeral stream in the northeastern (Option 2) portion of the Project Area, as shown on Figure 4. Stream 10 flows southeast within the Project Area to Stream 8. Approximately 199 linear feet of Stream 10 were interpreted as being ephemeral, while approximately 395 linear feet of Stream 10 were



interpreted as being intermittent. During the site visits, CEC sampled one reach within the ephemeral portion of Stream 10 and one reach within the intermittent portion of Stream 10.

The ephemeral portion of Stream 10 did not have flowing water or pools present during the site visit conducted on August 13, 2011. On August 14, 2011, shallow flowing water approximately 0.5 to 1 inch deep was present, and some small/shallow pools were observed, presumably from the significant rainfall that had fallen overnight. The average OHWM width of this portion of Stream 10 was approximately 2 to 3 feet and the average bankfull width was approximately 3 to 5 feet. Substrates within the ephemeral portion of Stream 10 consisted primarily of clay, silt, gravel, and cobble, with flat boulders present to a lesser extent. The USEPA High Gradient Stream score for the Stream 10 ephemeral sample reach was 92 (see Appendix C). Representative photographs of the ephemeral portion of Stream 10 are provided in Appendix B and the photograph locations are shown on Figure 5.

The intermittent portion of Stream 10 was characterized by an average OHWM width of approximately 6 to 8 feet and an average bankfull width of approximately 10 to 12 feet. Slowly flowing water was observed within Stream 10, within an average depth of approximately 0.5 to 1.5 inches, and pools of water up to 6 inches deep were also present. The substrates of this portion of Stream 10 primarily consisted of flat boulders, cobble, and gravel, with small areas of bedrock and large boulders also being present. The USEPA High Gradient Stream score for this representative reach of the intermittent portion of Stream 10 was 137. Adult northern dusky salamanders were observed, but no frogs or fish were observed within this sample reach. Overall, benthic macroinvertebrates were abundant but diversity was relatively low within this sample reach. Benthic macroinvertebrate taxa observed within the sample reach included crayfish, aquatic beetles, dobsonfly larvae, mayfly larvae, and caddisfly larvae. Benthic macroinvertebrate taxa observed within the Stream 10 sample reach also are not dependent upon a perennial source of water for completion of their life cycles, with the exception of dobsonfly larvae, which are sometimes dependent upon flowing water being present for periods of longer than 1 year. The USEPA High Gradient Stream forms and the USACE High-gradient Stream Forms are provided in Appendix C and Appendix D, respectively. Representative photographs of the intermittent portion of Stream 10 are provided in Appendix B.



Stream 10a consists of an unnamed ephemeral stream that originates in the northeastern (Option 2) portion of the Project Area. Stream 10a flows generally east to Stream 10. Approximately 160 linear feet of Stream 10a were identified within the Project Area. During the site visit, Stream 10a was characterized by an average OHWM width of approximately1.5 feet and an average bankfull width of approximately 3 feet. Stream 10a did not have flowing water or pools present during the site visit conducted on August 13, 2011. On August 14, 2011, shallow flowing water approximately 0.1 to 1 inch deep was present, and some small/shallow pools were observed, presumably from the significant rainfall that had fallen overnight. The substrates of Stream 10a during the site visit. The USEPA High Gradient Stream score for this representative reach of Stream 10a was 103. A representative photograph of Stream 10a can be found in Appendix B, with the photograph location depicted on Figure 5. USEPA High Gradient Stream forms for Stream 10a are provided in Appendix C.

Stream 11 consists of an unnamed ephemeral stream that originates in the eastern portion of the Option 2 limits of disturbance within the Project Area. Stream 11 flows generally northeast to Stream 8. Approximately 289 linear feet of Stream 11 were identified within the Project Area. During the site visit, Stream 11 was characterized by an average OHWM width of approximately 3 feet and an average bankfull width of approximately 6 to 8 feet. Stream 11 did not have flowing water or pools present during the site visit conducted on August 13, 2011. On August 14, 2011, shallow flowing water approximately 0.5 to 1 inch deep was present, presumably from the heavy rains that occurred the previous night. The substrates of Stream 11 consisted primarily of boulders, cobble, and gravel. No fish or amphibians were observed within Stream 11 during the field survey. The USEPA High Gradient Stream score for this representative reach of Stream 11 was 124. Representative photographs of Stream 11 can be found in Appendix B, with the photograph locations depicted on Figure 5. USEPA High Gradient Stream forms for Stream 11 are provided in Appendix C.

Stream 12 consists of an unnamed ephemeral stream that originates in the eastern portion of the Option 2 limits of disturbance within the Project Area. Stream 12 flows generally



west/southwest to Stream 8. Approximately 439 linear feet of Stream 12 were identified within the Project Area. During the site visit, Stream 12 was characterized by an average OHWM width of approximately 3 to 4 feet and an average bankfull width of approximately 6 to 8 feet. Stream 12 did not have flowing water or pools present during the site visit conducted on August 13, 2011. On August 14, 2011, shallow flowing water approximately 0.5 inch deep and scattered small shallow pools up to 2 inches deep were present, presumably from the heavy rains that occurred the previous night. The substrates of Stream 12 consisted primarily of boulders, cobble, and gravel, with clay, silt and leaf pack/woody debris also present to a lesser degree. No fish or amphibians were observed within Stream 12 during the field survey. The USEPA High Gradient Stream score for this representative reach of Stream 12 was 111. Representative photographs of Stream 12 can be found in Appendix B, with the photograph locations depicted on Figure 5. USEPA High Gradient Stream forms for Stream 12 are provided in Appendix C.

Stream 13 consists of an unnamed intermittent stream, which originates as an ephemeral stream in the eastern (Option 2) portion of the Project Area, as shown on Figure 4. Stream 13 flows generally northeast within the Project Area to Stream 8. Approximately 202 linear feet of Stream 13 were interpreted as being ephemeral, while approximately 333 linear feet of Stream 13 were interpreted as being intermittent. During the site visits, CEC sampled one reach within the ephemeral portion of Stream 13 and one reach within the intermittent portion of Stream 13.

The ephemeral portion of Stream 13 did not have flowing water or pools present during the site visit conducted on August 13, 2011. On August 14, 2011, shallow flowing water approximately 0.5-inch deep was present within portions of the stream channel, presumably from the significant rainfall that had fallen overnight. The average OHWM width of this portion of Stream 13 was approximately 2 feet and the average bankfull width was approximately 4 feet. Substrates within the ephemeral portion of Stream 13 consisted primarily of boulders, gravel, and cobble, with some leaf pack/woody debris also present to a lesser extent. The USEPA High Gradient Stream score for the Stream 13 ephemeral sample reach was 129 (see Appendix C). A representative photograph of the ephemeral portion of Stream 13 is provided in Appendix B and the photograph location is shown on Figure 5.



The intermittent portion of Stream 13 was very steep overall and characterized by an average OHWM width of approximately 5 to 6 feet and an average bankfull width of approximately 8 feet. Slowly flowing water was observed within Stream 13, within an average depth of approximately 0.5 to 1.5 inches, and pools of water up to 6 inches deep were also present. The substrates of the lower portion of this section of Stream 13 primarily consisted of bedrock (including bedrock waterfall areas), while the upper portion of this section of Stream 13 was more typical and included substrates consisting primarily of boulders, cobble, and gravel, with some bedrock and clay being present to a lesser extent. The USEPA High Gradient Stream score for this representative reach of the intermittent portion of Stream 13 was 125. Adult and juvenile northern dusky salamanders were observed, but no frogs or fish were observed within this sample reach. Overall, benthic macroinvertebrates were common but diversity was very low within this sample reach. Benthic macroinvertebrate taxa observed within the sample reach included larvae of one species of mayfly and larvae of one species of caddisfly. Benthic macroinvertebrate taxa observed within the Stream 13 sample reach also are not dependent upon a perennial source of water for completion of their life cycles. The USEPA High Gradient Stream forms and the USACE High-gradient Stream Forms are provided in Appendix C and Appendix D, respectively. Representative photographs of the intermittent portion of Stream 13 are provided in Appendix B.

Stream 14 consists of an unnamed intermittent stream, which originates as an ephemeral stream in the eastern (Option 2) portion of the Project Area, as shown on Figure 4. Stream 14 generally flows northeast within the Project Area to Stream 8. Approximately 194 linear feet of Stream 14 were interpreted as being ephemeral, while approximately 174 linear feet of Stream 14 were interpreted as being intermittent. During the site visits, CEC sampled one reach within the ephemeral portion of Stream 14 and one reach within the intermittent portion of Stream 14.

The ephemeral portion of Stream 14 did not have flowing water or pools present during the site visit. The average OHWM width of this portion of Stream 14 was approximately 3 to 4 feet and the average bankfull width was approximately 5 to 6 feet. Substrates within the ephemeral portion of Stream 14 consisted primarily of cobble, boulders, and gravel, with clay and leaf pack/woody debris also present to a lesser extent. The USEPA High Gradient Stream score for



the Stream 14 ephemeral sample reach was 109 (see Appendix C). Representative photographs of the ephemeral portion of Stream 14 are provided in Appendix B and the photograph locations are shown on Figure 5.

The intermittent portion of Stream 14 was very steep overall and characterized by an average OHWM width of approximately 6 feet and an average bankfull width of approximately 8 to 10 feet. Slowly flowing water was observed within Stream 14, within an average depth of approximately 0.5 to 1.0 inches. The substrates of this portion of Stream 14 primarily consisted of bedrock, with some cobble, boulders, gravel, and bedrock waterfalls also present. The USEPA High Gradient Stream score for this representative reach of the intermittent portion of Stream 14 was 140. Adult and juvenile northern dusky salamanders were observed, but no frogs or fish were observed within this sample reach. Overall, benthic macroinvertebrates were common but diversity was relatively low within this sample reach. Benthic macroinvertebrate taxa observed within the Stream 14 sample reach also are not dependent upon a perennial source of water for completion of their life cycles. The USEPA High Gradient Stream forms and the USACE High-gradient Stream Forms are provided in Appendix C and Appendix D, respectively. Representative photographs of the intermittent portion of Stream 14 are provided in Appendix B.

Stream 15 consists of an unnamed ephemeral stream that originates in the eastern portion of the Option 2 limits of disturbance within the Project Area. Stream 15 flows generally west/southwest to Stream 8. Approximately 290 linear feet of Stream 15 were identified within the Project Area. During the site visit, Stream 12 was characterized by an average OHWM width of approximately 3 feet and an average bankfull width of approximately 5 feet. Stream 15 did not have any flowing water or pools present during the site visit. The substrates of Stream 15 consisted primarily of cobble, clay, and flat boulders, with leaf pack/woody debris and bedrock also present to a lesser degree. No fish or amphibians were observed within Stream 15 during the field survey. The USEPA High Gradient Stream score for this representative reach of Stream 15 was 112. Representative photographs of Stream 15 can be found in Appendix B, with



the photograph locations depicted on Figure 5. USEPA High Gradient Stream forms for Stream 15 are provided in Appendix C.

Stream 16 consists of an unnamed intermittent stream, which originates at the downstream portion of Wetland B and flows into a pond (Open Water 1), where it is impounded. Below Open Water 1, Stream 16 continues from an outlet pipe from the pond and flows southeast and off-site in the western (Option 1) portion of the Project Area, as shown on Figure 4. A total of approximately 191 linear feet of Stream 16 were identified within the Project Area. The upper portion of Stream 16 was characterized by an average OHWM width of approximately 3 feet and an average bankfull width of approximately 5 feet. Slowly flowing water was observed within the upper portion of Stream 16, within an average depth of approximately 0.5 inches. This surface water was observed to originate from a spring located just above Wetland B. The lower portion of Stream 16 was characterized by an average OHWM width of approximately 2 feet and an average bankfull width of approximately 4 feet. Slow flowing water was observed within the lower portion of Stream 16, with an average depth of approximately 0.25 to 1 inch deep. No deep pools were observed within Stream 16 during the time of the site visit on August 15, 2011. The substrates of Stream 16 primarily consisted of silt and clay, with some cobble, gravel, and a few flat boulders also being present. The USEPA High Gradient Stream score for this representative reach of Stream 16 was 91. No stream salamanders, frogs, or fish were observed within this sample reach. Overall, benthic macroinvertebrates were rare within this sample reach. The diversity was very low, with only caddisfly larvae observed within the sample reach, which are not dependent upon a perennial source of water. The USEPA High Gradient Stream forms and the USACE High-gradient Stream Forms for Stream 16 are provided in Appendix C and Appendix D, respectively. Representative photographs of Stream 16 are provided in Appendix B and the locations where the photographs were taken are shown on Figure 5.

In addition to the aforementioned streams and as stated above, one pond (Open Water 1) was identified within the Project Area (Figure 4). Open Water 1 was an impoundment of Stream 16 and is approximately 1 acre in size. An outlet pipe from this pond is present below the impoundment and outfalls into the lower portion of the Stream 16 channel. Therefore, Open Water 1 would likely be considered a jurisdictional water of the U.S.



3.0 REGULATORY CONSIDERATIONS

3.1 MEETINGS WITH REGULATORY AGENCIES

No meetings between regulatory agencies and CEC had taken place at the time this report was prepared. The wetland and stream delineation findings presented in this document were developed based upon CEC's professional training and experience and the results of the wetland and stream delineation completed on August 11 through August 15 and on September 27 and 28, 2011.

3.2 REGULATORY PERMITTING

Jurisdictional waters of the United States, including wetlands, are defined by *33 CFR Part 328* and are protected by Sections 404 and 401 of the Clean Water Act (CWA)(*33 USC 1344*). Within this portion of West Virginia, the Regulatory Branch of the Pittsburgh District of the USACE administers Section 404 of the CWA. The WVDEP administers Section 401 of the CWA (a.k.a. the Water Quality Certification Program [WQC]). Impacts to jurisdictional waters/wetlands/open waters associated with proposed development require permits issued by these agencies.

Based on the results of the delineation, CEC identified approximately 6,368 linear feet of ephemeral stream and approximately 8,624 linear feet of intermittent stream within the boundaries of the Project Area. CEC also identified approximately 0.02 acres of palustrine emergent wetland and approximately 1 acre of open water body within the Project Area. It is noted that this stream length, wetland acreage, and open water acreage may include portions of waterbodies that may not be affected by landfill construction and operation activities within the Project Area.

A formal jurisdictional determination (JD) will need to be conducted by the USACE and the WVDEP to verify CEC's delineation findings, prior to permit issuance. The JD will identify those waters, including wetlands, that are classified as waters of the United States. Activities in



waters of the United States will be regulated by the USACE and WVDEP under the CWA. At this time, it appears that the wetlands and streams identified herein within the Project Area would be considered waters of the United States.

Two types of Section 404 CWA permits have been implemented by the USACE – Nationwide Permits (NWPs) and Individual Section 404 Permits, which are both utilized in conjunction with WVDEP 401 WQCs. The purpose of NWPs is to protect the aquatic environment and public interest while authorizing activities that have minimal individual and cumulative adverse effects on the aquatic environment. When impacts to waterbodies are greater than allowed by NWPs, an Individual Section 404 Permit and Individual 401 WQC are typically required. The Individual Permit and Individual 401 WQC application and approval process is significantly more involved relative to the NWP process, and requires interaction and review by a number of federal and state agencies, as well as opportunities for public comment. Based on conversations with AEP regarding proposed landfill construction and operation activities, it is anticipated that impacts to streams within the Project Area would require Individual Section 404 Permit and Individual Section 401 WQC permit applications. Individual Section 401 WQC permit applications would be required because stream impacts within the Project Area would exceed the thresholds authorized under applicable NWPs.

Individual Section 401/404 Permits require a sequencing review, which requires the permit applicant to demonstrate that the project purpose cannot be accomplished without impacting wetlands and other jurisdictional waters to the extent practicable. If this can be demonstrated, then the applicant is required to further demonstrate that the scope of the project has been revised to minimize impacts to jurisdictional waters. The sequencing process requires that an alternatives analysis be performed, and that the alternatives analysis must address other potential sites. Alternative site plans which attempt to avoid or minimize jurisdictional water impacts must be developed and evaluated. The regulatory agencies will only consider mitigation of jurisdictional water impacts after satisfactory completion of the sequencing requirements. A mitigation plan will be required for unavoidable impacts to jurisdictional streams and wetlands.



4.0 CONCLUSIONS

Approximately 6,368 linear feet of ephemeral stream and 8,624 linear feet of intermittent stream were identified within the Project Area. Two palustrine emergent wetland areas totaling approximately 0.02 acres were identified and delineated within the Project Area. The delineated wetland boundaries were flagged in the field and subsequently located by CEC scientists using a Trimble GeoXT GPS unit (sub-meter accuracy). Additionally, one pond/open waterbody totaling approximately 1 acre in size was identified within the Project Area. Wetland boundaries, stream locations, and the open waterbody location are shown on Figure 4.



5.0 LEVEL OF CARE

The jurisdictional waters delineation services performed by CEC were conducted in a manner consistent with the criteria contained in the USACE Manual and Eastern Mountain and Piedmont Supplement and with the level of care and skill ordinarily exercised by members of the environmental consulting profession practicing contemporaneously under similar conditions in the locality of the project. It must be recognized that the wetland and stream delineation was based on field observations and CEC's professional interpretation of the criteria in the USACE Manual and corresponding supplement at the time of our field visits. Jurisdictional water determinations may change subsequent to CEC's delineation based on changes in the regulatory criteria, seasonal variations in hydrology, alterations to drainage patterns and other human activities and/or land disturbances.

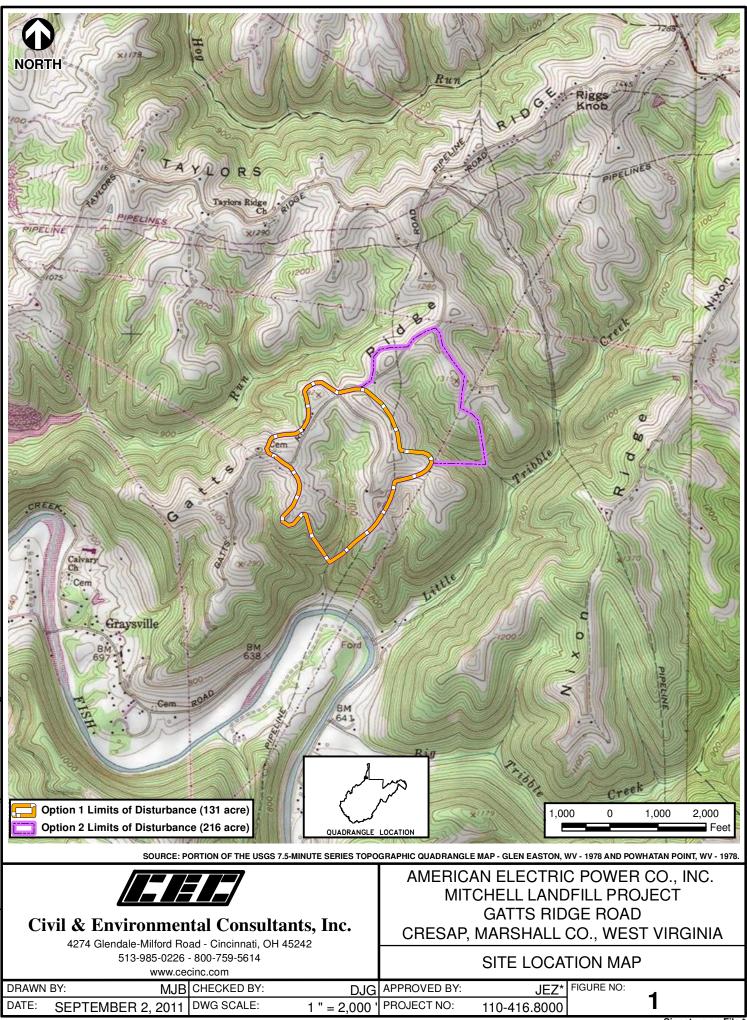


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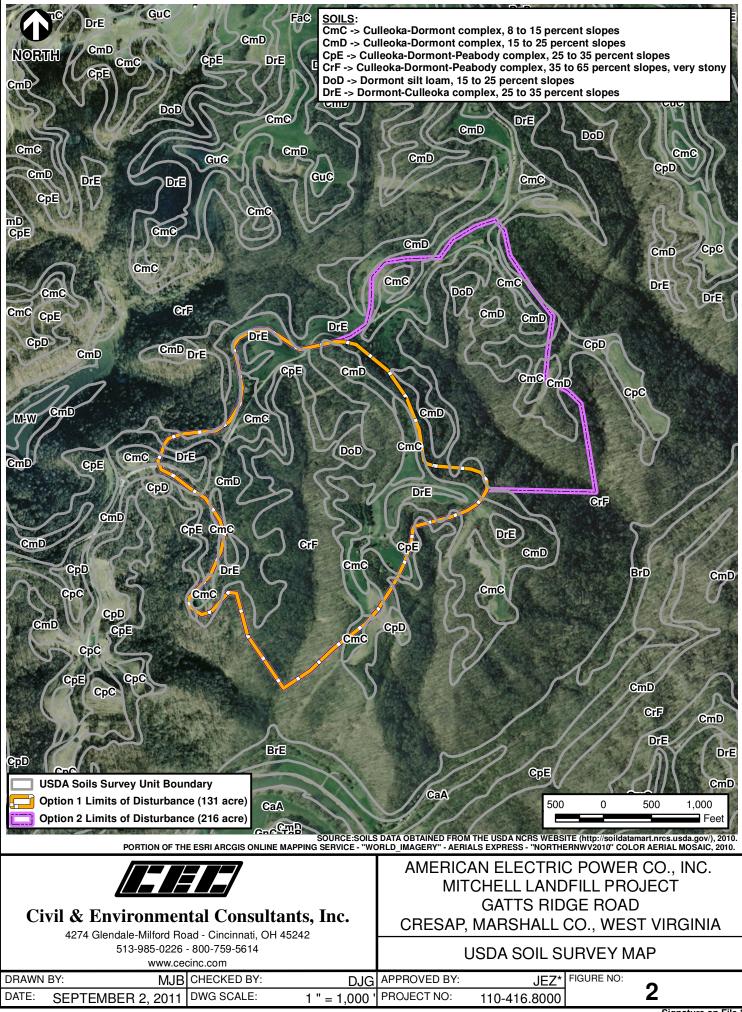


FIGURES

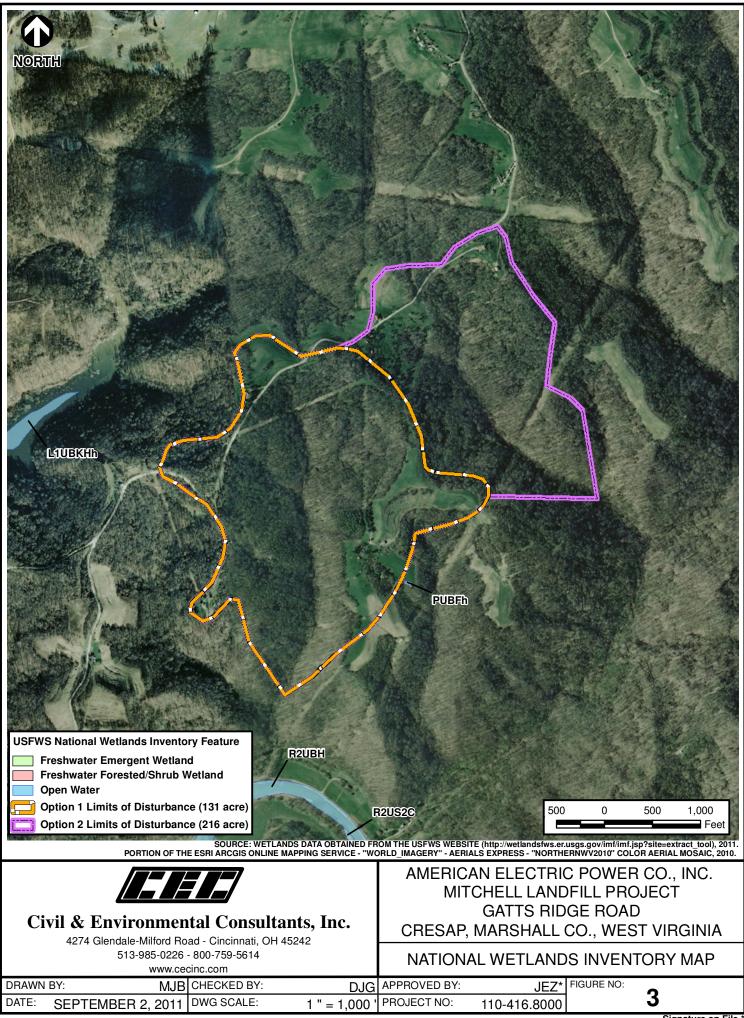


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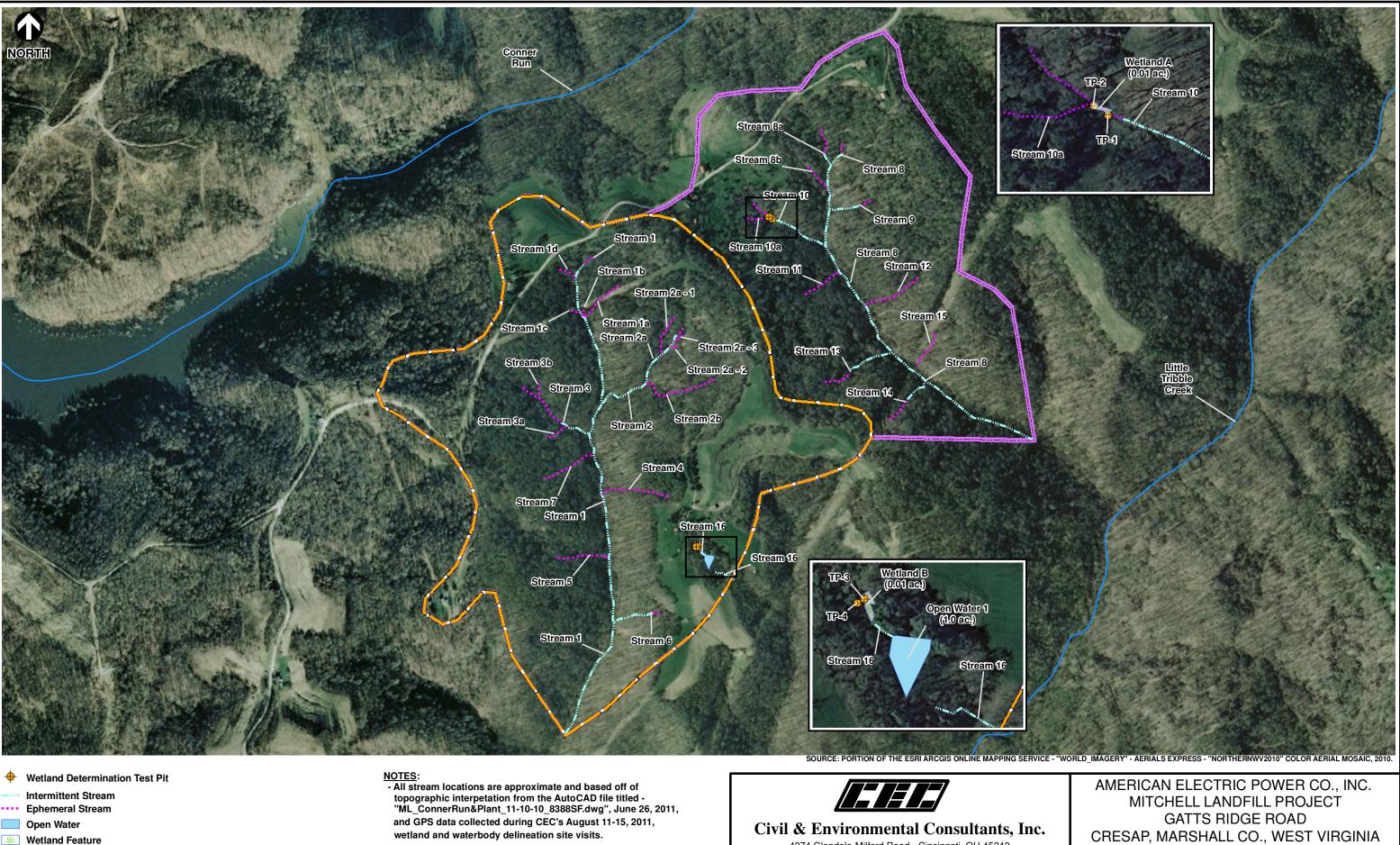
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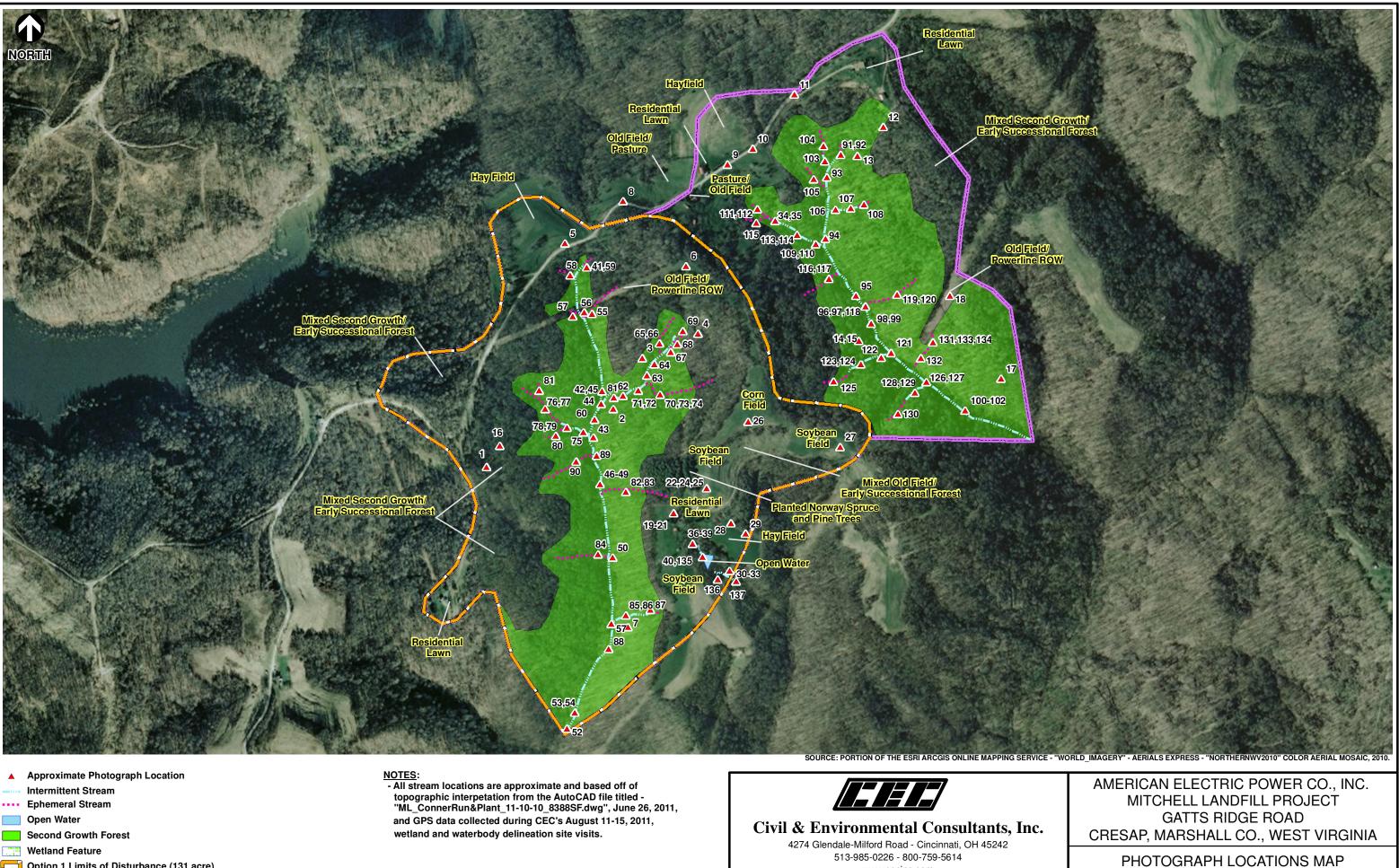
- Option 1 Limits of Disturbance (131 acre)
- Coption 2 Limits of Disturbance (216 acre Includes Footprint of Option 1)

300	600	DRAWN BY:

Feet

JURISDICTIONAL WATERS DELINEATION MAP

DJG	APPROVED BY:	JEZ*	FIGURE NO:	4
= 600 '	PROJECT NO:	110-416.8000		4
				Signature on File *



300

Approximate Photograph Location	NOTES:
 Intermittent Stream	 All stream locations are topographic interpetation
 Ephemeral Stream	"ML_ConnerRun&Plant
Open Water	and GPS data collected
Second Growth Forest	wetland and waterbody
Wetland Feature	
Option 1 Limits of Disturbance (131 acre)	
Option 2 Limits of Disturbance (216 acre - Includes Footprint of Option 1)	

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		**		0110.00111				
600	DRAWN	BY:	MJB	CHECKED BY:	DJG	APPROVED BY:	JEZ*	FIGURE NO:
Feet					Dua		002	5
	DATE:		2011	DWG SCALE:	1 " = 600 '	PROJECT NO:	110-416.8000	5
								Signature on File *



APPENDIX A

WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM -	Eastern Mountains and Piedmont
Project/Site: <u>AEPMitchell Landfill Project</u> City/County: _	Cresap/MarshallCo, Sampling Date: 8-14-11 State: WV Sampling Point: TP-1
Investigator(s): D. Godec, G. Gerke Section, Tow	
	cave, convex, none): 1002 Slope (%): 3-5%
Subregion (LRR or MLRA):	Long: 39.830365 Datum:
Soil Map Unit Name: CVI leoka - Dormont - Peabody Complex, 35-65	
	6
Are climatic / hydrologic conditions on the site typical for this time of year? Yes	No (If no, explain in Remarks.)
Are Vegetation \underline{N} , Soil \underline{N} , or Hydrology \underline{N} significantly disturbed?	Are "Normal Circumstances" present? Yes X No
Are Vegetation, Soil, or Hydrology naturally problematic?	(If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing sampling	point locations, transects, important features, etc.
Hudria Cail Dragont? Vog Na	Sampled Area a Wetland? Yes No
× ×	a
HYDROLOGY	
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)	Surface Soil Cracks (B6)
Surface Water (A1) True Aquatic Plants (B14)	Sparsely Vegetated Concave Surface (B8)
High Water Table (A2) Hydrogen Sulfide Odor (C1) Saturation (A3) Oxidized Rhizospheres on Li	Drainage Patterns (B10) ving Roots (C3) Moss Trim Lines (B16)
Vater Marks (B1) Presence of Reduced Iron (C	Presidente and a construction of the second s
Sediment Deposits (B2) Recent Iron Reduction in Tille	
Drift Deposits (B3) Thin Muck Surface (C7)	Saturation Visible on Aerial Imagery (C9)
Algal Mat or Crust (B4) Other (Explain in Remarks)	Stunted or Stressed Plants (D1)
Iron Deposits (B5)	Geomorphic Position (D2)
Inundation Visible on Aerial Imagery (B7)	Shallow Aquitard (D3)
Water-Stained Leaves (B9)	Microtopographic Relief (D4)
Aquatic Fauna (B13)	FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes No X Depth (inches):	
Water Table Present? Yes No Depth (inches):	
Saturation Present? Yes No Depth (inches):	Y I I I I I I I I I I I I I I I I I I I
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous in	
Remarks:	

/EGETATION (Four Strata) – Use scientific n	ames of plants.	Sampling Point:
Trop Stratum (Diat airc)	Absolute Dominant Indicator	Dominance Test worksheet:
<u>Tree Stratum</u> (Plot size:) 1	<u>% Cover</u> <u>Species?</u> <u>Status</u>	Number of Dominant Species That Are OBL, FACW, or FAC: (A)
2		Total Number of Dominant Species Across All Strata: (B)
4		Percent of Dominant Species 50%
5 3		That Are OBL, FACW, or FAC:(A/B)
7		Prevalence Index worksheet:
3		Total % Cover of: Multiply by:
Sapling/Shrub Stratum (Plot size:)	= Total Cover	OBL species $x_1 = $ FACW species 5 $x_2 = 10$
I		FAC species 70 $x_3 = 210$ FACU species 25 $x_4 = 100$
2		
3		UPL species $x = $ Column Totals: A 320 (B)
4 5		Prevalence Index = $B/A = 3, 2$
 5		
7		Hydrophytic Vegetation Indicators:
8. <u> </u>		 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50%
9		$\begin{array}{c} \underline{} \\ \underline{} \\ 3 - Prevalence Index is \leq 3.0^{1} \end{array}$
10	= Total Cover	4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
Herb Stratum (Plot size:) 1. Verbesing alternitolia	70% Yes FAC	Problematic Hydrophytic Vegetation ¹ (Explain)
2. Dactylisglomeratg	20% yes FACU	
The L'ANG CORPOSIS	5% NA FACIN	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
4. Solidago altissima		Definitions of Four Vegetation Strata:
5		Tree - Woody plants, excluding vines, 3 in. (7.6 cm) or
7		more in diameter at breast height (DBH), regardless of height.
8		Sapling/Shrub - Woody plants, excluding vines, less
9 10		than 3 in. DBH and greater than 3.28 ft (1 m) tall.
11		Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
12	100%	Woody vine – All woody vines greater than 3.28 ft in
Woody Vine Stratum (Plot size:)	<u>]00%</u> = Total Cover	height.
1 2	·	
2		
4		Hydrophytic
5		Hydrophytic Vegetation
6	et de la companya de	Present? Yes No <u>No</u>
	= Total Cover	
Remarks: (Include photo numbers here or on a separate s	r Dominant?	
201-0 1010		
Verbesina alternifolia 70	Yes	
Dactylis glomerata 20 Impatiens apensis 5 Salidaco altissima 5	No	
Impatiens apensis 5	No	
Dactylis glomerata 20 Impatiens apensis 5 Solidago altissing 5	100	

nches)	Matrix		Red	ox Features						
	Color (moist)		Color (moist)		Type ¹	Loc ²	Texture		Remarks	
-16	10484/4	65%	109R6/4	35%	RM	/VI	silfyclaylog	m		
			-			<u> </u>	<u> </u>	•		
	· · · · · · · · · · · · · · · · · · ·	·		·						
		<u></u>)								
	<u></u>			- <u> </u>			·			
							2			
	oncentration, D=Dep Indicators:	pletion, RM	Reduced Matrix, N	S=Masked	Sand Gra	ins.	² Location: PL Indica		ng, M=Matrix. roblematic Hy	dric Soils ³
Histosol	(13) - 122 () Alternative		Dark Surfac		- (00) (84				A10) (MLRA 1	47)
Black Hi	bipedon (A2) stic (A3)		Polyvalue B Thin Dark S					(MLRA 14	e Redox (A16) 17, 148)	
Hydroge	n Sulfide (A4)		Loamy Gley	ed Matrix (F			Pi	edmont Fle	oodplain Soils	(F19)
	Layers (A5)		Depleted Ma					(MLRA 13		
	ick (A10) (LRR N) d Below Dark Surfac	0 (111)	Redox Dark Depleted Da						Material (TF2) v Dark Surface	(TE12)
	ark Surface (A12)	e (ATT)	Redox Depr						in in Remarks	
	lucky Mineral (S1) (LRR N.	Iron-Mangai			.RR N,				
	A 147, 148)		MLRA 1							
Sandy G	Bleyed Matrix (S4)		Umbric Surf						ydrophytic veg	
· · · · · · · · · · · · · · · · · · ·	edox (S5) Matrix (S6)		Piedmont Fl	oodplain So	ils (F19)	MLRA 14			rology must be bed or probler	
	ayer (if observed)									
	ches):						Hydric Soil	Present?	Yes	No
marks:							Inyune con	resenti	103	105-1
narks.										

WETLAND DETERMINATION DATA FO	ORM – Eastern Mountains and Piedmont
Project/Site: AEPMitchell Landfill Project city/	County: Cresap/Marshall G, Sampling Date: 8/14/11
Applicant/Owner: AEP	State: WV Sampling Point: TP-2
	on, Township, Range:
Landform (hillslope, terrace, etc.):Local rel	lief (concave, convex, none): <u>slightly concave</u> slope (%): <u>0-2%</u>
Subregion (LRR or MLRA): LRR N Lat: 80.771616	Long: 39,830406 Datum:
Soil Map Unit Name: Culleoka - Damont - Peabody Com	1/2x, 35-65% slopes NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year?	/es No (If no, explain in Remarks.)
Are Vegetation \underline{N} , Soil \underline{N} , or Hydrology \underline{N} significantly distur- Are Vegetation \underline{N} , Soil \underline{N} , or Hydrology \underline{N} naturally problem	
SUMMARY OF FINDINGS – Attach site map showing san	
	iping point locations, transects, important leatures, etc.
Hydrophytic Vegetation Present? Yes No	Is the Sampled Area
Hydric Soil Present? Yes No	within a Wetland? Yes <u>No</u>
Wetland Hydrology Present? Yes No	
Remarks:	
	9 N
HYDROLOGY	
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)	Surface Soil Cracks (B6)
Surface Water (A1) True Aquatic Plants (
High Water Table (A2)	
	es on Living Roots (C3) Moss Trim Lines (B16)
Water Marks (B1) Presence of Reduced	A the second
Sediment Deposits (B2) Recent Iron Reduction	
Drift Deposits (B3) Thin Muck Surface (2 /8// (3// 0// / / / / / / / / / / / / / / / /
Algal Mat or Crust (B4) Other (Explain in Ref	
Iron Deposits (B5)	K Geomorphic Position (D2)
Inundation Visible on Aerial Imagery (B7)	Shallow Aquitard (D3)
Water-Stained Leaves (B9)	Microtopographic Relief (D4)
Aquatic Fauna (B13)	FAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Yes No X Depth (inches):	
Water Table Present? Yes No X Depth (inches):	
Saturation Present? Yes No Depth (inches):	Wetland Hydrology Present? Yes 📈 No
(includes capillary fringe)	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, pre	evious inspections), if available:
Remarks:	

		Dominant		Dominance Test works	sheet:	TP-2
ree Stratum (Plot size:)		Species?		Number of Dominant Sp That Are OBL, FACW, o		(A)
						、
				Total Number of Domina Species Across All Strat	2014-00	(B)
		·		Percent of Dominant Sp	ecies 1 1	01
				That Are OBL, FACW, o		10 (A/I
				Prevalence Index work	choot:	
				Total % Cover of:		
-				OBL species		
		= Total Cove	er	FACW species		
pling/Shrub Stratum (Plot size:)				FAC species		
				FACU species		
				UPL species		
				Column Totals:		
						(L
				Prevalence Index	= B/A =	
				Hydrophytic Vegetatio	n Indicators:	
				X 1 - Rapid Test for H	ydrophytic Vegetati	on
<u>.</u>				2 - Dominance Test	is >50%	
				3 - Prevalence Inde	x is ≤3.0 ¹	
•		= Total Cove		4 - Morphological A	daptations ¹ (Provide	e supporti
erb Stratum (Plot size:)	OCOL	a = z	- 01		or on a separate sl	87
Gluceria Stricta	35%	Yes	ORT	Problematic Hydrop	nytic vegetation (E	-xpiain)
Carex Frankii	15%	No	OBL	1		
Ascledias incarnata	5%	No	OBL	¹ Indicators of hydric soil be present, unless distu		
Pilea pumila	15%	No	FACW	Definitions of Four Ve		
Leersia oryzoides	20%	Yes	OBL		RE INTERNET	100000000000000000000000000000000000000
Polygonum punctatum	10%	No	OBL	Tree – Woody plants, ex more in diameter at brea		
Jo 1				height.	ast neight (DDH), re	garaicoo
				Capling/Chrub Wood	v planta ovaludina	vince los
				Sapling/Shrub – Wood than 3 in. DBH and grea		
)						
			3	Herb – All herbaceous (of size, and woody plant		
	100%	= Total Cov	er	Woody vine – All wood height.	y vines greater than	n 3.28 ft in
oody Vine Stratum (Plot size:)				- Height.		
•						
				Hydrophytic	M	
				Vegetation	к X No	
•				Present? Yes	S NO	
		= Total Cov	er			
emarks: (Include photo numbers here or on a separat	e sheet.)					

AEP Mitchell Landfill Project

Depth	. Matrix	0.0		<pre>k Features</pre>			rm the absence of indicators.)	
inches)	Color (moist)	%	Color (moist)		Type ¹	_Loc ²	Texture Remarks	
)-16	104R3/2	70%	<u>5984/6</u>	30%	RM	M	silłyclaylæm	
	<u></u>							
							² Location: PL=Pore Lining, M=Matrix.	
lydric Soil I Histosol Histic Ep Black His Hydrogel Stratified 2 cm Mu Depleted Thick Da Sandy M MLRA Sandy G Sandy R Sandy R Sandy R Carbone Sandy R Sandy R Sandy R	ndicators: (A1) ipedon (A2)	e (A11) RR N,	=Reduced Matrix, MS Dark Surface Polyvalue Be Thin Dark Su Loamy Gleye Depleted Matrix Redox Dark S Depleted Dar Redox Depre Iron-Mangana Umbric Surfa Piedmont Flo	(S7) low Surface rface (S9) d Matrix (F rix (F3) Surface (F4 k Surface ssions (F8 ese Masse 5) ce (F13) (I	e (S8) (N (MLRA 1 ⁷ 2) 6) (F7) 9) rs (F12) (1 MLRA 13	ILRA 147 47, 148) ₋RR N, 6, 122)	Indicators for Problematic Hydric So 2 cm Muck (A10) (MLRA 147) Coast Prairie Redox (A16) (MLRA 147, 148) Piedmont Floodplain Soils (F19) (MLRA 136, 147) Red Parent Material (TF2) Very Shallow Dark Surface (TF12) Other (Explain in Remarks) ³ Indicators of hydrophytic vegetation a	and
emarks:								

WETLAND DETERMINATION DATA FO	DRM – Eastern Mountains and Piedmont
Project/Site: AFP Mitchell Land fill Project City/C	County: Cresap/Marshall Co. Sampling Date: 8-15-11
Applicant/Owner: AEP	State: WV_ Sampling Point: TP-3
	on, Township, Range:
Landform (hillslope, terrace, etc.): JWa - Local rel	ief (concave, convex, none): <u>slightly concave</u> Slope (%): <u>1-3%</u>
Subregion (LRR or MLRA): LRR_ N Lat: 80, 773249	Long: 39, 824129 Datum:
Soil Map Unit Name: Culleokg-Dormant-Peabody Complex	
0 1	
Are climatic / hydrologic conditions on the site typical for this time of year? Y	
Are Vegetation \underline{N} , Soil \underline{N} , or Hydrology \underline{N} significantly distur	
Are Vegetation, Soil, or Hydrology naturally problems	atic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing san	pling point locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes X No Hydric Soil Present? Yes X No Wetland Hydrology Present? Yes X No	Is the Sampled Area within a Wetland? Yes X No
Remarks:	2
	5
HYDROLOGY	
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)	Surface Soil Cracks (B6)
Surface Water (A1) True Aquatic Plants (
High Water Table (A2) Hydrogen Sulfide Od	A provide second sec
	es on Living Roots (C3) Moss Trim Lines (B16)
Water Marks (B1) Presence of Reduced Sediment Deposits (B2) Recent Iron Reduction	
	and the second of the second s
Drift Deposits (B3) Thin Muck Surface (0 Algal Mat or Crust (B4) Other (Explain in Rer	
Iron Deposits (B5)	Geomorphic Position (D2)
Inundation Visible on Aerial Imagery (B7)	Shallow Aquitard (D3)
Water-Stained Leaves (B9)	Microtopographic Relief (D4)
Aquatic Fauna (B13)	FAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Yes X No Depth (inches):	-2
Water Table Present? Yes No K Depth (inches):	
Saturation Present? Yes X No Depth (inches): C	Wetland Hydrology Present? Yes X No
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, pre	avious inspections) if available:
Remarks:	
INTERNET SHOP OWNED	

201.116	Absolute Dominant Indicator	Sampling Point:
ree Stratum (Plot size: $20' \times 5'$)	<u>% Cover Species?</u> Status	Number of Dominant Species 2 (A)
		Total Number of Dominant
		Species Across All Strata: (B)
		Percent of Dominant Species
		That Are OBL, FACW, or FAC:O (A/B
		Prevalence Index worksheet:
		Total % Cover of: Multiply by:
	= Total Cover	OBL species x 1 =
pling/Shrub Stratum (Plot size: 20 ×15)		FACW species x 2 =
		FAC species x 3 =
		FACU species x 4 =
		UPL species x 5 =
		Column Totals: (A) (B)
		Prevalence Index = B/A =
		Hydrophytic Vegetation Indicators:
		1 - Rapid Test for Hydrophytic Vegetation
· · ·		2 - Dominance Test is >50%
		3 - Prevalence Index is ≤3.0 ¹
	= Total Cover	4 - Morphological Adaptations ¹ (Provide supportin
erb Stratum (Plot size: 20'×15')		data in Remarks or on a separate sheet)
Pitea pumila	40% FACW	Problematic Hydrophytic Vegetation ¹ (Explain)
Impatiens Capensis	10% FAEW	
Rumex verticillatus	5% OBL	¹ Indicators of hydric soil and wetland hydrology must
Polygorum pensylvanicum	10% FACW	be present, unless disturbed or problematic.
Tupha lotifalia	5% OBL	Definitions of Four Vegetation Strata:
Equisetum arvense	- 5% FAC	Tree - Woody plants, excluding vines, 3 in. (7.6 cm) o
Edusetoni di nerise		more in diameter at breast height (DBH), regardless of
Symphystrichum puniceus	2310 902	height.
		Sapling/Shrub - Woody plants, excluding vines, less
		than 3 in. DBH and greater than 3.28 ft (1 m) tall.
		Herb – All herbaceous (non-woody) plants, regardless
·		of size, and woody plants less than 3.28 ft tall.
·		- Constraint State of the State of State St State State S
body Vine Stratum (Plot size: 20 ×15)	100% = Total Cover	Woody vine – All woody vines greater than 3.28 ft in height.
<u>,</u>		
•		Hydrophytic
		Vegetation
		Present? Yes No
	= Total Cover	

rofile Description: (Description: (Descript				Complian Datat TP-
Depth Matrix Redox Features Color (moist) % Color (moist) % Type! Loc? Texture Remarks O-3 IO Y & Y / Z 100% Si / I loan No mot / Ias No mot / Ias No mot / Ias 3 - I6 Gley J 3/A1 100% Si / I loan No mot / Ias No mot / Ias 3 - I6 Gley J 3/A1 100% Si / I loan No mot / Ias No mot / Ias 3 - I6 Gley J 3/A1 100% Si / I loan No mot / Ias Si / I loan 3 - I6 Gley J 3/A1 100% Si / I loan No mot / Ias Si / I loan 4 Jon / J	Description: (Describe to the de	anth needed to document the indicator of	confirm the absence	Sampling Point: / / /
Inches) Color (moist) % Type! Loc ² Texture Remarks O-3 In V R V/2 100% Si It loam No motifue Si No mot			commit the absence of	or mulcators.)
3-16 Glty 3/1 100% Si // loam Si // loam No motify Le S 3-16 Glty 3/1 100% Si // loam No motify Le S 3-16 Glty 3/1 100% Si // loam No motify Le S 3-16 Glty 3/1 Ioo% Si // loam No motify Le S 100% Si // loam No motify Le S Si // loam No motify Le S 100% Si // loam Si // loam No motify Le S Si // loam No motify Le S 100% Si // loam Si // loam No motify Le S Si // loam	s) Color (moist) %	Color (moist) % Type ¹		111
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix. Iydric Soil Indicators: Indicators for Problematic Hydric So Histosol (A1) Dark Surface (S7) 2 cm Muck (A10) (MLRA 147, 148) Histosol (A2) Polyvalue Below Surface (S8) (MLRA 147, 148) Coast Prairie Redox (A16) Black Histic (A3) Thin Dark Surface (S9) (MLRA 147, 148) (MLRA 147, 148) Hydrogen Sufide (A4) Loamy Gleyed Matrix (F2) Piedmont Floodplain Soils (F19) Stratified Layers (A5) Depleted Dark Surface (F6) Red x Dark Surface (F7) You Sufface (A11) Depleted Dark Surface (F7) Very Shallow Dark Surface (TF12) Thick Dark Surface (A12) Redox Depressions (F8) Other (Explain in Remarks) Sandy Gleyed Matrix (S4) Umbric Surface (F13) (MLRA 136, 122) ³ Indicators of hydrophytic vegetation wetland hydrology must be preser				
Indicators: Indicators for Problematic Hydric Set Histosol (A1) Dark Surface (S7) 2 cm Muck (A10) (MLRA 147) Histic Epipedon (A2) Polyvalue Below Surface (S8) (MLRA 147, 148) Coast Prairie Redox (A16) Black Histic (A3) Thin Dark Surface (S9) (MLRA 147, 148) (MLRA 147, 148) Hydrogen Sulfide (A4) Loamy Gleyed Matrix (F2) Piedmont Floodplain Soils (F19) Stratified Layers (A5) Depleted Matrix (F3) (MLRA 136, 147) 2 cm Muck (A10) (LRR N) Redox Dark Surface (F6) Red Parent Material (TF2) Thick Dark Surface (A11) Depleted Dark Surface (F7) Very Shallow Dark Surface (TF12) Thick Dark Surface (A12) Redox Depressions (F8) Other (Explain in Remarks) Sandy Mucky Mineral (S1) (LRR N, Iron-Manganese Masses (F12) (LRR N, MLRA 136, 122) Sandy Gleyed Matrix (S4) Umbric Surface (F13) (MLRA 136, 122) ³ Indicators of hydrophytic vegetation wetland hydrology must be preser	16 GRY1 3/N 100%	2	Siltlogun	110 11044125
ydric Soil Indicators: Indicators for Problematic Hydric So Histosol (A1) Dark Surface (S7) 2 cm Muck (A10) (MLRA 147) Histic Epipedon (A2) Polyvalue Below Surface (S8) (MLRA 147, 148) Coast Prairie Redox (A16) Black Histic (A3) Thin Dark Surface (S9) (MLRA 147, 148) Coast Prairie Redox (A16) Hydrogen Sulfide (A4) Loamy Gleyed Matrix (F2) Piedmont Floodplain Soils (F19) Stratified Layers (A5) Depleted Matrix (F3) (MLRA 136, 147) 2 cm Muck (A10) (LRR N) Redox Dark Surface (F6) Red Parent Material (TF2) Very Shallow Dark Surface (A11) Depleted Dark Surface (F7) Very Shallow Dark Surface (TF12) Thick Dark Surface (A12) Redox Depressions (F8) Other (Explain in Remarks) Sandy Mucky Mineral (S1) (LRR N, Iron-Manganese Masses (F12) (LRR N, Indicators of hydrophytic vegetation wetland hydrology must be preser Sandy Gleyed Matrix (S4) Umbric Surface (F13) (MLRA 136, 122) ³ Indicators of hydrophytic vegetation wetland hydrology must be preser			(; (
ydric Soil Indicators: Indicators for Problematic Hydric So Histosol (A1) Dark Surface (S7) 2 cm Muck (A10) (MLRA 147) Histic Epipedon (A2) Polyvalue Below Surface (S8) (MLRA 147, 148) Coast Prairie Redox (A16) Black Histic (A3) Thin Dark Surface (S9) (MLRA 147, 148) Coast Prairie Redox (A16) Hydrogen Sulfide (A4) Loamy Gleyed Matrix (F2) Piedmont Floodplain Soils (F19) Stratified Layers (A5) Depleted Matrix (F3) (MLRA 136, 147) 2 cm Muck (A10) (LRR N) Redox Dark Surface (F6) Red Parent Material (TF2) Very Shallow Dark Surface (A11) Depleted Dark Surface (F7) Very Shallow Dark Surface (TF12) Thick Dark Surface (A12) Redox Depressions (F8) Other (Explain in Remarks) Sandy Mucky Mineral (S1) (LRR N, Iron-Manganese Masses (F12) (LRR N, Indicators of hydrophytic vegetation wetland hydrology must be preser Sandy Gleyed Matrix (S4) Umbric Surface (F13) (MLRA 136, 122) ³ Indicators of hydrophytic vegetation wetland hydrology must be preser				
ydric Soil Indicators: Indicators for Problematic Hydric So Histosol (A1) Dark Surface (S7) 2 cm Muck (A10) (MLRA 147) Histic Epipedon (A2) Polyvalue Below Surface (S8) (MLRA 147, 148) Coast Prairie Redox (A16) Black Histic (A3) Thin Dark Surface (S9) (MLRA 147, 148) Coast Prairie Redox (A16) Hydrogen Sulfide (A4) Loamy Gleyed Matrix (F2) Piedmont Floodplain Soils (F19) Stratified Layers (A5) Depleted Matrix (F3) (MLRA 136, 147) 2 cm Muck (A10) (LRR N) Redox Dark Surface (F6) Red Parent Material (TF2) Copeleted Below Dark Surface (A11) Depleted Dark Surface (F7) Very Shallow Dark Surface (TF12) Thick Dark Surface (A12) Redox Depressions (F8) Other (Explain in Remarks) Sandy Mucky Mineral (S1) (LRR N, Iron-Manganese Masses (F12) (LRR N, Other (Explain in Remarks) Sandy Gleyed Matrix (S4) Umbric Surface (F13) (MLRA 136, 122) ³ Indicators of hydrophytic vegetation wetland hydrology must be preser Sandy Redox (S5) Piedmont Floodplain Soils (F19) (MLRA 148) wetland hydrology must be preser				
ydric Soil Indicators: Indicators for Problematic Hydric So Histosol (A1) Dark Surface (S7) 2 cm Muck (A10) (MLRA 147) Histic Epipedon (A2) Polyvalue Below Surface (S8) (MLRA 147, 148) Coast Prairie Redox (A16) Black Histic (A3) Thin Dark Surface (S9) (MLRA 147, 148) (MLRA 147, 148) Hydrogen Sulfide (A4) Loamy Gleyed Matrix (F2) Piedmont Floodplain Soils (F19) Stratified Layers (A5) Depleted Matrix (F3) (MLRA 136, 147) 2 cm Muck (A10) (LRR N) Redox Dark Surface (F6) Red Parent Material (TF2) Coepleted Below Dark Surface (A11) Depleted Dark Surface (F7) Very Shallow Dark Surface (TF12) Thick Dark Surface (A12) Redox Depressions (F8) Other (Explain in Remarks) Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) Iron-Manganese Masses (F12) (LRR N, MLRA 136) ³ Indicators of hydrophytic vegetation wetland hydrology must be preser) <u></u>			
dric Soil Indicators: Indicators for Problematic Hydric So _ Histosol (A1)				
ydric Soil Indicators: Indicators for Problematic Hydric So Histosol (A1) Dark Surface (S7) 2 cm Muck (A10) (MLRA 147) Histic Epipedon (A2) Polyvalue Below Surface (S8) (MLRA 147, 148) Coast Prairie Redox (A16) Black Histic (A3) Thin Dark Surface (S9) (MLRA 147, 148) (MLRA 147, 148) Hydrogen Sulfide (A4) Loamy Gleyed Matrix (F2) Piedmont Floodplain Soils (F19) Stratified Layers (A5) Depleted Matrix (F3) (MLRA 136, 147) 2 cm Muck (A10) (LRR N) Redox Dark Surface (F6) Red Parent Material (TF2) 2 bepleted Below Dark Surface (A11) Depleted Dark Surface (F7) Very Shallow Dark Surface (TF12) Thick Dark Surface (A12) Redox Depressions (F8) Other (Explain in Remarks) Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) Iron-Manganese Masses (F12) (LRR N, MLRA 136) ³ Indicators of hydrophytic vegetation wetland hydrology must be preser			<u> </u>	
ydric Soil Indicators: Indicators for Problematic Hydric So Histosol (A1) Dark Surface (S7) 2 cm Muck (A10) (MLRA 147) Histic Epipedon (A2) Polyvalue Below Surface (S8) (MLRA 147, 148) Coast Prairie Redox (A16) Black Histic (A3) Thin Dark Surface (S9) (MLRA 147, 148) (MLRA 147, 148) Hydrogen Sulfide (A4) Loamy Gleyed Matrix (F2) Piedmont Floodplain Soils (F19) Stratified Layers (A5) Depleted Matrix (F3) (MLRA 136, 147) 2 cm Muck (A10) (LRR N) Redox Dark Surface (F6) Red Parent Material (TF2) 2 bepleted Below Dark Surface (A11) Depleted Dark Surface (F7) Very Shallow Dark Surface (TF12) Thick Dark Surface (A12) Redox Depressions (F8) Other (Explain in Remarks) Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) Iron-Manganese Masses (F12) (LRR N, MLRA 136) ³ Indicators of hydrophytic vegetation wetland hydrology must be preser			<u> </u>	
ydric Soil Indicators: Indicators for Problematic Hydric So Histosol (A1) Dark Surface (S7) 2 cm Muck (A10) (MLRA 147) Histic Epipedon (A2) Polyvalue Below Surface (S8) (MLRA 147, 148) Coast Prairie Redox (A16) Black Histic (A3) Thin Dark Surface (S9) (MLRA 147, 148) Coast Prairie Redox (A16) Hydrogen Sulfide (A4) Loamy Gleyed Matrix (F2) Piedmont Floodplain Soils (F19) Stratified Layers (A5) Depleted Matrix (F3) (MLRA 136, 147) 2 cm Muck (A10) (LRR N) Redox Dark Surface (F6) Red Parent Material (TF2) Very Shallow Dark Surface (A11) Depleted Dark Surface (F7) Very Shallow Dark Surface (TF12) Thick Dark Surface (A12) Redox Depressions (F8) Other (Explain in Remarks) Sandy Mucky Mineral (S1) (LRR N, Iron-Manganese Masses (F12) (LRR N, Indicators of hydrophytic vegetation wetland hydrology must be preser Sandy Gleyed Matrix (S4) Umbric Surface (F13) (MLRA 136, 122) ³ Indicators of hydrophytic vegetation wetland hydrology must be preser	C=Concentration, D=Depletion, RM	 M=Reduced Matrix, MS=Masked Sand Grain 	ns. ² Location: PL:	- Pore Lining, M=Matrix.
Histic Epipedon (A2) Polyvalue Below Surface (S8) (MLRA 147, 148) Coast Prairie Redox (A16) Black Histic (A3) Thin Dark Surface (S9) (MLRA 147, 148) (MLRA 147, 148) Hydrogen Sulfide (A4) Loamy Gleyed Matrix (F2) Piedmont Floodplain Soils (F19) Stratified Layers (A5) Depleted Matrix (F3) (MLRA 136, 147) 2 cm Muck (A10) (LRR N) Redox Dark Surface (F6) Red Parent Material (TF2) Opeleted Below Dark Surface (A11) Depleted Dark Surface (F7) Very Shallow Dark Surface (TF12) Thick Dark Surface (A12) Redox Depressions (F8) Other (Explain in Remarks) Sandy Mucky Mineral (S1) (LRR N, Iron-Manganese Masses (F12) (LRR N, MLRA 136, 122) Sandy Gleyed Matrix (S4) Umbric Surface (F13) (MLRA 136, 122) ³ Indicators of hydrophytic vegetation wetland hydrology must be preser	Soil Indicators:		Indica	tors for Problematic Hydric Soils ³
Black Histic (A3)				
Stratified Layers (A5) Depleted Matrix (F3) (MLRA 136, 147) 2 cm Muck (A10) (LRR N) Redox Dark Surface (F6) Red Parent Material (TF2) ✓ Depleted Below Dark Surface (A11) Depleted Dark Surface (F7) Very Shallow Dark Surface (TF12) Thick Dark Surface (A12) Redox Depressions (F8) Other (Explain in Remarks) Sandy Mucky Mineral (S1) (LRR N, Iron-Manganese Masses (F12) (LRR N, Other (Explain in Remarks) Sandy Gleyed Matrix (S4) Umbric Surface (F13) (MLRA 136, 122) ³Indicators of hydrophytic vegetation wetland hydrology must be preser				
2 cm Muck (A10) (LRR N) Redox Dark Surface (F6) Red Parent Material (TF2) ✓ Depleted Below Dark Surface (A11) Depleted Dark Surface (F7) Very Shallow Dark Surface (TF12) Thick Dark Surface (A12) Redox Depressions (F8) Other (Explain in Remarks) Sandy Mucky Mineral (S1) (LRR N, Iron-Manganese Masses (F12) (LRR N, Other (Explain in Remarks) MLRA 147, 148) MLRA 136) Indicators of hydrophytic vegetation Sandy Gleyed Matrix (S4) Piedmont Floodplain Soils (F19) (MLRA 148) Indicators of hydrophytic vegetation				
 ✓ Depleted Below Dark Surface (A11) _ Depleted Dark Surface (F7) _ Thick Dark Surface (A12) _ Redox Depressions (F8) _ Sandy Mucky Mineral (S1) (LRR N, _ MLRA 147, 148) _ Sandy Gleyed Matrix (S4) _ Sandy Redox (S5) _ Depleted Dark Surface (F13) (MLRA 136, 122) _ Piedmont Floodplain Soils (F19) (MLRA 148) _ Very Shallow Dark Surface (TF12 _ Other (Explain in Remarks) _ Other (Explain in Remarks) _ Other (Explain in Remarks) _ MLRA 136) _ Umbric Surface (F13) (MLRA 136, 122) _ Piedmont Floodplain Soils (F19) (MLRA 148) 				
 Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148) Sandy Gleyed Matrix (S4) Sandy Redox (S5) Iron-Manganese Masses (F12) (LRR N, MLRA 136) Iron-Manganese Masses (F12) (LRR N, MLRA 136) MLRA 136) MLRA 136) Indicators of hydrophytic vegetation wetland hydrology must be present 	pleted Below Dark Surface (A11)	Depleted Dark Surface (F7)	Ve	ery Shallow Dark Surface (TF12)
MLRA 147, 148) MLRA 136) Sandy Gleyed Matrix (S4) Umbric Surface (F13) (MLRA 136, 122) ³ Indicators of hydrophytic vegetation wetland hydrology must be presented by the presented by th				her (Explain in Remarks)
Sandy Gleyed Matrix (S4) Umbric Surface (F13) (MLRA 136, 122) ³ Indicators of hydrophytic vegetation Sandy Redox (S5) Piedmont Floodplain Soils (F19) (MLRA 148) wetland hydrology must be preserved.			AK N,	
	ndy Gleyed Matrix (S4)			
	ndy Redox (S5) ipped Matrix (S6)	Piedmont Floodplain Solis (F19) (N		eliand hydrology must be present, iless disturbed or problematic.
estrictive Layer (if observed):				
Туре:				\vee
Depth (inches): No NoN	th (inches):		Hydric Soil	Present? Yes 🔼 No
marks:	(S:			

WETLAND DETERMINATION DATA F	ORM – Eastern Mountains and Piedmont
Provide AEPMitchell/andfill Project city	County Cireson Marchall Co. Sampling Date: 8/15/11
Project/Site: <u>AEPMitohellLandfillProject</u> City, Applicant/Owner: <u>AEP</u>	County: Orcourb / Marshapping Date. 07.07.11
	tion, Township, Range:
Landform (hillslope, terrace, etc.): hillslope Local re	elief (concave, convex, none): <u>Nore</u> Slope (%): <u>5 %</u>
Subregion (LRR or MLRA): LRRN Lat: 80,77329	2 Long: 39,824109 Datum:
Soil Map Unit Name: Culleokg- Dormont - Prabody Comple	X, 25-35% Slopes NWI classification: N/A
· · · · · ·	
Are climatic / hydrologic conditions on the site typical for this time of year?	
Are Vegetation _/V_, Soil _/V, or Hydrology _/V_ significantly dist	
Are Vegetation \underline{N} , Soil \underline{N} , or Hydrology \underline{N} naturally problem	natic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing sa	mpling point locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes No X	
Hydric Soil Present? Yes No	Is the Sampled Area
Wetland Hydrology Present? Yes No X	within a Wetland? Yes No
Remarks:	
Tenano.	
· · ·	5 8 8
HYDROLOGY	Cocondany Indicators (minimum of two required)
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)	Surface Soil Cracks (B6)
Surface Water (A1) True Aquatic Plants	A REAL REAL REAL REAL REAL REAL REAL REA
High Water Table (A2) Hydrogen Sulfide C	24 (P) as an and a structure of second control and a structure to the second control of the second control
	eres on Living Roots (C3) Moss Trim Lines (B16)
Water Marks (B1) Presence of Reduc	
	ion in Tilled Soils (C6) Crayfish Burrows (C8)
Drift Deposits (B3) Thin Muck Surface	
Algal Mat or Crust (B4) Other (Explain in R	
Iron Deposits (B5)	Geomorphic Position (D2)
Inundation Visible on Aerial Imagery (B7)	Shallow Aquitard (D3)
Water-Stained Leaves (B9)	Microtopographic Relief (D4) FAC-Neutral Test (D5)
Aquatic Fauna (B13)	
Field Observations:	
Surface Water Present? Yes No Depth (inches):	
Water Table Present? Yes No X Depth (inches):	V V
Saturation Present? Yes No X_ Depth (inches):	Wetland Hydrology Present? Yes No
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, p	revious inspections), if available:
Remarks:	

The Stratum (Plot size: 10 × 201), second stratum Providence indication in the Voltament Species in	Acer negundo	25%			
India Number of Dominant Species Arcs					
Prevalence Index worksheet: Table Are Oblin Ham Species 50 % (WB) The Are Dobin Ham Species 50 % (WB) Prevalence Index worksheet: Table Are Oblin Ham Species Table Are Dobin Ham Species x1 = abino/Shrub Stratum (Plot size: 10 'x20'), 20% Ye S KaSa Multifier 20% Ye S Column Totals: 95 Column Totals: 95 Column Totals: 95 Hydrophytic Vegetation Indicators: - - - - 20% Ve S - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -					
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adingiShrub Stratum (Plot size: 10 'x 20') 20% Yes FACV species x = 180 FACV species x = 180 FACV species x = 190 FACV species x = 101 FACV species x = 100		25%			
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2 - Dominance Test is >50% 3 - Prevalence Index is 33.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation ¹ (Explain) Problematic Hydrophytic Vegetation ¹ (Explain) Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. Definitions of Four Vegetation Strata: Tree - Woody plants, excluding vines, 3 in (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub - Woody plants, excluding vines, 3 in (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub - Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Voody Vine Stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratum (Plot size: 10 ¹ × 20 ¹) For the stratu					1 - Rapid Test for Hydrophytic Vegetation
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Image: Stratum Image	•		- S.	FACU	Definitions of Four Vegetation Strata:
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Saping Sinds - Vroot plants, excluding whes, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. 0.					
1.					
2.					
Voody Vine Stratum (Plot size: 10 × 20 1) 10 × 20 1) height. Height. Hydrophytic Hydrophytic Vegetation Present? Yes No	2				
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Hydrophytic Vegetation Present? Yes No					
Hydrophytic Vegetation Present? Yes No					
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= Total Cover Remarks: (Include photo numbers here or on a separate sheet.) Herb Stratum					Present? Yes No
Herb Stratum				ver	
Dela D. LO	Remarks: (Include photo numbers here or on a separate	sheet.)			
50% of 50% = 25% 20% of $50\% = 10\%$					
20% of 50% - 10%					
	50% of 50% = 25%				
	50% of 50% = 25% 20% of 50% = 10%				

AEP Mitchell Landfill Rojod TD 11

SOIL						Sa	mpling Point:	1P-4
Profile Desc	ription: (Describe	to the dept	h needed to document the indicator or o	confirm	the absence	of indicator	rs.)	
Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist) % Type ¹ L				Remarks	
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		pletion, RM=	Reduced Matrix, MS=Masked Sand Grains	S	² Location: PL:		g, M=Matrix. oblematic Hy	dria Saila ³
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	en Sulfide (A4)		Loamy Gleyed Matrix (F2)	, 140)			odplain Soils ((F19)
	1 Layers (A5)		Depleted Matrix (F3)			(MLRA 136		(110)
	ick (A10) (LRR N)		Redox Dark Surface (F6)				aterial (TF2)	
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	ark Surface (A12)	, , , , , , , , , , , , , , , , , , ,	Redox Depressions (F8)				n in Remarks)	
	lucky Mineral (S1) (LRR N,	Iron-Manganese Masses (F12) (LRI	RN,				
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Sandy G	Bleyed Matrix (S4)		Umbric Surface (F13) (MLRA 136, 1				drophytic veg	
	ledox (S5)		Piedmont Floodplain Soils (F19) (MI	LRA 14			logy must be	
	Matrix (S6)				un	less disturb	ed or problem	natic.
Restrictive I	Layer (if observed)	:						
Туре:								\times
Depth (ind	ches):				Hydric Soil	Present?	Yes	No
Remarks:					-			
								-

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APPENDIX B

SITE PHOTOGRAPHS



Photograph 1. View of mixed early successional/second growth forest in the northwest portion of the Project Area. Photo taken facing northeast.



Photograph 2. View of second growth forest on hillside adjacent to Stream 1. Photo taken facing southeast from the confluence of Stream 1 and Stream 2.



Photograph 3. View of second growth forest adjacent to Stream 2A. Photo taken facing northwest.



Photograph 4. View of second growth forest adjacent to Stream 2A-3. Photo taken facing southeast.



Photograph 5. View of hay field north of Gatts Ridge Road. Photo taken facing northwest.



Photograph 6. View of old field habitat within powerline right-of-way in Option 1 Limits of Disturbance. Photo taken facing south.



Photograph 7. View of second growth forest adjacent to Stream 6. Photo taken facing southwest.



Photograph 8. View of old field/pasture in northern portion of Option 2 Limits of Disturbance. Photo taken facing northeast.



Photograph 9. View of lawn and hayfield in northern portion of Option 2 Limits of Disturbance. Photo taken facing north.



Photograph 10. View of pasture/old field habitat south of Gatts Ridge Road in Option 2 Limits of Disturbance. Photo taken facing southeast.



Photograph 11. View of residential lawn and driveway in northeast portion of Option 2 Limits of Disturbance. Photo taken facing northeast.



Photograph 12. View of mixed early successional/second growth forest in northeast portion of Option 2 Limits of Disturbance. Photo taken facing south.



Photograph 13. View of second growth forest at the headwaters of Stream 8. Photo taken facing west.



Photograph 14. View of second growth forest near confluence of Stream 8 and Stream 13. Photo taken facing east.



Photograph 15. View of second growth forest near the junction of Stream 8 and Stream 13. Photo taken facing south.



Photograph 16. View of mixed early successional/second growth forest adjacent to Gatts Ridge Road. Photo taken facing southeast.



Photograph 17. View of second growth forest at southern end of Option 2 Limits of Disturbance. Photo taken facing west.



Photograph 18. View of old field habitat within powerline right-of-way. Photo taken facing southwest.



Photograph 19. View of residential lawn habitat on Gatts Farmstead within Option 1 Limits of Disturbance. Photo taken facing south.



Photograph 20. View of mowed lawn habitat on Gatts Farmstead within Option 1 Limits of Disturbance. Photo taken facing southwest.



Photograph 21. View of residential lawn and planted coniferous trees along access road to Gatts Farmstead. Photo taken facing north.



Photograph 22. View of soybean field on Gatts Farmstead. Photo taken facing southwest.



Photograph 23. View of soybean field on Gatts Farmstead. Photo taken facing southeast.



Photograph 24. View of soybean field and mixed old field/early successional forest habitat. Photo taken facing northeast.



Photograph 25. View of soybean field and mixed old field/early successional forest. Photo taken facing north.



Photograph 26. View of corn, soybean, and hayfields on Gatts Farmstead. Photo taken facing northeast.



Photograph 27. View of soybean field and powerline right-of-way on Gatts Farmstead. Photo taken facing east.



Photograph 28. View of hayfield southeast of Gatts Farmhouse. Photo taken facing south. American Electric Power Co., Inc. Proposed Mitchell Landfill Project Cresap, Marshall County, West Virginia CEC Project No. 110-416 Photographs taken on 8-11-2011 through 8-15-2011



Photograph 29. View of old field habitat in natural gas pipeline right-of-way near Gatts Farmstead. Photo taken facing north.



Photograph 30. View of mapped National Wetlands Inventory wetland located just outside of the Project Area boundary on Gatts Farmstead. Photo taken facing west.



Photograph 31. View of mapped National Wetlands Inventory wetland located just outside of the Project Area boundary on Gatts Farmstead. Photo taken facing south.



Photograph 32. View of mapped National Wetlands Inventory wetland located just outside of the Project Area boundary on Gatts Farmstead. Photo taken facing southeast.



Photograph 33. View of mapped National Wetlands Inventory wetland located just outside of the Project Area boundary on Gatts Farmstead. Photo taken facing southwest.



Photograph 34. Representative view of Wetland A. Photo taken facing west.



Photograph 35. View of upland test pit at Wetland A. Photo taken facing south.



Photograph 36. View of bathtub located at spring on the north side of Wetland B. Photo taken facing north.



Photograph 37. Representative view of Wetland B. Photo taken facing south.



Photograph 38. View of Wetland Determination Test Pit 3 within Wetland B.



Photograph 39. View of Wetland B. Photo taken facing north.



Photograph 40. View of Open Water 1. Photo taken facing south.



Photograph 41. View of upper/ephemeral portion of Stream 1. Photo taken facing upstream.



Photograph 42. View of Stream 1 within the upper sample reach in Option 1 Limits of Disturbance. Photo taken facing upstream.



Photograph 43. View of Stream 1 downstream from the confluence with Stream 3. Photo taken facing downstream.



Photograph 44. View of Stream 1 above the confluence with Stream 2. Photo taken facing upstream.



Photograph 45. View of Stream 1 upstream of the confluence with Stream 2. Photo taken facing upstream.



Photograph 46. View of large bedrock pool along Stream 1 upstream with Stream 4 confluence and within middle sample reach. Photo taken facing upstream.



Photograph 47. View of Stream 1 upstream of the confluence with Stream 4 and within middle sample reach. Photo taken facing south.



Photograph 48. View of Stream 1 upstream of confluence with Stream 4 and within middle sample reach. Photo taken facing upstream.



Photograph 49. View of Stream 1 upstream of confluence with Stream 4 and within middle sample reach. Photo taken facing downstream.



Photograph 50. View of Stream 1 at confluence with Stream 5. Photo taken facing downstream.



Photograph 51. View of Stream 1 at confluence with Stream 6. Photo taken facing upstream.



Photograph 52. View of Stream 1 directly upstream of the southern edge of Option 1 Limits of Disturbance boundary. Photo taken facing downstream.



Photograph 53. View of Stream 1 within lower sample reach. Photo taken facing upstream.



Photograph 54. View of Stream 1 within lower sample reach. Photo taken facing downstream.



Photograph 55. View of Stream 1A. Photo taken facing upstream.



Photograph 56. View of Stream 1B. Photo taken facing upstream.



Photograph 57. View of Stream 1C. Photo taken facing upstream.



Photograph 58. View of Stream 1D. Photo taken facing upstream.



Photograph 59. View of ephemeral portion of Stream 1. Photo taken facing upstream.



Photograph 60. View of Stream 1 upstream of confluence with Stream 3. Photo taken facing upstream.



Photograph 61. View of Stream 2 above confluence with Stream 1. Photo taken facing upstream.



Photograph 62. View of Stream 2 above confluence with Stream 1. Photo taken facing downstream.



Photograph 63. View of the downstream portion of Stream 2A. Photo taken facing upstream.



Photograph 64. View of Stream 2A within sample reach. Photo taken facing upstream.



Photograph 65. View of Stream 2A-1. Photo taken facing upstream.



Photograph 66. View of Stream 2A-1. Photo taken facing downstream.



Photograph 67. View of Stream 2A-2. Photo taken facing upstream.



Photograph 68. View of Stream 2A-3. Photo taken facing downstream.



Photograph 69. View of ephemeral portion of Stream 2A. Photo taken facing upstream.



Photograph 70. View of Stream 2B. Photo taken facing downstream.



Photograph 71. View of Stream 2 below the confluence of Stream 2A and Stream 2B and within sample reach. Photo taken facing downstream.



Photograph 72. View of Stream 2 below the confluence of Stream 2A and Stream 2B and within sample reach. Photo taken facing upstream.



Photograph 73. View of Stream 2B upstream of confluence with Stream 2A. Photo taken facing downstream.



Photograph 74. View of Stream 2B upstream of confluence with Stream 2A. Photo taken facing upstream.



Photograph 75. View of Stream 3 above the confluence with Stream 1. Photo taken facing upstream.



Photograph 76. View of ephemeral portion of Stream 3. Photo taken facing upstream.



Photograph 77. View of ephemeral portion of Stream 3. Photo taken facing downstream.



Photograph 78. View of intermittent portion of Stream 3 near confluence with Stream 3A and within sample reach. Photo taken facing downstream.



Photograph 79. View of intermittent portion of Stream 3 near confluence with Stream 3A and within sample reach. Photo taken facing upstream.



Photograph 80. View of Stream 3A. Photo taken facing upstream.



Photograph 81. View of Stream 3B. Photo taken facing upstream.



Photograph 82. View of Stream 4. Photo taken facing upstream.



Photograph 83. View of Stream 4. Photo taken facing upstream.



Photograph 84. View of lower portion of Stream 5. Photo taken facing upstream.



Photograph 85. View of intermittent portion of Stream 6 within sample reach. Photo taken facing upstream.



Photograph 86. View of intermittent portion of Stream 6 within sample reach. Photo taken facing downstream.



Photograph 87. View of ephemeral portion of Stream 6. Photo taken facing upstream.



Photograph 88. View of portion of Stream 1 with large boulders downstream of the confluence with Stream 6. Photo taken facing upstream.



Photograph 89. View of lower portion of Stream 7. Photo taken facing upstream from confluence with Stream 1.



Photograph 90. View of Stream 7. Photo taken facing upstream.



Photograph 91. View of ephemeral portion of Stream 8. Photo taken facing upstream.



Photograph 92. View of beginning of intermittent portion of Stream 8. Photo taken facing downstream.



Photograph 93. View of Stream 8, downstream of Stream 8A. Photo taken facing upstream.



Photograph 94. View of Stream 8 upstream of confluence with Stream 10 and within upper sample reach. Photo taken facing upstream.



Photograph 95. View of bedrock waterfall and pool along Stream 8 upstream of confluence with Stream 12. Photo taken facing upstream.



Photograph 96. View of Stream 8. Photo taken facing upstream from confluence with Stream 12.



Photograph 97 View of Stream 8. Photo taken facing downstream from confluence with Stream 12.



Photograph 98. View of bedrock waterfall and pool area along Stream 8. Photo taken facing upstream.



Photograph 99. View of bedrock waterfall and pool area along Stream 8. Photo taken facing upstream.



Photograph 100. View of Stream 8 within the lower sample reach near the Limits of Disturbance boundary. Photo taken facing upstream.



Photograph 101. View of Stream 8 within the lower sample reach near the Limits of Disturbance boundary. Photo taken facing upstream.



Photograph 102. View of Stream 8 within the Lower Sample Reach near the Limits of Disturbance boundary. Photo taken facing upstream.



Photograph 103. View of intermittent portion of Stream 8A. Photo taken facing upstream.



Photograph 104. View of ephemeral portion of Stream 8A. Photo taken facing upstream.



Photograph 105. View of Stream 8B. Photo taken facing upstream.



Photograph 106. View of downstream portion of Stream 9. Photo taken facing upstream.



Photograph 107. View of intermittent portion of Stream 9 within sample reach. Photo taken facing downstream.



Photograph 108. View of ephemeral portion of Stream 9. Photo taken facing upstream.



Photograph 109. View of downstream portion of Stream 10. Photo taken facing upstream.



Photograph 110. View of downstream portion of Stream 10. Photo taken facing upstream.



Photograph 111. View of ephemeral portion of Stream 10 after heavy rainfall occurred. Photo taken facing upstream.



Photograph 112. View of ephemeral portion of Stream 10 after heavy rainfall occurred. Photo taken facing upstream.



Photograph 113. View of intermittent portion of Stream 10 within sample reach. Photo taken facing upstream.



Photograph 114. View of intermittent portion of Stream 10 within sample reach. Photo taken facing downstream.



Photograph 115. View of Stream 10A after heavy rainfall occurred. Photo taken facing upstream.



Photograph 116. View of Stream 11. Photo taken facing upstream.



Photograph 117. View of Stream 11. Photo taken facing upstream.



Photograph 118. View of lower portion of Stream 12 after heavy rainfall occurred. Photo taken facing upstream.



Photograph 119. View of Stream 12. Photo taken facing upstream.



Photograph 120. View of Stream 12. Photo taken facing upstream.



Photograph 121. View of Stream 13. Photo taken facing upstream from the confluence with Stream 8.



Photograph 122. View of bedrock waterfall and small pool along the lower portion of Stream 13. Photo taken facing upstream.



Photograph 123. View of Stream 13 within the sample reach. Photo taken facing upstream.



Photograph 124. View of Stream 13 within the sample reach. Photo taken facing downstream.



Photograph 125. View of ephemeral portion of Stream 13. Photo taken facing upstream.



Photograph 126. View of Stream 14. Photo taken facing upstream from the confluence with Stream 8.



Photograph 127. View of downstream/bedrock portion of Stream 14. Photo taken facing upstream.



Photograph 128. View of bedrock waterfall within downstream portion of Stream 14. Photo taken facing upstream.



Photograph 129. View of upper intermittent portion of Stream 14 within sample reach. Photo taken facing downstream.



Photograph 130. View of ephemeral portion of Stream 14. Photo taken facing upstream.



Photograph 131. View of upper portion of Stream 15. Photo taken facing upstream.



Photograph 132. View of lower portion of Stream 15. Photo taken facing upstream.



Photograph 133. View of upper portion of Stream 15. Photo taken facing upstream.



Photograph 134. View of upper portion of Stream 15. Photo taken facing downstream.



Photograph 135. View of upper portion of Stream 16. Photo taken facing upstream.



Photograph 136. View of lower portion of Stream 16. Photo taken facing upstream.



Photograph 137. View of lower portion of Stream 16. Photo taken facing upstream.



APPENDIX C

USEPA RAPID BIOASSESSMENT PROTOCOL STREAM DATA FORMS

Upstream of Confluence w/ Str	egn 2
STREAM NAME STREAM	LOCATION Mileholl Landfill, Cresap, WV
STATION # RIVERMILE	STREAM CLASS Intermittent
LAT 39°49'36,46" LONG 0°46'32.43" W	RIVER BASIN Ohio River
STORET #	AGENCY
	er Ke
FORM COMPLETED BY D. Godec	DATE 8/12/11 TIME 12:30 AM (FM) AEP Mitche Landfill Project

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

)

			Condition	Category	
	Habitat 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 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 5	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.
ed ii	SCORE	20 19 18 17 (6)	15 1 <u>4 13 12</u> 11	10 9 <u>8</u> 7 <u>6</u>	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). Slow shallow
1 E	SCORE 2	20 19 18 17 16	15 14 13 12 11	<u>10</u> 9 8 7 <u>6</u>	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 12	20 19 18 17 16	15 14 13 2 11	<u>10 9 8 7 6</u>	55432.10
	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.	
	score 7	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 2 1 0

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Stream 1 - upstream of confluence with Stream 2 (conti)

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

		<u> </u>	Condition	Category				
	Habitat Parameter	Optimal	Suboptimal	Marginal	Poor			
	6. Chaunel 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 20	20) 19 <u>18 17 5</u> 16	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3 2 1 0			
ing 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.	datively frequent; ratio f distance between riffles ivided by width of the ream <7:1 (generally 5 by: variety of habitat is ey. In streams where ffles are continuous, lacement of boulders or ther large, naturalinfrequent; distance between riffles divided by the width of the stream is between 7 to 15.bottom contours provid some habitat; distance between riffles divided by the width of the stream is between 7 to 15.7); variety of habitat is ey. In streams where ffles are continuous, here large, naturalbottom contours provid some habitat; distance between riffles divided by the width of the stream is between 7 to 15.bottom contours provid some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					
sampl	SCORE 5	20 30 19 18 17 16	15 14 13 12 11	<u>10 -9 8 7</u> 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.			
to be ev	SCORE (LB) SCORE (RB)	Left Bank 10 9 Right Bank 10 9	1 1 6 3 7 6	<u>5</u> 4 3 5 4 3	2 1 0 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 $\frac{\mathscr{S}}{\mathscr{S}}$ (LB) SCORE \mathscr{S} (RB)	Left Bank 10 9 Right Bank 10 9	$\begin{array}{c c} \hline 8 & 7 & 6 \\ \hline 8 & 7 & 6 \\ \hline \end{array}$	5 4 3 5 4 3	2 1 0 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 zong.	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 U (LB)	Left Bank 10 9	8 7	5 4 3	2 1 0			
	SCORE 10 (RB)	Right Bank (10) 9.	8 7 6	5 4 3	2 1 - 0			

Total Score 3

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

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Just upstream	of confl. w/s	Stream 2	

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STREAM NAME STREAM	LOCATION CRESAP, Marshall CO.I. WV
STATION # RIVERMILE	STREAM CLASS Informitian
LAT 39° 49'36,46'NLONG 20 46'32.48'W	RIVER BASIN Ohio River
STORET #	AGENCY
INVESTIGATORS D. Godec, G. G.	berke
FORM COMPLETED BY	TIME 11/25 MPM REASON FOR SURVEY AEP Mitchel / Landfill Priject

WEATHER CONDITIONS	Now Past 24 hours Has there been a heavy rain in the last 7 days? Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy ra
SITE LOCATION/MAP	Draw a map of the site and indicate the areas sampled (or attach a photograph)
	See photographs and Figure 5 from Jurisdictional Waters Delineation Report
STREAM CHARACTERIZATION	Stream Subsystem Perennial A Intermittent Tidal Stream Origin Glacial Spring-fed Non-glacial montane Swamp and bog Other

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Stream 1 - upstream of Stream 2 (cont.)

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

_							
WATERS FEATURI		Predom A Forest U Field/					
		C Agrici C Reside					
RIPARIA VEGETA (18 meter	N TION buffer)	Indicate A Trees dominat	the dominant type and A Sh at species present <u>500</u>	record the do nubs Jan maple	minant species present A He Grasses , red maple, while Gsh	baccous	tch hazel, spicebos
INSTREA FEATURI	M ES	Estimat Samplin Area in Estimat	ed Stream Width 1.8 Ing Reach Area 55.7 km ² (m ² x1000) . 000055 ed Stream Depth 0.0 Velocity 0, 2 m	wood nettle			
LARGE V DEBRIS	YOODY	LWD Density	<u>3</u> m ² of LWD 53,859,9m	¹ /km ² (LWD/)	rcach area)		
AQUATIC VEGETA		domina	ng Algãe \Box At at species present \underline{C}^{\Box}	ooted submerge tached Algae Par WQQc	nt Rooted floating d, Polygonum 5p.	□ Free floating	
			of the reach with aquat	ic vegetation_	2%		
WATER (QUALITY	Temper Specific Dissolve pH <u>6</u> Turbidi WQ Ins					
SEDIMEN SUBSTRA		Odors Norm Chem					
		Oils Abser					
INC	ORGANIC SUB (should a	STRATE	COMPONENTS 100%)		ORGANIC SUBSTRATE C (does not necessarily add	COMPONENTS up to 100%)]
Substrate Type	<u> </u>		% Composition in Sampling Reach	% Composition in Sampling Area			
Bedrock Boulder	> 256 mm (10"	 	20%	Detritus	2%		
Cobble	64-256 mm (2.		20%	Muck-Mud	black, very fine organic	<u> 101</u>	1
Gravel	2-64 mm (0.1"	-2.5")	20%	<u> </u>	(FPOM)	0/0	4
Sand	0.06-2mm (gril	tty)		Marl	grey, shell fragments	10/	
Silt	0,004-0.06 mm		10%	4		010	
Clay	< 0,004 mm (s	lick)		<u> </u>]		

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET Just upstream of Fronklin W/Stream 2

STREAM NAME	treaml	LOCATION Mitchell LO	and FIM, Cresap, Marshall Co, WV						
STATION #		STREAM CLASS Interr	STREAM CLASS Intermittent						
LAT3994936,46"	V LONG 80°46'32.43"W	RIVER BASIN Ohio	River						
STORET #		AGENCY							
INVESTIGATORS	D. Godec, G	Gerke	LOT NUMBER						
FORM COMPLETED		DATE 8/12/11 TIME 11:30 @ PM	REASON FOR SURVEY AEP MitchellLandAll Maject						
HABITAT TYPES	Indicate the percentage of ACobble 20_% 21 Sn Submerged Macrophytes	ags 45 % X Vegetated B							
SAMPLE COLLECTION	Gear used Image: Construction of the samples collected? Image: Construction of the samples collected? How were the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Indicate the number of jabs/kicks taken in each habitat type. Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples collected? Image: Construction of the samples constructing constructing constructing construction of t								
GENERAL COMMENTS	N, Duskysaloma	nden larrae observe	· · · · · · · · · · · · · · · · · · ·						

QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	01234	Slimes	(0) 1 2 3 4
Filamentous Algae	01234	Macroinvertebrates	0(1)234
Macrophytes	0 1 2 3 4	Fish	(0)1234

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3 = Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0		l	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa .	0	1	2	3	4	Zygoptera	0		1	2	3	4	Ephemeroptera_	0	1	Ō	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	l	2	3	4	Trichoptera	0	1	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	\mathbf{C}	D	2	3	4	Other	0	1	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	Ī	L.	2	3	4					-	·
Oligochaeta	0	1	2	3	4	Sialidae	0	j	i i	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	0	D	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	Ć	D.	2	3	4						
Decapoda.	0	0	2	3	4	Empididae	0]	í	2	3	4						
Gastropoda	0	1	2	3	4	Simuliidae	0	j	l	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0]	l	2	3	4						
						Culcidae	0			2	3	4						

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRO At contluing with streamy	DNT)
At confluence with streamy	

STREAM NAME Stream	LOCATION Mitchell Landfill, Cresat, Marshall County, WV				
STATION # RIVERMILE	STREAM CLASS Intermittent				
LAT 39°49'30,21"N, LONG 80 94632.40"W	river basin Ohio River				
STORET #	AGENCY				
INVESTIGATORS D. Godec, G. Gert	£				
FORM COMPLETED BY D. Godec	TIME 7:00 AM (M) AEP Mitchell Landfill Project				

ļ		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 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 5	20-19-18-17 16	(15)14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
۲ ۲ همر . ۲۰	sampling reach	2, Enıbeddedness	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.
	edin	SCORE 13	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0
		3. Velocity/Depth Regime	All four velocity/depth regimes present (slow- deep, slow-shallow, fast- deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast- shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
	173E	score C	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. ¹	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	<u>10 9 8 7</u> 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 9	20 19 18 17 16	<u>15 14 13 12 11</u>	10 3 8 7 6	5 4 3 2 1 0

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

-			Condition		
	Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
	6. Cbannel 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 20	20 <u>-19-18-17-16</u>	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3 2 1 0
vling 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 1 <u>6</u>	15 14 13 12 11	<u>10 9 8 7</u> 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.
to be eva	score <u>9</u> (lb) score <u>9</u> (rb)	Left Bank 10 ③ Right Bank 10 ④	8 7 6 8 7 6	5 4 3	1 0 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 $\frac{1}{2}$ (LB) SCORE $\frac{1}{2}$ (RB)	Left Bank 10 9	8 (7) 6 8 (7) 6	5 4 3 5 4 3	2 1 0 2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Right Bank 10 29 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 () (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	SCORE (D (RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Total Score 146

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PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET

At Confluen	e with Stro.	ran 4
STREAM NAME Str	2gml	LOCATION Mitchell Landfill, Cresap, Marshall Co., WV
STATION # R	VERMILE	STREAM CLASS Intermittent
LAT39"49'30,21"N LO	DNG 80 46 32.40" W	RIVER BASIN ONIO RIVEY
STORET #		AGENCY
INVESTIGATORS D.	GODEC; G.C	Gerke
FORM COMPLETED BY	GODEZ	TIME TOO AM CON AEP Mitchell Landfill Project
WEATHER CONDITIONS	□ rain (□ showers %□, %cl	Past 24 hours Air Temperature 25 °C cloud cover% Other
SITE LOCATION/MAP	Draw a map of the sit	ite and indicate the areas sampled (or attach a photograph)
	See pl Jurisd	photographs and figure 5 of the lictional Waters delineation report
STREAM CHARACTERIZATION	Stream Subsystem Perennial Vinte Stream Origin Glacial Servon-glacial montane Swamp and bog	atermittent
L		

PHYSICAL CI	HARACTERIZATION/WATER QUALITY FIELD DATA SHEET
Stream la	- confluence with Stream 4 (cont.)
WATERSHED FEATURES	Predominant Surrounding Landuse Local Watershed NPS Pollution Commercial No evidence Field/Pasture Industrial Agricultural Other Residential Local Watershed NPS Pollution Moderate Some potential sources Agricultural Other Residential Moderate
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present A Herbaceous dominant species present Sugar naple, busswood, witch huzel, christmasforn, In patients pallida, Clauwood white ash
INSTREAM FEATURES	Estimated Reach Length 0.10 m 100H Canopy Cover Dearly shaded A Shaded
	Sampling Reach Area 90.29 m ² 10f/x100fl, High Water Mark 5.05 m $[0 \neq 0, 0^{-0}0]$. Area in km ² (m ² x1000), $0 \approx 929$ km ² r/ffles Represented by Stream Morphology Types Estimated Stream Depth $0-0.5$ m $0-2i_{0}c_{0}$ 0 Pool $20.\%$
	Surface Velocity O. m/sec 6-19 incl. Channelized TYes ANo
	(at thalweg) Dam Present 🗆 Yes 🖉 (No
LARGE WOODY DEBRIS	LWD 21, 528, 5 m ² /km ² (LWD/ reach area)
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present Constructed emergent Construction Construction Construction Construction Construction Construction Construction Construction Construction Constr
	dominant species present
	Portion of the reach with aquatic vegetation%
WATER QUALITY	Temperature 8.4 °C Water Odors Specific Conductance 336 mS/c.m Petroleum Chemical Dissolved Oxygen 7.05 mg/L Fishy Other
	pH_7,15 Slick Sheen Globs Flecks
	Turbidity 12,1 Turbidity (if not measured) WQ Instrument Used Horiba U-52 Turbidity (if not measured) Clear Slightly turbid Opaque Stained
SEDIMENT/ SUBSTRATE	Odors Deposits NOAL MOrmal Sewage Petroleum Sludge Sand Chemical Anaerobic None Relict shells Other
	Oils Absent Slight Moderate Profuse Yes ANO
INORGANIC SUBS (should a	STRATE COMPONENTS ORGANIC SUBSTRATE COMPONENTS dd up to 100%) (does not necessarily add up to 100%)
Substrate Diamet	er % Composition in Substrate Characteristic % Composition in

---- --

	(should add up to	100%)	(does not necessarily add up to 100%)					
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area			
Bedrock		36%	Detritus sticks, wood, coarse plant					
Boulder	> 256 mm (10")	20%	1	materials (CPOM)				
Cobble	64-256 mm (2.5"-10")	30%	Muck-Mud	black, very fine organic				
Gravel	2-64 mm (0.1"-2.5")	15%		(FPOM)				
Sand	0.06-2mm (gritty)		Marl	grey, shell fragments				
Silt	0.004-0.06 mm]					
Clay	< 0.004 mm (slick)							

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	on W/Stream 4		_					
STREAM NAME S	freanl	LOCATION MilchellLan	Cill Crasal, Marshall Co., WV					
STATION #	RIVERMILE	STREAM CLASS Interni	itter #					
LAT 39049'30.21"	. LONG 80 46 32,40 W							
STORET #		AGENCY						
INVESTIGATORS	D. Godec G.	Gerke	LOT NUMBER					
FORM COMPLETED). Godee	DATE <u>8/12/1</u> TIME <u>6:30</u> am 6	REASON FOR SURVEY AEP Mitchell Land All Project					
HABITAT TYPES	TTYPES Indicate the percentage of each habitat type present Cobble 50_% Snags% Vegetated Banks% Sand% Submerged Macrophytes% Cother(POOIS)%							
SAMPLE COLLECTION	How were the samples coll Indicate the number of jab	Gear used D-frame D kick-net MOther <u>Grad SampLos</u> How were the samples collected? A wading A from bank D from boat Indicate the number of tabs/kicks taken in each habitat type.						
GENERAL COMMENTS	N. DUSky Salaman		anks 🗆 Sand Pools/ RH4[45]					

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton		() 1	2	3	4	Slimes	0 1 2 3	4
Filamentous Algae	,	() 1	2	3	4	 Macroinvertebrates	0 1 2 3	4
Macrophytes		<u>_01</u>	2	3	4	 Fish	(0) 1 2 3	4

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3= Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	34
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	1	2 🤇	3) 4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	Œ	2	3	4	Trichoptera	0	đ	2 3	34
Turbellaria	0	1	2	3	4	Coleoptera	0	(Γ))2	3	4	Other	0	1	2	34
Hirudinea	0	1	2	3	4	Lepidoptera	0	$\widetilde{1}$	2	3	4					•
Oligochaeta	0	1	2	3	4	Sialidae	0	1	2	-3	4					
Isopoda	0	1	2	3	4	Corydalidae	0	Ĩ	2	3	4					
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4					
Decapoda	0	1	2	3	4	Empididae	-0	1	2	3	4					
Gastropoda	0	I	2	3	4	Simuliidae	0	1	2	3	4					
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4					
						Culcidae	0	1	2	3	4					

HABITAT ASSESSMENT FIELD DATA SHE	ET-HIGH GRADIENT STREAMS (FRONT)
At downstream and of project Area	

STREAM NAME STOCAM)	LOCATION Mitchell Landfill, Cresap, Marshall County WV
STATION # RIVERMILE	STREAM CLASS Internition
LAT 39° 49' 13,90" N LONG 20° 46'35,08" W	river basin Ohio River
STORET #	AGENCY
INVESTIGATORS D. Godec, G.G.	
FORM COMPLETED BY	DATE 8/13/11 REASON FOR SURVEY
D. Godee	TIME 12:30 AM EN AEP Mitchell Loundfill Project

	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 (6	20 19 18 17	15 14 13 12 11	10 9 <u>8 7 6</u>	<u>5</u> 4 <u>3</u> <u>2</u> <u>1</u> <u>0</u>
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 8	20 19 18 17 16	<u>15 14 13 12 11</u>	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).
Ĕ	SCORE	20 19 <u>18 17 16</u>	<u>15 14 13 12 11 </u>	10 9 8 7 6	5 4 3 2 11 0
Pa A	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 5	20 19 18 17 16	13 14 13 12 11	10 9 8 7 6	5 4 <u>3 2 1 0</u>
	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 riftle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE 8	20 <u>19 18 17 16</u>	<u>15 14 13 12 +11 </u>	10 9 8 7 6	5 4 3 2 1 0

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

			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 20	20 19 18 17 16		10 9 8 7 6	5 4 3 2 1 0
ling reach	7. Frequency of Riffes (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 6	20-19-18-17 (19	<u>15 14 13 12 11</u>	<u>10 9</u> 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 croded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
to be ev	$\frac{10}{\text{score}}$	Left Bank (10) 9 Right Bank 10 9	8 7 6 8 7 6	<u>5 4</u> 3 5 4 3	<u>2 1 0</u> 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 (LB)	Left Bank + 10 - 9 //	<u>8</u> 76	5 4 3	2 1 0
	score <u>7</u> (rb)	Right Bank 10 9	8 7 6	<u>4 4 3 3</u>	20
	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.
	$score \underline{O}(LB)$	Left Bank 10 9	8 7 6	d and a second sec	2 1 0
	SCORE 10 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 154

A-8

		RIZATION/WATER QUALITY FIELD DATA SHEET
Stream	at downstr	can end of (coject Area
STREAM NAME	Stream	LOCATION Mitchell Land fill, Cresap, Marshall Cunty, W
STATION #	RIVERMILE	STREAM CLASS Tallon Wile +

		SIKEAM CLASS INACLW/AASUA					
LAT 31"49"13,90"N LONG 10"	<u>1685.08"M</u> R	RIVER BASIN OWO RIVEN					
STORET #	A	GENCY					
INVESTIGATORS D. GODE	C, G Gor	Ke .					
FORM COMPLETED BY	dec P	ATE 8/12/11 IME 6:36	_ AM 100	REASON FOR SURVEY AEP Mitchell Landfill Project			
<u> </u>							
CONDITIONS	storm (he rain (stea showers (in clear/s	avy rain) dy rain) termittent) I cover		Has there been a beavy rain in the last 7 days? Ayes DNo Air Temperature 26 °C Other			
SITE LOCATION/MAP Draw:	t map of the site at	nd indicate the	areas sample	ed (or attach a photograph)			
		~	ictiona	nd figure 5 of the 11 Waters neation report			
Stream Glac ZeNon	Subsystem nnial Allnterm Origin ial glacial montane np and bog	ittent D Tidal D Spring-fed D Mixture of D Other		Stream Type Coldwaler D Warmwater Catchment Areakm ²			

.

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

Predominant Surrounding Landuse Protest Commercial Field/Pasture Industrial Agricultural Other Residential	Local Watershed NPS Pollution No evidence Some potential sources Obvious sources Local Watershed Erosion None Moderate Heavy	
Indicate the dominant type and record the domin A Trees dominant species present Sugar Muple, tulia	ant species present AHerbaceous J Grasses nopin, barrwood, spia bush, har pate, Clear we	ed, Chrolmasterr
Estimated Reach Length 30.5 m 100fd.	Canopy Cover Party open Partly shaded Shaded High Water Mark 3-3.7 m 10-12.64, Proportion of Reach Represented by Stream Morphology Types WRINE 15 % WRun 10 % Channelized PYes No	
LWD <u>10</u> m ² Density of LWD 979 <u>43.2</u> m ² /km ² (LWD/ reac		
dominant species present	·····	
Temperature <u>18.7 °C</u> Specifie Conductance <u>0.324</u> M5/cm Dissolved Oxygen <u>C, 31 mg</u> /L pH <u>7.35</u> Turbidity <u>26.8</u> WQ Instrument Used <u>Horiba</u> <u>V-52</u>	Water Odors Wormal/None Sewage Detroleum Chemical Petroleum Other Water Surface Oils Slick Slick Sheen Globs Vater Surface Oils Slick Slick Other Turbidity (if not measured) Clear Slightly turbid Opaque Stained	
Odors ANormal O Sewage O Petroleum Chemical O Anacrobic O None O Other	Deposits NOAL Deposits NOAL Studge Sawdust Paper fiber Sand Relict shells Other Looking at stones which are not deeply embedded, are the undersides black in color? Yes ANO	
	$ \begin{bmatrix} Agricultural \\ Besidential \end{bmatrix} $ $ \begin{bmatrix} D \text{ Other} \\ Besidential \end{bmatrix} $ $ \begin{bmatrix} \text{Indicate the dominant type and record the domin ant species present } \\ Shrubs \\ \text{dominant species present } \\ \hline Surface Reach Length \\ \hline Bottom \\ \hline Bottom \\ \hline Bestimated Stream Width \\ \hline Bestimated Stream Depth \\ \hline Dottom \\ \hline Density of LWD \\ \hline Point \\ \hline Density of LWD \\ \hline Point \\ \hline Pooled emergent \\ \hline Brooted emergent \\ \hline Brooted emergent \\ \hline Brooted emergent \\ \hline Brooted emergent \\ \hline Dottom \\ \hline Rooted submergent \\ \hline Dottom \\ \hline Dottom \\ \hline Temperature \\ \hline Normal \\ \hline Compare \\ \hline Dottom \\ $	

INC	ORGANIC SUBSTRATE (should add up to		ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)					
Substrate Type	Diameter % Composition in Substrate Characteristic Sampling Reach Type		% Composition in Sampling Area					
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	15.01			
Boulder	> 256 mm (10")	60 %		materials (CPOM)	5%			
Cobble	64-256 mm (2.5"-10")	25%	Muck-Mud	black, very fine organic	~ 5/			
Gravel	2-64 mm (0.1"-2.5")	15%	1	(FPOM)	0%			
Sand	0.06-2mm (gritty)		Marl	grey, shell fragments				
Silt	0.004-0.06 mm		1		O%			
Clay	< 0.004 mm (slick)		1		. 70			

At auwnstream end of Project Apreg							
STREAM NAME	tregm 1	LOCATION Mitch	LOCATION Mitchell Land fill, Cresap, Marshall Q., WV				
STATION #	RIVERMILE			mittent			
LAT 39049' 3.90"	V LONG D 46'35.08"W			River			
STORET #		AGENCY					
INVESTIGATORS	D. Godec, 6	Gerke .		LOT NUMBER			
FORM COMPLETEE) BY	DATE 8/13/11	AM (B)	REASON FOR SURVEY AEP Milebell LOAN Fill Project			
	r						
HABITAT TYPES	Indicate the percentage of Cobble 25_%	ags% □Ve % Å	getated Ba Other (anks% [] Sand% POO 5) 5%			
SAMPLE COLLECTION	How were the samples coll	lected? Awading	habitat ty	754			
GENERAL COMMENTS	N, Dusky Sale	amanders (ju	2 Veni le	s and larvae)			

At downstream end of Project Areg

QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	0 1 2	3	4	Slimes		23	4
Filamentous Algae	012	3	4	Macroinvertebrates	<u> </u>	23	4
Macrophytes	<u>0 1 2</u>	3	4	Fish		23	4

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3 = Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0		2	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other	0	1	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	1	2	3	4						-
Oligochaeta	0	1	2	3	4	Sialidae	0	1	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	1	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4						
Gastropoda	0	1	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4						
l						Culcidae	0	1.	2	3	4						

Ephimeral portion of Strogm	
STREAM NAME STIFAM	LOCATION Mitutel Landfill Cresup, Marshalla, WV
STATION # RIVERMILE	stream class Ephemeral
LAT 39º 49'4L.32"N LONG 00 46' 33.85' W	RIVER BASIN Ohio River
STORET #	AGENCY
INVESTIGATORS D. GODEC, G.	Gerke
FORM COMPLETED BY D. Godec	TIME 2145 AM CO AFP Mitchellandfill Project

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

			Condition	Category	
	Habitat 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 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	<u>-5 4 3 2 1 0</u>
t 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.
ed ii	SCORE	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	3. Velocity/Depth 3. Velocity/Depth		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).
rame	score U	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 42 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 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 rifile substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE U	20 19 18 17 16	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3 2 1 (0)

NOFLOW

noflow

pools

 \sum

...)

Rapid Bioassessment Protocols For Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Edition - Form 2

A-7

Stream 1-epheneral purtion (cont.)

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

	Habitat		Conditio	n 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 9	20 3718 17 16	15 14 13 12 11	10 9 8. 7 6	5.4 3 2.1 0
oling reach	7. Frequency of Riffes (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.
d and a	SCORE Z	20 19 18 17 16	1 <u>5 14</u> 13 <u>12</u> 11	10 9 8 7 6	5 4 3 0 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.
s to be ($\frac{\text{score}}{\text{score}} \frac{7}{(\text{LB})}$	Left Bank 10 9 Right Bank 10 9	8 7 6 8 7 6	5 4 3 5 4 3	$\frac{2}{2} \frac{1}{1} \frac{1}{0}$
Parameters to	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	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.
	$\frac{1}{\text{score}} \frac{1}{2} \text{(LB)}$	to grow naturally. Left Bank 10 97 Right Bank 10 9	8 7 6	5 4 3	2 1 = 0 $2 1 = 0$
	10. Riparlan Vegetative Zone Width (score each bank riparlan 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	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
	$\frac{9}{6}$ (LB)	Left Bank [10')	8 2 6	3 4 3	2
l	SCORE (RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0

Total Score 16

A-8 Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 2

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

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STREAM NAME STREAM 1A	LOCATION Mitchell Landfill, Cresan Marshall County, W
STATION # RIVERMILE	STREAM CLASS Ephemeral
LAT 39049143.57"N LONG 8046 32,77" W	RIVER BASIN OGIO RIVER
STORET #	AGENCY
INVESTIGATORS D, Good C, G. Ger	ke
FORM COMPLETED BY D. Godec	TIME 1:00 AM (M) REASON FOR SURVEY

	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	20 19 18 17 16.	15 14 13 12 11	<u>10</u> 9 8 <u>7 6</u>	5 4 3 2 1 0			
u sampling reach	2. Embeddedness	Gravel, cobble, and boulder particles are 0- 25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	er particles are 0- surrounded by fine ent. Layering of e provides diversity he space. boulder particles are 25- softwarrounded by fine sediment. boulder particles are 50- than 75% surrounded by fine sediment. boulder particles are 50- than 75% surrounded by fine sediment.		articles are 25- bounded by fine sediment. boulder particles are 50- than 75% surrounded by fine sediment.		50- boulder particles are more fine than 75% surrounded by fine sediment.	
ted i	score 17	20 19 18 12 16	15 14 13 12 11	10 9 8 <u>, 7 6</u>	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).	no flow		
12B	score ()	20 19 18 17 16	15 414 13 12 11	10 9 <u>8 7 6</u>	5 4 3 2 1 🔘			
P3	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.			
1	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.	no Flow orpools		
	score ()	<u>20 19 18 17 16</u>	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1			

Rapid Bioassessment Protocols For Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Edition - Form 2

Stream IA (cont.)

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

	Tables		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 20	20 19 18 17 16	<u>15 14 13 12 11 </u>	10 9 8 7 6	5 4 3 2 1 2 0
oling reach	7. Frequency of RiMes (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 riflles 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 Z	<u>20 19 18 17 16</u>	15 14 13 12 11	10	5 4 3 2 1.0
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score cach 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.
o be ev:	SCORE 8 (LB) SCORE 8 (RB)	Left Bank 10 9 Right Bank 10 9	<u> </u>	<u>5</u> <u>4</u> <u>3</u> <u>5</u> <u>4</u> <u>3</u>	$\begin{array}{c c} 2 & -1 & 0 \\ \hline 2 & 1 & 0 \end{array}$
Parameters to	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 moving 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	
	$score \underline{2}(RB)$	Right Bank-10 9	8 7 6	5 4 3	
	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 <u>10</u> (lb) score <u>10</u> (rb)	Left Bank 10 9 Right Bank 10 9	8 7 6	5 4 3 5 4 3	2 J 0 4 2 1 0
		TORUT HAUK (STATE) SERVAT	<u>errogram</u> e/initio de	<u>- 1993年1月にに</u> 入りがは	

Total Score 103

STREAM NAME STARGM 1B	LOCATION Mitchell Landfill, Crerge, Marshall Co., WV
STATION # RIVERMILE	STREAM CLASS Ephemera
LAT 31 49' 42.45" N LONG 80 46'34.21" N	RIVER BASIN O'L'O RIVER
STORET #	AGENCY
INVESTIGATORS D. GUNGO, G.	Gerke,
FORM COMPLETED BY	DATE 8/12/11 TIME 1:30 AM PM REASON FOR SURVEY AEP Milchell Landfill Project

HABITAT ASSESSMENT FIELD DATA SHEET-	HIGH GRADIENT STREAMS (FRONT)
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	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	20 19 18 17 16	15 14 13 12 11	<u>10 9 8</u> 7 6	5 4 3 2 0 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 i	SCORE	20 <u>19</u> 18 <u>17</u> 16	15 14 13 12 11	<u>10</u> 9 8 7 6	543210	
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).	r
12 12 12	SCORE U	20 19 18 17 16	<u>15 14 13 12 11 6</u>	10-9-8 7 6	5 4 3 2 1	
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 S	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.	, r
	score 🛆	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	

no flou

no flow

Stream 1B (cont.)

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

		·	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 9	20 19 18 17 16		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.
dmes	SCORE	20 <u>19 18 17</u> 16	15 14 13 12 11	10 9 8 7 6	5 4 <u>3 2 (1) 0</u>
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score cach bank) Note: determine left or right side by facing downstream. SCORE 3 (LB)	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.
to be ($\frac{SCORE \underline{3}(LB)}{SCORE \underline{3}(RB)}$	Left Bank109Right Bank109	8 7 6 8 7 6	$\frac{3}{5} 4 \bigcirc \\ 3 \boxed{3}$	$\frac{1}{1} = \frac{2}{1} = \frac{1}{1} = 0$
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 <u>(lb)</u> score (rb)	Left Bank 10 (9)	8 7 6	5 4 3	2 <u>1</u> 0 2 <u>1</u> 0
	SCORE(RB) 10. Riparian Vegetative Zone Width (score each bank riparian zone)	Right Bank 10 (9) Width of riparian zone >18 meters; human activities (i.e., parking Iots, roadbeds, clear-cuts, Iawns, or crops) have not impacted zone.	8 7 6 Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	5 4 3 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 (0) 9	8 7 6	The straight the start and the	2 1 0
I	SCORE 10 (RB)	Right Bank 10	8 7 6	-5 - 4 - 3	2 1 0

Total Score <u>5</u>

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

STREAM NAME STREAM IC	LOCATION Mitchell Landfill, Cresap, Manshall Co., WV
STATION # RIVERMILE	STREAM CLASS Ephemoral
LAT 39° 49' 42.75"N LONG 10' 46' 34.91" W	RIVER BASIN ON OR RIVER
STORET #	AGENCY
INVESTIGATORS D. Godeu, B.	sorke
FORM COMPLETED BY D. Goden	TIME 2115 AM (PM) AEP Mitchell Land Fill Project
1.000E0	MET MITCHAIL AWATTIN TTO JEDT

	TT-LALA		Condition	Category		
	Habitat 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 5	20, 19 <u>18 17 16</u>	15 14 13 12 11	10 9 8 7 6	<u>3</u> 43210	
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.	· .
ed i	SCORE 6	20 19 18 17 16	<u>15 14 13 12 11</u>	10 9 8 7 🙆	5 4 3 2 1 0	
ers to be evaluate	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).	Noflow
, a	$_{\text{score}} O$	20 19 18 17 16	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3 2 1 🞯	
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 '	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.	No flou or pools
	SCORE	20 19 18 17 16	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3 2 1 💽	

Noflow

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Stream IC (cont.)

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

	TT.14.4	<u> </u>	Condition	Category	
	Habitat Parameter	Optimal	Suboptimal	Marginal	Роог
	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)	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3 2 1 0
g 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	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 croded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
e ev:	SCORE (LB)	Left Bank 10 9	8 7 6 /2	<u>54</u> 3	2 ① 0
stot	SCORE (RB)	Right Bank 10	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 (LB)	Left Bank 10 2		1-17-11 - 12-23 - 12-23	2 2 4 5 5 5 5 5 5 5 5 5 5 5 5 5
	SCORE (RB)	Right Bank 10	(8) 7 6	2015 (11.4) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.7) (11.	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.
	$score \frac{ 0 }{ B }$	Left Bank 10 9	8 7 6	5 4 3	2
	SCORE 10 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 73

A-8

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

STREAM NAME STREAM D	LOCATION Mitchell Landfill, Crossap, Marshall Ca, WV
STATION # RIVERMILE	STREAM CLASS E phemeral
LAT 39049'45.49" N LONG 80946 35.66"W	RIVER BASIN OHIO RIVER
STORET #	AGENCY
INVESTIGATORS D. GODEL, G.	Gerkg.
FORM COMPLETED BY D. Godeu	DATE 8/12/11 TIME 2:30 AM FOR A EP Milch / Indfill Project

	Habitat		Condition	n Category		1
	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).	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 🛞 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.	
tedi	SCORE	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).	ne Flow
aram	SCORE U	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6.	5 4 3 2 1	1.00
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	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 rifile substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.	no flou pools
	score U	20 19 18 <u>17 16</u>	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	•

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

		··· -		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 9	20 19 18 17 16	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3 2 1 0
ig 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	20 19 18 17 16	<u>15 14 13 12 11</u>	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. SCORE <u>4</u> (LB)	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.
ers to	SCORE <u>8</u> (RB)	Right Bank 10 9	3 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 $\frac{q}{Q}$ (LB)	Left Bank , 10 9	8 7	5 4 3	2 0
	SCORE ((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.
l	SCORE 10 (LB)	Left Bank 10 9	8 7 6	5 4 3	2
	SCORE 10 (RB)	Right Bank 0 9.	8 7 6	5 4 3	12 1 0

Total Score 102

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

STREAM NAME Stream 2	LOCATION Mitchell Landfill, Gresgp, Marshall Co., WV		
STATION # RIVERMILE	STREAM CLASS Intermittent		
LAT 39°49'37,3"N LONG 0°41'32,31"W	RIVER BASIN OH'O RIVER		
STORET #	AGENCY		
INVESTIGATORS D. GODEC, G.G.	er ke		
FORM COMPLETED BY D. Godec	TIME 9:00 AM PM REASON FOR SURVEY AEPM, to hall Landfill Project		

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	Habitat		Condition	1 Category	
	Parameter	<u>Opt</u> imal	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 VG	20. 19 18 17 16	<u>15 14</u> 13 12 11	10 9 8 7 6	5 4 3 2 1 0
u 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 i	score 15	20 19 <u>18 1</u> 7 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).
агап	SCORE 7	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 (4) 3 2 1 0
Å	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	20 19 18 17 16	<u>15 14 13 12 (11)</u>	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 O	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0

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Stream 2 (cont.)

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

			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 20	20 19 18 17 16	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3 2 1 0
bling 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 5	20 19 18 1 <u>7 16</u>	<u>15 14 13 12 11</u>	<u>-10</u> 9 8 7 6	
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 S (LB)	Left Bank 10 9	8 7 6	5 and 4 and 5	2 1 0
s to b	SCORE <u>(RB</u>)	Right Bank/10	8 7 6	5 4 3	2 1 0
Parameters to	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 (LB)	Left Bank 10 9	<u>8</u> 76	5 4 3	2 1 Ö
	SCORE ((RB)	Right Bank 10	8 7 6	eren same er er sin stationer af er sin stationer af er sin se stationer af er sin se stationer af er sin se s Refer se stationer af er sin se stationer a	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 (LB)	Left Bank (10)9	8 7 6	5 4 3	2 0 1
	SCORE O (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 30

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PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

	STREAM NAME SING	Am 2	LOCATIONAEP MITCHELL LANDFILL, MARSHAUCO.NV			
		IVERMILE	STREAM CLASS INTERMITTENT			
NT CANELVENCE	LAT 39' 49' 3823"/VLC	ong <u>80°46′28.51″</u> W	RIVER BASIN ORIORIVED			
AT CONFLUENCE OF STREET 2.a	STORET #	_	AGENCY CEC			
AND GTREAM 26	INVESTIGATORS 6, 6	GEALE, D. GO	>DEC			
ANYGILEIN	FORM COMPLETED BY G1 GERKE/). Godec	DATE 8/11/11 TIME 6140 AM BO REASON FOR SURVEY MITCHELL LANDFILL PROJECT			
	WEATHER CONDITIONS	Now storm	Past 24 Has there been a heavy rain in the last 7 days? hours 24 Yes 2 No h(heavy rain) 2 there is 70 a g			
		□ rain (□ showers □ %□ %cl	(heavy rain) (steady rain) s (intermittent) houd cover ear/sunny Gamma Air Temperature 70°C C Other			
	SITE LOCATION/MAP	Draw a map of the site	te and indicate the areas sampled (or attach a photograph)			
		GEE PH	CTIONAL WATERS REPORT			
		JURISDI	CTIONAL WATERS REPORT			
			• • • • • • • • • • • • • • • • • • •			
	STREAM	Stream Subsystem	Stream Type			
	CHARACTERIZATION	Derennial AInter Stream Origin Glacial Non-glacial montane Swamp and bog	ermittent 🗅 Tidal Stream Type Q Coldwater Warmwater Catchment Areakm ² Mixture of origins Q Other_ <u>KUN0FF</u>			

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PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET

Stream 2	(BACK)	- 	
WATERSHED FEATURES	Predominant Surrounding Landuse Forest Commercial Field/Pasture Industrial Agricultural Other Residential	Local Watershed NPS Pollution CarNo evidence Some potential sources Obvious sources Local Watershed Erosion De None Moderate Heavy	
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the domin U Trees dominant species present AUSIN GOURDUN	Herbaceous Chasses DHerbaceous LIRIODENDERV, FRAX AMER, FAGU.	Q. PUBRA , LAPORTEA
INSTREAM FEATURES	Estimated Reach Length $\frac{36.5}{1000}$ m Estimated Stream Width $\frac{16.5}{1000}$ m Sampling Reach Area 45.75 m ² Area in km ² (m ² x1000) , 0000 4595 km ² Estimated Stream Depth $0 - 0.05$ m Surface Velocity $(2-1)$ m/sec (at thalweg)	Canopy Cover Partiy open D Partly shaded D Shaded High Water Mark 1.271.9m Proportion of Reach Represented by Stream Morphology Types Riffle 30 Run % Dool % Channelized D Yes A No Dam Present D Yes A No	1MPATIONS LINDERA
LARGE WOODY DEBRIS	LWD <u>5</u> m ² Deusity of LWD 109290 m ² /km ² (LWD/ read	ch area)	·
AQUATIC VEGETATION	Indicate the dominant type and record the domin A Rooted emergent Floating Algae dominant species present Portion of the reach with aquatic vegetation	ant species present Cooled floating	
WATER QUALITY	Temperature <u>19.13</u> °C Specific Conductance <u>333</u> ORF mV Dissolved Oxygen <u>6.68</u> Mg/L pH <u>6.94</u> Turbidity <u>0.370</u> mS/Cm WQ Instrument Used <u>HOR BA-U-52</u>	Water Odors Water Odors Petroleum Chemical Pishy Other Water Surface Oils Slick Slick Sheen Globs Vater Surface Oils Slick Slick Sheen Globs Vater Surface Oils Slick Slick Sheen Clobs Flecks Vater Surface Oils Slick Slick Sheen Clear Slightly turbid Opaque Stained	
SEDIMENT/ SUBSTRATE	Odors Mormal Sewage Petroleum Chemical Anaerobic None Other Oils Moderate Profuse	Deposits Sludge Sawdust Paper fiber Sand Relict shells Other Looking at stones which are not deeply embedded, are the undersides black in color? Yes No	
			\sim

INC	ORGANIC SUBSTRATE (should add up to	COMPONENTS 100%)	ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)				
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling A rea		
Bedrock		5	Detritus	sticks, wood, coarse plant materials (CPOM)			
Boulder	> 256 mm (10")	30	1	materials (CPOM)	10%		
Cobble	64-256 mm (2.5"-10")	30	Muck-Mud	black, very fine organic			
Gravel	2-64 mm (0.1"-2.5")	10		(FPOM)			
Sand	0.06-2mm (gritty)	10	Marl	grey, shell fragments			
Silt	0.004-0.06 mm	5	1	,	ر ے		
Clay	< 0.004 mm (slick)	-	1				

A-6 Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 1

	STREAM NAME 5	TREAM 2	LOCATION AEP MITC	HELL LANDFILL, CRESAP, MALSHAL	CO, WV			
	STATION #	_ RIVERMILE		MIRBY				
	LAT 3994937.36	NLONG 00 46 32.37 W	RIVER BASIN ()/~/0	River	DOWNSTREAM			
(STORET #		AGENCY		FROM WNFLUEIRE			
0 1	INVESTIGATORS	GREG GERKE, DA	N GODEC	LOT NUMBER	OF STREAM ZA			
Ulstream END	FORM COMPLETED		DATE <u>8/11/11</u>	REASON FOR SURVEY	AND SIRFAM 2			
OF REACH AT	D. GODEC,	G. GERFE	TIME (2) AM (PM)	ARP MITCHELL LANDFILL PROJECT				
CONFLUENCE	· · · · ·	·						
)f STAFAM Za	HABITAT TYPES	Indicate the percentage of	each habitat type present ags <u>10_</u> % □ Vegetated Ba	anks 10 % 🗆 Sand %				
& SIRGAM 25		Submerged Macrophytes		·)%				
1 microrited	SAMPLE	Gear used D-frame	kick-net Other	SRAB SAMPLE, Aquaniumnet				
	COLLECTION	How were the samples coll	ected? Wading	om bank 📮 from boat				
	:		/ //					
		Cobble <u>15</u>	s/kicks taken in each habitat ty ags_10□ Vegetated Ba					
		Submerged Macrophytes_	Other ()				
	GENERAL COMMENTS	NOT MUCH FI	ow to take	SAMPLES FROM				
					5- 1-			

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	0/1234	Slimes	1 2 3 4
Filamentous Algae	0 1 2 3 4	Macroinvertebrates	ŭ 1 2 (3) 4
Macrophytes	<u>(0) 1 2 3 4</u>	Fish	(0) 1 2 3 4

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3= Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	(0)	1	2	3	4	Anisoptera	<u>~</u> 071	2	3	4	Chironomidae	() 1	2	3	4
Hydrozoa	(\mathfrak{d})	1	2	3	4	Zygoptera	(Ô) 1	2	3	4	Ephemeroptera	0 1	2	3 (4]
Platyhelminthes	6)	1	2	3	4	Hemiptera	(0) 1	2	3	4	Trichoptera	(0≥1	2	3	4
Turbellaria	ď	1	2	3	4	Coleoptera	<u>(</u> 0) 1	2	3	4	Other	<u>(0)</u> 1	2	3	4
Hirudinea	Ò	1	2	3	4	Lepidoptera	() 1	2	3	4					
Oligochaeta	(0)	1	2	3	4	Sialidae	1 🔘	2	3	4					
Isopoda	(0)	I	2	3	4	Corydalidae	0 1	2	3	4					
Amphipoda	$\overline{\mathbb{O}}$	1	2	3	4	Tipulidae	<u>()</u> 1	2	3	4					
Decapoda	0	1	2	3	4	Empididae	<u>@</u> 1	2	3	4					
Gastropoda	0	1	2	3	4	Simuliidae	(0) 1	2	3	4					1
Bivalvia	\bigcirc	1	2	3	4	Tabinidae	() 1	2	3	4					
						Culcidae	$(0)_1$	2	3	_ 4					

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

STREAM NAME Stream 2A (ept. pur dia)	LOCATION Millohell Landfill, Cresan, Marshall Co., WV
STATION # RIVERMILE	STREAM CLASS POhemara
LAT 39 49 41.48 N LONG 16 75,54 W	
STORET #	AGENCY
INVESTIGATORS D, GODOC, G. G	erke
FORM COMPLETED BY D, Godec	DATE AM PM REASON FOR SURVEY

	Habitat		Condition	Category	
	Parameter	Optimal		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 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 4	20, 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 (4) 3 2 1 0
a 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 ir	SCORE	20 19 18 17 16	15 14 13 12 (1)	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).
BEI	score O	20 19 18 17 16	15 <u>14 13 12 11</u>	10 9 8 7 6	5 4 3 2 1 🔘
ŭ	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} 8	20 19 18 17 16	15 14 13 12 11	10-9-876	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	20 19 18 17 16	15 14 <u>13 12 11</u>	10 9 8 7 6	5 4 3 2 (2) 0

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no flow

Stream 2A - ephemoral portion (cont.)

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

			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 20	20 19 18 17 16	<u>15 14 13 12 11</u>	1 <u>0 9 8</u> 7 <u>6</u>	5 4 3 2 1 0
ling reach	7. Frequency of Rlffles (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.
Sашр	score Ø	20 19 18 17 16	15 <u>14 13</u> 12 11	10 9 8 7 6	<u>5 4 3 2 1 0</u>
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.
to be e	SCORE 6 (LB) SCORE 6 (RB)	Left Bank 10 9 Right Bank 10 9	8 7 G	5 3 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 <u>5</u> (LB)	Left Bank 10 9	8 7 6	$\frac{3}{(5)}$ $\frac{4}{4}$ $\frac{3}{3}$	2 1 0 2 1 0
	SCORE 5 (RB)	Right Bank 10 9	8 7 6		
	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 (0 (LB))	Left Bank (10) 9	8 7 6	3	2 1 0
	SCORE 10 (RB)	Right Bank (10) 9	8 7 6	4 3	2 1 0

Total Score _____2

A-8

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

STREAM NAME Stream 2A	LOCATION AEP Milehell Londfill, Cresap, Manshall Co., WV
STATION # RIVERMILE	stream class Infermitiont
LAT 39º 49'39.73"NLONG 80 46'27.49"W	RIVER BASIN OHIO RIVER
STORET #	AGENCY
INVESTIGATORS D. GOORC, G. Gerke	
FORM COMPLETED BY	DATE 8/11/11 TIME 3:00 AM () AFP Miloful Landfill Project

	TT 1 1 1		Condition	Category	
	Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
	1. Epifauoal 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 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 3	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.
edii	SCORE	20-19-18 17 16	15 14 13 12 🛈	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). 5 low -5ha/low
Lan	SCORE U	20 19 18 17 16	15 14 13 12 11	<u> 10 9 8 7 6 </u>	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 🖒	20 19 18 17 16	<u>-15</u> 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 niffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	score	20 <u>19</u> 18 <u>17</u> 16	15 14 13 12 11	<u>10, 9, 8, 7, 6</u>	<u>(5) 4</u> 3 <u>2 1 0</u>

Rapid Bioassessment Protocols For Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Edition - Form 2

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

τ			Condition	Category		
	Habitat	Outlinel	Suboptimal	Marginal	Poor	
	Alteration	Optimal 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	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 20	20 19 18 17 16	present.	10 9 8 7 7	<u>5 4 3 2 1 0</u>	
	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	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 o shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.	
	SCORE 3	obstruction is important. 20 19 18 17 16	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3 2 1	
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank) Note: determine left or right side by	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.	
лика эд	facing downstream. SCORE $\underline{\int}$ (LB)	Left Bank 10 9 Right Bank 10 9	1		2 1 0 2 1 0	
Parameters to be	SCORB (RB) 9. Vegetative Protection (score each bank)	Right Bank 10 - 22 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 allowe 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 potenti to any great extent; more than one-half of the potential plant stubble height remaining.	patches of bare soli of closely cropped vegetati common; less than one- al half of the potential plan e stubble height remaining	removed to s centimeters or less ir average stubble height	
	$\frac{1}{\text{SCORE}} \frac{2}{2} \text{ (LB)}$	Left Bank 10. 9. Right Bank 10. 9.	and the second s	<u>5</u> <u>4</u> <u>3</u> <u>5</u> <u>4</u> 3		
	10. Riparian Vegetative Zone Width (score each bank riparian zone	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cu lawns, or crops) have n	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	zone a great deal.	d riparian vegetation de human activities.	
	SCORE (LB)	impacted zone.	2 8 7 6	3 34 2 3		
	SCORE (B)	and the second sec	9 8 7 6	3 5 2 4 3	22章有拿	

Total Score 82

11

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME Stream 2A	LOCATION AEP Mitchell Landfill, Cresup, Marshyll Co., WV
STATION # RIVERMILE	STREAM CLASS Internitient
LAT 39 49 39,73'N LONG 8 46'27	149" RIVER BASIN OL TO RIVEY
STORET #	AGENCY
INVESTIGATORS D. Goder, G. G	yer Kl
FORM COMPLETED BY	DATE S/11/11 TIME 300 AM (R) A EP mitchell Lund fill Poject
WEATHER Now CONDITIONS	Past 24 Has there been a heavy rain in the last 7 days? hours Al Yes? DNo
	storm (heavy rain) rain (steady rain) Air Temperature 25,6 °C
25 %	showers (intermittent) %cloud cover
<u> </u>	clear/sunny '
SITE LOCATION/MAP Draw a map See ph Dellas	of the site and indicate the areas sampled (or attach a photograph) hotographs and Floure 5 of Jurisdictronal Worters eation Report
STREAM CHARACTERIZATION Glacial Stream Orig Glacial Swamp and	gin Catchment Area km ²

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

Stre	an 2A						_	
WATERSHED FEATURES		Predominant Surrounding Landuse A Forest			Local Watershed NPS) DYNo evidence G Some Obvious sources	Pollution e potential sources		
		C Resid	ential		Local Watershed Erost	011 Heavy		
RIPARIAI VEGETAT (18 meter	N FION buffer)	Indicate A Trees domina	Indicate the dominant type and record the dominant species present A Trees dominant species present <u>Hulip Aplan, 5pi'a bush</u> , white ash, red mple, chaster a Estimated Beach Length 62 m Canony Cover a					
INSTREA FEATURE		Estimated Reach Length 62 mCanopy Cover Partly openPartly shadedShadedEstimated Stream Width1 mmPartly openPartly shadedShadedSampling Reach Area 62 m²mHigh Water Mark_ mArea in km² (m²x1000) 06062 km²Proportion of Reach Represented by Stream Morphology Types M Rifle $760 - 5\%$ Estimated Stream Depth 0.05 m (1/a.) $900 - 10\%$ Surface Velocity 0.05 m/secChannelizedYes(at thalweg)Dam PresentYesNo			Clearwe			
LARGE W DEBRIS	VOODY	LWDm ² Density of LWD / 6/29_m ² /km ² (LWD/ reach area)						
AQUATIC VEGETAT		Indicate the dominant type and record the dominant species present ArRooted emergent Rooted submergent Rooted floating Free floating Floating Algae Altached Algae dominant species present Inport i Pas correngis lo 4 gonum of. Portion of the reach with aquatic vegetation 5%						
WATER (QUALITY	Temperature <u>19,5</u> °C Specific Conductance 0.45ms/cm Dissolved Oxygen 5.55mg/L pH 6.92			Water Odors Mormal/None Q Sewa Petroleum Fishy Water Surface Oils	rge Chemical Other I Globs D Flecks		
· · · ·		Turbidi WQ Ins	ity <u>0.0</u> itrument Used <u>Hon'ba</u>	U-52	Turbidity (if not measu Clear Standard Slightly tu Opaque Stained	rred) rbid		
SEDIMENT/ SUBSTRATE			Petroleum None		□ Paper fiber □ Sand Other <u>Sil</u> }			
Oils Absent 🗅 Slight 🖵 Moderat				te 🗆 Profus	are the undersides blac	h are not deeply embedded, k in color?		
INC	ORGANIC SUB (should a	STRATE dd up to 1	COMPONENTS		ORGANIC SUBSTRATE C (does not necessarily add]	
Substrate Type	i		% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition In Sampling Area	1	
_	· ·			1	· · · · · · · · · · · · · · · · · · ·		-1	

	(should add up to 1	00%)	(does not necessarily add up to 100%)			
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition In Sampling Area	
Bedrock			Detritus	sticks, wood, coarse plant	70/	
Boulder	> 256 mm (10") 🛛 🔍	1%	materials (CPOM)		1%	
Cobble	64-256 mm (2.5"-10")	9%	Muck-Mud	black, very fine organic (FPOM)	$\sim 0/$	
Gravel	2-64 mm (0.1"-2.5")	10%		(FFOM)	0/0	
Sand	0.06-2mm (gritty)	·	Marl	grey, shell fragments	A A (
Silt	0.004-0.06 mm	30%]		0%	
Clay	< 0.004 mm (slick)	50%				

Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 1

Å-6

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BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME	freqm 2A	LOCATION A EP MIKA	ell Land fill, Gresap, Marshall Cor, W		
STATION #			imit tent		
LAT 39049139.73	5'NLONG 80 46'2749"		RIVER		
STORET #		AGENCY			
INVESTIGATORS	D. Godec, G. C	berke	LOT NUMBER		
FORM COMPLETER D. Godoc,) BY	DATE 3 /11/11 TIME 1100 AM FM	REASON FOR SURVEY AEPM, Ychell Landfill Project		
HABITAT TYPES	BITAT TYPES Indicate the percentage of each habitat type present AT Cobble 9 % ASnags < 5 % □ Vegetated Banks 25 % □ Sand ○ % Submerged Macrophytes 10 % □ Other () %				
SAMPLE COLLECTION	Gear used D-frame kick-net Cother Cother How were the samples collected? A wading A from bank I from boat Indicate the number of jabs/kicks taken in each habitat type. Cobble 20 I Snags 5 I Vegetated Banks Submerged Macrophytes I Other				
GENERAL COMMENTS NOT MUCH STANDING OR FLOWING WATER TO SAMA FROM, SAMPLING WAS LIMITED TO A HANDFUL OF SHALLOW PODLS.					

QUALITATIVE LISTING OF AQUATIC BIOTA

٠,

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	1 2 3 4	Slimes	@ 1 2 3 4
Filamentous Algae	$\bigcirc 1 \ 2 \ 3 \ 4$	Macroinvertebrates	$0 \bigcirc 2 3 4$
Macrophytes	(0)1 2 3 4	Fish	$\bigcirc 1 2 3 4$

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3 = Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	Q1	2	3	4	Anisoptera	(0) 1 2	3	4	Chironomidae	<u>()</u> 1 2	3 4
Hydrozoa	\mathcal{O}^1	2	3	4	Zygoptera	0 1 2	3	4	Ephemeroptera		34
Platyhelminthes	Ø1	2	3	4	Hemiptera	0 1 2	3	4	Trichoptera		34
Turbellaria	<u></u> 🕖 1	2	3	4	Coleoptera	0 1 2	3	4	Other		3 4
Hirudinea	$\bigcirc 1$	2	3	4	Lepidoptera	0 1 2	3	4			
Oligochaeta	() 1	2	3	4	Sialidae	0) 1 2	3	4			
Isopoda	01	2	3	4	Corydalidae	@ 12	3	4			
Amphipoda	() 1	2	3	4	Tipulidae	@12	3	4			
Decapoda	ரு 1	2	3	4	Empididae	(0) 1 2	3	4			
Gastropoda	<u>()</u> 1	2	3	4	Simuliidae	OD 1 2	3	4			
Bivalvia	(<u>0</u>) 1	2	3	4	Tabinidae	<u>(</u>) 1 2	3	4			
L					Culcidae	012	3	4			

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A-25

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

STREAM NAME STREAM 2A-1	LOCATION Mitchell Land Fill, Cresap, Murshall Co., WV			
STATION # RIVERMILE	STREAM CLASS Ephemera			
LAT 39 49 41,29" N LONG D 46 27 .14" W	RIVER BASIN OLio River			
STORET #	AGENCY			
INVESTIGATORS D. GOGES, G.GER	Ke			
FORM COMPLETED BY D. Godeu	TIME 5:50 AM (M) AFP Mildle Land Fill Project			

			Condition	Category		
	Habitat 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 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	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
ampling reach	2. Embeddeduess	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 fune sediment.	
6 Ë	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).	no flow
Ē	SCORE O	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 🛈	
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 2.	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.	no water o posis
	SCORE U	20 19 <u>18 17</u> 16	<u>.15 14</u> 1 <u>3 12</u> 11	10.9.8 7 6	5 4 3 2 1 (0)	

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Stream 2A-1 (cont.)

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

	Habitat	l	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 20	20 19 18 17/516	15 14 13 12 11	<u>10 9 8 7 6</u>	5 4 3 2 1 0	
ng 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 (Ø	20 19 18 17 <u>16</u>	<u>15 14 13 12 11</u>	10 9 8 7 🙆	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.	
be eva	SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0	
rs to	SCORE <u>6</u> (RB)	Right Bank 10 9	8 7 6	<u> </u>	2 1	
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.	
	$\text{SCORE} \frac{Q}{\Delta}$ (LB)	Left Bank 10 🕥	8. 7. 6	5 4 3 3 101 101 101 101 101 101 101 101 101 10	2 1 0	
	SCORE (RB)	Right Bank 10	8 7 6	an S	2 1 2 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 <u>9</u> (lb) score <u>9</u> (rb)	Left Bank 10	<u>8</u> 76	5 + 4 - 3 5 4 3	2 <u>1</u> 0 <u>1</u> 0	
L	SCORE (RB)	Right Bank. 10	1999 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5	「小心」の認識は発展的でいた。		

Total Score

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

A. A.

1

STREAM NAME Stream 2A-2	LOCATION Mitchell Landfill, Cresap, Marshall Co., WV
STATION # RIVERMILE	STREAM CLASS @ Pheneral
LAT 39 49 40.42"N LONG 2046 26, 14 "W	RIVER BASIN Ohio River
STORET #	AGENCY
INVESTIGATORS D. Godec, G.	Gerke,
FORM COMPLETED BY D, Godec	TIME 6:00 AM (M) AEP Mitchell Land V. 11 Miget

	Habitat		Condition	1 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).	20-402 mix of stable hapital; 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 2	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
a 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 j	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6.	<u>5</u> 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).	no flow
arant	SCORE V	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.	
	<u>score</u>	20 19 18 17 16	15 14 13 12 11	10 9 🛞 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.	no wate poils
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 🔘	

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A-7

Stream 2A-2 (cont.)

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

		<u></u>	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 20	20 19 18 17 16	<u>15 14 13 12 11</u>	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.
sampl	score 6	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.
be eva	SCORE (LB) SCORE (RB)	Left Bank 10 9 Right Bank 10 9	Image: 0 1 6 Image: 0 1 6	<u>5</u> 4 3 <u>5</u> 4 3	<u>2 1 0</u> 2 1 0
Parameters to b	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 (LB) score <u>5 (</u> RB)	Left Bank 10 9 Right Bank 10 9	8 7 6 8 7 6	$\begin{array}{c c} \hline 5 & 4 & 3 \\ \hline \hline 5 & 4 & 3 \\ \hline \end{array}$	2 <u>1 0</u> 2 <u>1</u> 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.
	$\text{SCORE} \frac{ 0 }{ b }$ (LB)	Left Bank (10) 9	8 7 6	5 4 3	2 <u>1 0</u> 2 1 0
	SCORE 10 (RB)	Right Bank (10) 9	8 7 .6	5 4 3	<u> 36.72.03年到</u> 上完全到0.85%。

Total Score

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

STREAM NAME Stream 2A-3	LOCATION MITCHOIL Landfill, Cresap, Marshall Co., WV
STATION # RIVERMILE	STREAM CLASS - Ohe meral
LAT 39°49'41,08"N LONG 20°4625,64"W	RIVER BASIN O'LIO RINGS
STORET #	AGENCY
INVESTIGATORS D, Godec, G.	Serke
FORM COMPLETED BY	TIME 6:30 AM EN AEP Mitchell Landtill Project

	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 8	20 - 19 - 18 - 17 - 16	15 14 13 12 11	10 9 1 -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.
tedi	SCORE	20 19 18 17 16	15 14 13 12 11	10 🕥 8 7 6	5 4 3 2 1 0
iers to be evaluate	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 U	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.
	<u>score</u> X	20 19 18 17 16	15 14 13 12 11	10 9 3 7 6	5 4 3 2 100
	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 Z	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

no flow

Stream 2A-3 (cont.)

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

[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 20	6 19 18 17 16	15 14 13 12 11	10 9 8 7 5 6°	5 4 3 2 1 0
ding reach	7. Frequency of Rlffles (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 /	20 19 18 17 16	<u>-15 14 -13 12 11</u>	10 9 8 🕜 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.
eva a	$\text{SCORE} \underline{4}$ (LB)	Left Bank 10 9	8 7 6	5 (4) 3	2 1 0
ta ta	$score \underline{4}(RB)$	Right Bank 10 9	8 7 6	<u> </u>	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.
	$\frac{2}{(LB)}$	Left Bank 10 9	8 7 6	5 4 3	
	SCORE 2 (RB)	Right Bank 10 9	8 7 6	<u> </u>	2)10
	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.
	$score \frac{10}{10}$ (LB)	Left Bank 109	8 7 6	5 4 3	2 <u>)</u> 0
	SCORE 10 (RB)	Right Bank 10 9	8 7	5 4 5 3	. 2 1 0

Total Score

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

STREAM NAME Stregn 2B	LOCATION Mitchell Landfill, Crosap, Marshall Co., WV
STATION # RIVERMILE	STREAM CLASS Ephemenal
LAT 39º49'37.38"N LONG 80º46 25, 1"W	river basin Oh.'s River
STORET #	AGENCY
INVESTIGATORS D, Godtec, G. GE	
FORM COMPLETED BY D. GOORC	TIME 8:30 M PM AEP M' tehull Landfill Project

			Condition	Category	
	Habitat 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 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	<u>10 9 8 7</u> 6	<u>54</u> 3210
t 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.
6d in	SCORE 12	20 19 18 17 16	15 14 13 12 11	<u>10 9 8 7 6</u>	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).
1 2 1 2 1 2	SCORE	20 19 <u>18 17</u> 16	<u>15 14 13 12 11</u>	<u>10 9 8 7 6</u>	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	20 <u>19</u> 18 <u>17 16</u>	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	<u>20 19 18 17</u> 16	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3.2 0 0

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no Flow

Stream 2B (cont.)

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

			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 20	20 19 18 17 16	<u>15 14 13 12 11</u>	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 8	20 <u>19 18 17 16</u>	<u>15 14 13 12 11</u>	10 -9 🛞 7 6	<u>5 4 3 2</u> 1. 0
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score cach 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.
to be eva	$\frac{1}{3}$ (LB) $\frac{1}{3}$ (RB)	Left Bank109Right Bank109	8 7 6 8 7 6	<u>5</u> <u>4</u> <u>3</u> <u>5</u> <u>4</u> <u>3</u>	2 1 0 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) SCORE 5 (RB)	Left Bank 10 97	8 7 <u>6</u> 8 7 6	(5) 4 3 (3) 4 3	2 <u>1</u> 0 2 <u>1</u> 0
	SCORE (RB)	Right Bank 10 9			
	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 (LB)	Left Bank (10) - 9	8 7 6	5 4 3	2 1 0
	$_{\text{SCORE}} \mathcal{O}_{(\text{RB})}$	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Total Score 109

HABITAT ASSESSMENT	FIELD DATA SHEET	-HIGH GRADIEN	T STREAMS (FRONT)
just above prest pt.			

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Jos acomp press pres	
STREAM NAME STREAM 3 (eph. fortion)	LOCATION Mitchell Lond fill, Cresap, Marshyll County, WV
STATION # RIVERMILE	STREAM CLASS EPhomory
LAT 39°49'36.48"N LONG 80°46'37.59" W	RIVER BASIN OHIO RIVER
STORET #	AGENCY
INVESTIGATORS D. G. G. G. G.	rka
FORMCOMPLETEDBY	DATE 8/12/11 REASON FOR SURVEY
D. Godec	TIME 3140 AM (AEP Mitchell Land fill Project

	TT-1-14-4	···	Condition	Category		
	Habitat Parameter	Optimal	Subop <u>timal</u>	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 fail 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	20 19 18 17 16	15 14 13 12 (1)	10 9 8 <u>7 56</u>	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 ir	SCORE 0	20 19 18 17 16	<u>15 14 13</u> 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).	No Flow
Lam	$_{\text{score}}$ U	20 19 18 17 16	15 <u>14</u> 13 12 <u>11</u>	<u> 10 9 8 7 6</u>	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	20 19 18 17 16	<u>15 14 13 12</u> 11	10 9 8 (7) 6	<u>5</u> 4 3 <u>2 1</u> 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.	noflow orpools
	SCORE U	20 19 18 17 16	15 14 13 12 11	10.9 8.7 6	5 4 3 2 1 0	

Stream 3-ephemeral portion (cont.)

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 20	20 19 18 17 16	<u>15 14 13 12 11</u>	10 . 9 <u>8 // 7. 6</u>	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	20 <u>19 18 17</u> 16	15 14 13 12 11	10 9 8 🕢 6	5 4 3 2 100
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.
s to be ev	SCORE (LB) SCORE (RB)	Left Bank 10 9 Right Bank 10 9	8 7 6 8 7 6	5 4 3 5 4 3	2 1 0 2 1 0
Parameters t	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.
	$\frac{\text{SCORE}}{\text{SCORE}} (\text{LB})$	Left Bank, 10 - 9 + 9 Right Bank, 10 - 9	8 (1) 6 8 (7) 6	5 4 3 5 4 3	2 <u>1 0</u> 2 <u>1 0</u>
	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.
	$\text{SCORE} \left[\begin{array}{c} 0 \\ 1 \end{array} \right] $ (LB)	Left Bank (10) 9	8	5 4 3	2 1 0
	SCORE $\underline{0}$ (RB)	Right Bank 10	8 7 6	5	2 1 0

Total Score 103

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

STREAM NAME STREAM 3	LOCATION Mitchell Landfill
STATION # RIVERMILE	STREAM CLASS Internitient
LAT 39°49'34,80'N LONG 0°46'34,00" W	river basin Ohto Aher
STORET #	AGENCY
INVESTIGATORS D. Godec, G.C.	Serke
FORM COMPLETED BY	DATE 8/12/11 REASON FOR SURVEY
D: Godec	TIME 5:00 AM (P) AFP Mitchel) Landfill Project

	Habitat	Condition Category				
Parameters to be evaluated in sampling reach	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	20 19 18 17 16	15 14 13 12 🕕	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 5	20 / 19 18 17 16	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). SlowShaflow	
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 🙆 1. 0	
	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
	score (5	20 19 18 17 16	(5) 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.	
1	score ()	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0	

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Stream 3 (cont.)

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

—	Habitat		Condition	 a 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 W	20 19 18 17 516	<u>15 14 13</u> 12 11	10 9 8 7 6	5 4 3 2 1 0
pling 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 habital; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
	score ち	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	<u>(5) 4 3 2 1 0</u>
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank) Note: determine left or right side by facing downstream. SCORE 0 (LB)	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 croded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
s to be	SCORE (RB)	Right Bank 10 9		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 (LB) SCORE (RB)	Left Bank 10 9		543	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Right Bank. 10 29 Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	(8) 7 6 Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	5 4 3 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.
	$score \frac{ O }{ B }$	Left Bank 0 9	8 7 6	5 4 3	2 1 0
	SCORE 10 (RB)	Right Bank 10 9	8. 7. 26.	4 4 3	1 0

Total Score

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME STR	am ³	LOCATION/AEPMItchell Landfill, Gresap, Marshall Co,w
STATION # RI	VERMILE	stream class Intermittent
LAT 39° 49' 34.80" NLO	NG <u>80°4Ľ34,©″w</u>	RIVER BASIN Ohio River
STORET #		AGENCY
INVESTIGATORS D	Godec, G.G	erke
FORM COMPLETED BY	D.Godec	TIME 570 AM (P) REASON FOR SURVEY
WEATHER CONDITIONS		Past 24 Has there been a heavy rain in the last 7 days? hours Yes No (heavy rain) Air Temperature 27_°C
	\Box showers $()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} = ()_{\%} $	s (intermittent) U Other
		ear/sunny X
SITE LOCATION/MAP	see	photographs and figure 6 of uvsidictional Waters
		Delincation Report
STREAM CHARACTERIZATION	Stream Subsystem Perennial Min Stream Origin Glacial Non-glacial montan Swamp and bog	Catchment Areakm ²

PHY			-Jnternition	(RACK)	(cont)	D DATA SHEET	
WATER: FEATUR	SHED	Predo Foro Fiel	minant Surrounding La sst Comm d/Pasture Indush icultural Other idential	nduse ercial rial	Local Watershed NP2 A No evidence Sor Obvious sources Local Watershed Ero	sion]
RIPARIA VEGETA (18 meter	N TION buffer)	Indica A Tree domin	te the dominant type an S AS	d record the d hrubs	M None U Moderate	Heavy	iun vitiginianum, Cleaner eind multifican rase
INSTREA FEATUR	AM ES	Estim: Estim: Sampl Area in Estima	ated Reach Length O_{1}	<u>46 m</u> 1004 <u>7 m</u> B·10 <u>3 m</u> ² 8 <u>23</u> km ² 3 m 1 inc	Canopy Cover Parily open Par Yarily open Par High Water Mark Proportion of Reach I Morphology Types Riffle go % Writtle go % Channelized Channelized Yes	lly shaded □ Shaded 67m 5-6 64 Represented by Stream a/Run 10_%	- cthol multi flora rose
LARGE DEBRIS	WOODY	LWD Densit	<u>10</u> m ² y of LWD 121566.6 r	n²/km² A WD	Dam Present Q Yes	<u>X</u> No //	-
AQUATIO VEGETA	TION	Indica A Root Floa domina	te the dominant type and ed emergent	d record the d ooted submerg ttached Algae	ominant species present ent BRooted floating Wood hettle, Timport	Tree floating	
WATER	QUALITY	Tempe Specifi Dissolv pH	rature <u>16.8</u> °C 60 c Conductance <u>0.34</u> red Oxygen <u>7,25</u> 43 .75	p°F Mr/Cm	Water Odors MNormal/None Sew Petroleum Fishy Water Surface Oils	age 1 Chemical 1 Other 1 Globs 🖵 Flecks	
¢.			ity <u>47, 1</u> strument Used <u>HOri</u>	bg_	Turbidity (If not meas)	ured) Irbid	
SEDIME SUBSTRA		Odors Norm Chen Othe	nical CI Anaerobic	D Petroleum D None	Relict shells	Paper fiber Sand Other	· · ·
	BGANIC SUB		nt 🗆 Slight 🗆 Moderat	te 🗆 Profu	Se Yes No	· · · · · · ·]
Substrate	(should a	add up to :	(100%) % Composition in	Substrate	Characteristic	up to 100%)	
Туре			Sampling Reach	Туре		% Composition in Sampling Area	
Bedrock Boulder	>256 mm (10")	0%	Detritus	sticks, wood, coarse plant materials (CPOM)	25%	
Cobble	64-256 mm (2.5		30%	Muck-Mud	black, very fine organic	AB1	
Gravel	2-64 mm (0.1"-		20%		(FPOM)	0%	
Sand Silt	0.06-2mm (gritt		<u> </u>	Marl	grey, shell fragments	0%	
Clay	0.004-0.06 mm < 0.004 mm (sli		<u> </u>			0 10	
				L	I	•	

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A-6 Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 1

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BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME	tream 3	LOCATION M	tchell Lo	and fill, Creshp, Marsall Co., WV
STATION #	_ RIVERMILE	STREAM CLASS		ermittent
LAT 39 49'34, 60"	NLONG 80°46 34.80" W	RIVER BASIN	Ohio	River
STORET #		AGENCY	-	
INVESTIGATORS	D. Gorles. G.	Gerko		LOT NUMBER
FORM COMPLETED		DATE <u>8/12/1</u> TIME <u>5130</u>	л лм (т)	REASON FOR SURVEY AEPMHchell Land Fill Project
HABITAT TYPES	Indicate the percentage of Cobble 30_% ATSn Submerged Macrophytes	ags <u>5</u> % 🗖 🕻	resent /egelated Ba D Other (anks <u>5</u> % Q Sand <u>%</u>)%
SAMPLE COLLECTION	Gear used D-frame T How were the samples coll Indicate the number of jab W Cobble Sn	lected? Xwadir	ng Xi	
GENERAL COMMENTS	N.Ousky Salama	ndascadu H	Xi Other () 0∫s€	pools, NATUS)

QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	0 1 2 3 4	Slimes	0 1 2 3 4
Filamentous Algae	1 2 3 4	Macroinvertebrates	0 (1) 2 3 4
Macrophytes	0 (1) 2 3 4	Fish	(0)1234

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3 = Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	I	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	<u>Ephemeroptera</u>	0	í	2	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	\odot	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other	0	1	2	3	4
Hirudinea	0	$^{\odot}$	2	3	4	Lepidoptera	0	1	2	3	4						
Oligochaeta	0	1	2	3	4	Sialidae	0	1	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	1	2	3	4						
Amphipoda,	0		2	3	4	Tipulidae	0	1	2	3	4						
Decapoda	0	Ō	2	3	4	Empididae	0	1	2	3	4						
Gastropoda	0	í	2	3	4	Simuliidae	0	1	2	3	4						1
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4						
						Culcidae	0	1	2	3	4						

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

STREAMNAME Stregm 3A	LOCATION Mitchell Land Fill, Cresap, Marshall County, WV
STATION # RIVERMILE	STREAM CLASS Ephemoral
LAT 3994934.38"N LONG 8094636.42"W	RIVER BASIN OLIO RIVER
STORET #	AGENCY
INVESTIGATORS D1 Godec, G. G	berke
FORM COMPLETED BY	TIME 4:30 AM (P) AEP M, tokell Landfill Project

	Habitat		Condition	Calegory		
	Parameter	Optimal	Suboptimal	Marginal	Poor	
	Greater than 70% of substrate favorable for substrate/ Available Cover substrate/ 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	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
u 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 ii	SCORE	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).	No Flow
ITan	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 🕖	
P.	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	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.	Coupleshallow Smallpools present
	SCORE 4	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 /0	

Stream 3A (cont.)

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

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	Habitat		Condition	1 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 20	<u>20 19 18 17 16</u>	15 14 13 12 11	10 9 8 7 6	<u>5</u> 4 3 <u>2</u> 1 <u>0</u>
oling reach	7. Frequency of RiMes (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 6	20 19 18 17 16	<u>15 14 13 12</u> 11	<u>10 9 8 7</u> Ô	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.
to be ev:	SCORE (LB) SCORE (RB)	Left Bank 10 9 Right Bank 10 9	Image: Total of the second s	5 4 3 5 4 3	2 1 0 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.
	$\frac{\text{SCORE}}{\text{SCORE}} \frac{\mathscr{G}_{(LB)}}{\mathscr{G}_{(RB)}}$	Left Bank 10 9 Right Bank 10 9	<u>3</u> 3 4 7 6	5 <u>4</u> 3 5 4 3	2 <u>1</u> 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.
	$SCORE \frac{10}{10}$ (LB)	Left Bank 10 9	8 7 **** 6	5	2 1 0
	SCORE 10(RB)	Right Bank (10	412 8 - 11 7 . 6 .111	543	益型 2 3 1 0

Total Score 109

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

STREAM NAME Stream 3B	LOCATION Mitchell Land Fill, Cresap, Marshall Co., WV
STATION # RIVERMILE	stream class @ phemory
LAT39949'37.35"N LONG 80'46'38.09 W	RIVER BASIN OLIO RIVOR
STORET #	AGENCY
INVESTIGATORS D. Godec, G. G.	jerke
FORM COMPLETED BY D, Godge	TIME 4:00 AM () REASON FOR SURVEY

ľ		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	20 19 18 17 16	15 14 <u>13 12 1</u> 1	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.	
	ed ir	SCORE	201119 18 17 16	15 4 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).	NoFlow
	ram.	$_{\text{score}}$ \cup	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 4	20 19 18 17 16	15 (14)113 12 11	10 9 8 7 6	5 4 3 2 1 0	
-	. 6	5. Channel Royr, 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.	No Flo pools
	· · .	SCORE V	20 19 <u>18 17 16</u>	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3 2 1 0	
I				All and a second se			-
		· · ·	* .	· .			

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No Flow pools

Stream 3B (cont.)

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

		··		Category	
	Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
	6. Chaunel 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 20	20 19 18 17 16	<u>15 14 13 12 11</u>	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.
sampl	score Z	20 19 18 17 16	15 14 13 12 11	<u>10</u> 987_6	5 4 3 241 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.
be eva	score (1)	Left Bank 10 9	8 0 6	5 4 3	$\begin{array}{c c} \hline 1 & 2i & 1 \\ \hline 2 & 1 & 0 \\ \hline \end{array}$
s to	SCORE 7 (RB)	Right Bank 10 9	8 🖸 6	5 4 3	
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.
	$\frac{\text{SCORE}}{\text{SCORE}} \underbrace{(\text{LB})}{\text{(RB)}}$	Left Bank 10 97	8 7 6 8 7 6	5 4 3 5 4 3	2 <u>1</u> <u>0</u> 2 <u>1</u> <u>0</u>
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	Right Bank 10 9 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.
	$SCORE \mathcal{O}_{(LB)}$	Left Bank (10)	8 7 6	5 4 3	2 1
	SCORE O (RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Total Score 103

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

STREAM NAME Stream H_	LOCATIONM; tchell Land Fill, Cresap, Marshall Co., WV
STATION # RIVERMILE	STREAM CLASS Ephemeral
LAT 39 49 30.66" N LONG D' 46 29.36" W	RIVER BASIN OLIO RIVER
STORET #	AGENCY
INVESTIGATORS D. Godee, G. Ger	Ke
FORM COMPLETED BY	DATE 8/12/11 REASON FOR SURVEY
D. Godec	TIME 6:00 AM PAEP Mitchell Land fill Project

	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 13	20 19 18 17 16	15 14 13 12, 11	10 9 8 7 6	5 4 3 2 1 0	
a 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.	
Parameters to be evaluated in sampling reach	score 3	20 19 18 17 16	15 14 13 12 11	<u>10 9 8 7</u> 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).	No flow
Han	score U	20 19 18 17 16	15 14 13 12 11	10 24 9 8 7 46	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 3	20 19 18 17 1 <u>6</u>	≥15 14 (3 12 411)	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.	No flav Pools
	SCORE U	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	

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Stream 4 (cont.)

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

			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 20	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.
saml	SCORE 6	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.
ie ev:	SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
s to b	SCORE (RB)	Right Bank, 10 9	876	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 $\frac{5}{C}$ (LB)	Left Bank 10 9	8 7 6	<u>(</u>) 4 3	2 1 0
	score <u>5</u> (rb)	Right Bank 10 9	8 7 6	343	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.
	$score \frac{ O }{ O }$	Left Bank (10) 9.	8 7 6	5 4 4 3	2 1 0
	<u>SCORE 10 (RB)</u>	Right Bank (10) - 9.	8	5 4 3	2 1 0

Total Score

A-8

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

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STREAM NAME Stregm 5	LOCATION Mitchell Landfill, Cresap, Marshall Co. WV		
STATION # RIVERMILE	STREAM CLASS EPhemeral		
LAT 39049'26.08"N LONG 80'46'34.04"W	river basin Ohio River		
STORET #	AGENCY		
INVESTIGATORS D. GODEL G.	Gerke		
FORM COMPLETED BY	TIME \$130 M PM AFP Mitchell (Andfill Project		

	Habitat		Condition	a 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.	
1	score 2	20 19 18 17 16	15 14 13 (2) 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.	
ted i	score 15	20 19 18 17 16	14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
eters to be cvalua	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).	Noflow
land	<u>score</u> ()	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 🚺	
ų	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.	No Flow Pools
	SCORE V	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	

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Stream 5 (cont.)

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

			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 20	20 19 18 17 16		10 9 <u>8 7 6</u>	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.
dærs	SCORE	20 19 18 17 <u>16</u>	<u>15 14</u> 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Parameters to be evaluated broader than sumpling 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.
o be eva	SCORE $\frac{7}{1}$ (LB) SCORE $\frac{7}{1}$ (RB)	Left Bank 10 9 Right Bank 10 9	8 7 6 8 7 6	5 4 <u>3</u>	2 <u>1 0</u> 2 1 0
Parameters to	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.
	$score \frac{5}{5}$ (LB)	Left Bank 10 9	8 7	() 4 3	2
	score <u>5</u> (RB)	Right Bank 10 9	8 7 6	(5) 4 3	2 1
	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.
	$\frac{10}{10}$ (LB)	Left Bank (10) 9	8 1 88 2 8 2 8 3	5 - 4 - 3	2 1 0
L	SCORE 10 (RB)	Right Bank 10	8 7 6	5 4 3	2 1 0

Total Score

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

	STREAM NAME Stream 6	LOCATION MiroHI Land Fill, Cresap, Marshall G., WV		
	STATION # RIVERMILE	STREAM CLASS Ephemera		
	LAT 39.49'22.21"N LONG 80'4627.31" W	RIVER BASIN Ohis RINGM		
q	STORET #	AGENCY		
	INVESTIGATORS D. GOOC.G.C	berke		
	FORM COMPLETED BY $D_{c} \bigcirc d\mathbf{e}c$	TIME 10:30 AM PM AEPMIChell Landfill Project		

	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 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 Z	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.
ted ir	SCORE	20 19 18 17 16	15 14 13 12 (1)	10 9 8 7 6	5 4 3 2 1 0
ers to be evaluate	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 U	20 19 18 17 16	15 14 13 12 11	<u>10 9 8 7 6</u>	5 4 3 2 1 🕖
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	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 U	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 (0)

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Naflow

No Flow

A-7

Stream 6 (ephemoral portion) - cont.

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

	Habitat		Condițio	n 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 20	20 19 <u>18 17</u> 16	15 <u>14 13 12</u> 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.
Sam,	SCORE	20 19 18 17 16	<u>15 14</u> 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.
s to be er	$\frac{4}{100}$ (LB) $\frac{4}{100}$ (RB)	Left Bank 10 9 Right Bank 10 9	8 7 6 8 7 6	<u>5</u> (4) 3 5 (4) 3	2 1 0 2 1 0
Parameters t	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.
	$\frac{L}{CORE} \frac{L}{2} (LB)$	Left Bank 10 9 Right Bank 10 9	8 7 6 6 F	5 4 3 5 4 3	
:	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 (LB)	Left Bank 10	7 6	<u>5</u> 4 3	2
	SCORE 10 (RB)	Right Bank 10 9.	8 7 6	5 4 3	2 1 0

Total Score 77

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

STREAM NAME Stream 6	LOCATION Mitchell Land fill, Cresap, Marshall Co. WV
STATION # RIVERMILE	STREAM CLASS Internittent
LAT39949'22.02"W LONG 10946'29.45"W	RIVER BASIN Ohio River
STORET #	AGENCY
INVESTIGATORS D. GODQC, G. GRA	ke
FORM COMPLETED BY D, Goder	TIME 10:30 AM PM AEP Mitchell Land Fill Proje

	Habitat		Condition	Category	
	Parameter _	Optimal	Suboptimal	Marginal	Poor
ach	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 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	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.
ed 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).
rame	SCORE 2	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 (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.
	SCORE	20 19 18 17 16	<u>15</u> 14 <u>13</u> 12 11	10 (9) 8 7 6	5 4 3 2 1 0

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Stream 6 (Intermittent portion) - cont.

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

			Condition	Category	
	Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
	6. Chaunel 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 20	20) 19 18 17 16	<u>15</u> 14 13 12 11	10 9 8 7 6	-5-4- <u>3-2</u> 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.
sampl	score 4	<u>20 19 18 17 16</u>	<u>15 14 13 12 11</u>	10 9 🚯 7 6	5 4 3 2 1 0
Parameters to be evaluated broader than sampling reach	8. Bauk Stability (score each bauk) Note: determine left or right side by facing downstream. SCORE (LB)	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.
to be	SCORE (RB)	Right Bank 10	7 6	5 4 3	2 1 0
Parameters to	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.
	$score \frac{2}{7}$ (LB)	Left Bank; 10	8	5	
	<u>SCORE $\overline{\mathcal{L}}(RB)$</u>	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.
	$\frac{ 0 }{ 0 }$ (LB)	Left Bank (10)9	8 7 6	5 4 3	2
	SCORE 10 (RB)	Right Bank 10 9	8	5 4 3	2 1 0.

Total Score

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME STOP	img	LOCATIONAEP Mitchell Landfill, Grosgp, Marshall Co, WV				
STATION # R	IVERMILE	STREAM CLASS INTERNITENT				
LAT 39°49'22.02"NL	DNG804629,451W	MRIVER BASIN ONIO RIVEY				
STORET #		AGENCY				
INVESTIGATORS D.C.	odec, G.Ger	KC .				
FORM COMPLETED BY D. GODE	۰۰ ۱	DATE 3/13/11 TIME 10:30 AM PM REASON FOR SURVEY AEP Mitchell Landfill Project				
<u> </u>						
WEATHER CONDITIONS	□ rain (□ shower: %□ %c	Past 24 Has there been a heavy rain in the last 7 days? hours Yes No n (heavy rain) Air Temperature°C res (intermittent) O cloud cover% Other clear/sunny O				
SITE LOCATION/MAP	Draw a map of the sit	site and indicate the areas sampled (or attach a photograph)				
		e photographs and Figure 5 of the Juvisdictional Waters Delincation Report				
STREAM CHARACTERIZATION	Stream Subsystem Perennial Inte Stream Origin Glacial Non-glacial montane Swamp and bog	Catchment Areakm ²				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

Stream 6 (cont.)	,				-
WATERSHED FEATURES	Predomina M Forest G Field/Pa G Agricult Resident	ural \Box Other	cial	Local Watershed NPS I A No evidence Some Obvious sources Local Watershed Erosio M None Moderate	potential sources	
RIPARIAN VEGETATION (18 meter buffer)				Lasson of Aribert Spi	baceous ice bush, ASTANSP.,	Churchuster
INSTREAM FEATURES	Estimated Sampling Area in kr		<u>}_</u> m m² 306km² 2 <u>3</u> m 1:1/102	High Water Mark Proportion of Reach Re Morphology Types	r shaded 🗆 Shaded 2.9_m epresented by Stream Run5_% XNo XNo	boxelder
LARGE WOODY DEBRIS	LWD Density of	<u>3</u> m ² 1WD 98039.2m	²/km² (LWD/ 1	reach area)		
AQUATIC VEGETATION	C Rooted e Floating dominant	mergent ORo Algae OAtt	oted submerge ached Algae	æn4	Free floating	· ·
WATER QUALITY	Specific C Dissolved pH Turbidity	ure <u>17.8</u> °C onductance.412m Oxygen <u>5.30</u> m <u>48</u> <u>2.95</u> ument Used <u>Hóri</u>	.g/L.	Water Surface Oils	Globs Globs	
SEDIMENT/ SUBSTRATE	Odors A Normal Chemica Other_ Oils Absent	□ Sewage al □ Anaerobic □ Slight □ Moderat	□ Petroleum □ None e □ Profu:	Looking at stones which are the undersides blac	Paper fiber Sand Other h are not deeply embedded, k in color?	
INORGANIC SUE (should	STRATE CO add up to 100	OMPONENTS 9%)		ORGANIC SUBSTRATE C (does not necessarily add		
Substrate Diame Type	ter	% Composition In Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area	
Bedrock Boulder >256 mm (10'	·)	10%	Detritus	sticks, wood, coarse plant materials (CPOM)	Z5%	
Cobble 64-256 mm (2. Gravel 2-64 mm (0.1%)		60%	Muck-Mud	black, very fine organic (FPOM)	0%]
Sand 0.06-2mm (grit Silt 0.004-0.06 mm	ty)		Marl	grey, shell fragments	0%	1

1

A-6 Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 1

179%

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Clay

< 0.004 mm (slick)

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BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME	treamG	LOCATION Mitchell LO	and fill, Cresap, Marshall Co., WV			
STATION #	RIVERMILE		cnittent			
LAT 39049'22,02"	N LONG 80"46'29.45"W	RIVER BASIN Oh'	s River			
STORET #	_	AGENCY				
INVESTIGATORS	D. Godeo, G		LOT NUMBER			
FORM COMPLETE	Di Godec	DATE 8/13/1 TIME <u>10:30</u> (AM) PM	REASON FOR SURVEY AEP Milebell Landfill Project			
HABITAT TYPES	Indicate the percentage of Cobble%	ags % 🗘 Vegetated B	anks%Sand% Pools)_\$_%			
SAMPLE COLLECTION	Gear used D-frame kick-net Cother Anply How were the samples collected? wading from bank from boat Indicate the number of jabs/kicks taken in each habitat type. Vegetated Banks Sand VCobble Snags Vegetated Banks Sand Submerged Macrophytes Value (\rhoools) Sand					
GENERAL COMMENTS	N, DUSKYSalam	anders (adult)				

QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	01234	4 Slimes	
Filamentous Algae	() 1 2 3 4	4 Macroinvertebrates	0 1 2 3 4
Macrophytes		1 Fish	

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3 = Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera,	0	ſ	2	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other	0	1	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	1	2	3	4						•
Oligochaeta	0	1	2	3	4	Sialidae	0	1	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	1	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4						
Gastropoda	0	1	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4						
						Culcidae	0	1	2	3	4						

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

STREAM NAME STREAM 7	LOCATION Milchell Land VIII, Crosap, Marshall Co., WV
STATION # RIVERMILE	STREAM CLASS Ephemeral
LAT 39 49 32,08 N LONG 0 46 35.27 W	RIVER BASIN OLIORIVER
STORET #	AGENCY
INVESTIGATORS D. Godeci (, Gerke
FORM COMPLETED BY	DATE 8/13/11 TIME 1:00 AM FM AEP Mitchell Land fill Project

	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.	
1	SCORE	20 19 18 17 16,	15 14 13 12 (1)	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.	
ed in	SCORE 3	20 19 18 17 16	15 14 13 12 11	<u>10 9</u> 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).	Noflow
гаше	SCORE	20 19 18 17 16	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3 2 1 🙆	
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 8	20 19 18 17 16	15 1 <u>4 13 12</u> 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.	No plow pools
	score ()	20 19 18 17 16	<u>15 14 13 12 11</u>	<u>10 9 8 7 6</u>	5 4 3 2 1 (0)	

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Stram 7 (cont.)

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

	· · · · · ·		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 20	20 19 18 17 16	15. <u>14.13.12</u> .11	<u>10 9 8 7 6</u>	5 4 3 2 1 0
g 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.
sampl	SCORE	<u>20 - 19</u> 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 cach 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.
to be ev:	SCORE $\frac{1}{2}$ (LB) SCORE $\frac{1}{2}$ (RB)	Left Bank 10 9 Right Bank 10 9	$8 \qquad 6$ $\overline{8} \qquad 7 \qquad 6$	5 4 3 5 4 3	2 1 0 2 1 0
Parameters to I	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 $\underline{1}$ (LB) score $\underline{1}$ (RB)	Left Bank 10 9 Right Bank 10 9	8 0 <u>6</u> 8 0 6	5 4 3 5 4 3	2 1 0 2 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 $\frac{ 0 }{ 0 }$ (LB)	Left Bank 10 9	8 7 6	3.2.2.3.4.4.3.3.3.3.2.2.3.3.2.2.3.3.2.2.3.3.2.2.3.3.2.2.3.2.2.3.2.2.3.2.2.3.2.2.3.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2	2 1 0
	$ _{\text{SCORE}} \underline{l0}_{(\text{RB})}$	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 107

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

STREAM NAMESTREAM 8	LOCATION Mitchell Landfill Project, Cresgo, Marshall Co., W
STATION # RIVERMILE	stream class & phemera)
LAT 39 49 54. 5 "N LONG 10 46 12, 81" W	RIVER BASIN OLLO Rher
STORET #	AGENCY
INVESTIGATORS D. GODEC, G.	Gerke
FORM COMPLETED BY D. Godee	DATE 8/13/11 TIME 5:15 AM PM REASON FOR SURVEY

Habitat		Condition	1 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).	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 obyious; substrate unstable or lacking.
SCORE (20-19-18-17-16	15 14 13 12 11	10 9 8 7 🕜	5 4 3 2 1 0
2. Embeddednes	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/Dept Regime	All four velocity/depth regimes present (slow- deep, slow-shallow, fast- deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast- shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE (20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 🛈
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	20 19 -18 17 -416	15 14 13 -12 (11)	<u>10 9 8 7 6</u>	543210
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	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Vo Flow

Strug m 8 - iphemeral portion (cont.) 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 9	<u>20 19 18</u> 17 16	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 <u>3 2</u> 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 'S	20 <u>19 18 17</u> 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.
be ev.	SCORE 7 (LB)	Left Bank 10	8 7 6	4 3	<u> </u>
rs to)	SCORE (RB)	Right Bank 10 9	8 7 6	4 3	21.0
Parameters to	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 (LB)	Left Bank 10 918	8 7 6	5 4 3	2 1 0
	SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
	10. Riparlan 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 \mathcal{V} (LB)	Left Bank 10 - 9	876	5 4 3	2
	SCORE (O(RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score ____]

A-8

1

HABITAT ASSESSMENT FIELD DATA Just Upstramof confluence with	SHEET-HIGH	GRADIENT STREAMS ()	FRONT)
Just Upstream of confluence with	Stream 10		,

STREAM NAME Stream 8	LOCATION Mitchell Landfill; Cresap, Marshall Co., WV
STATION # RIVERMILE	STREAM CLASS Intermittent
LAT 39"49"47.75" LONG 80" 4612.75" W	RIVER BASIN OLIO River
STORET #	AGENCY
INVESTIGATORS D. Godec, G. Ger	
FORM COMPLETED BY	TIME 2100 AM C AEP Mitchell Land fill Project

	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 13	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0
a 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 it	SCORE D	20 19 18 17 16	<u>15 14 13 12 11</u>	<u>10 9 8</u> 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).
ILan	score &	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 3	20 19 18 17 16	15 14 13 12 11	<u>10 9 8 7</u> 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	<u>20 19 18 17 16</u>	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3 2 1 0

Rapid Bioassessment Protocols For Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Edition - Form 2

4

Stream 8 just upstream of Stream 10 (cont.)

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

	TT-14-4		Condition	l 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.
	$_{\text{score}}$ 20	20 19 18 17 16	15 14 13 12 11	<u>10 9 8.7</u> 6	5 4 3 2 1 0
pling 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.
l sam]	SCORE 16	<u>20 - 19 18 17</u> 16	<u>15 14</u> 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.
be ev	$\text{SCORE} \prod_{i=1}^{n} (\text{LB})$	Left Bank 10 9	8 0 6	<u>5</u> 4 3	2 1 0
ta ta	SCORE (RB)	Right Bank 10 9	8 0 6		2 1 0
Paramete	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	3 4 4 5 3 5 5	2 1
	SCORE (RB)	Right Bank 10 9	8 7 6	<u>(</u> 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 $\frac{0}{\sqrt{2}}$ (LB)	Left Bank 10 the 9 th	8 7 6	4 3	2 1 0
	SCORE 10 (RB)	Right Bank (10) 9	118 76	5 4 3	2 1 0

Total Score <u>\38</u>

A-8

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT) Stream & just upstream of Stream in

Stream & just upstream of st	
STREAM NAME STREAM 8	LOCATIONAR Mitchell Landfill Cresap, Marshall Co, WV
STATION # RIVERMILE	stream class Intermittent
LAT 39º49'41.79'NLONG 10'4412,75'W	RIVER BASIN
STORET #	AGENCY
INVESTIGATORS D. GOLCC, G.GC	
FORM COMPLETED BY D. GOCLEC	TIME -2:00 AM AEP Mitchell Landfill Project

WEATHER CONDITIONS	Now Past 24 hours Has there been a heavy rain in the last 7 days? Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy rain) Image: Storm (heavy ra
SITE LOCATION/MAP	Draw a map of the site and indicate the areas sampled (or attach a photograph)
	See photographs and figure 5 of Jurisdictional Waters Delincation Report
STREAM CHARACTERIZATION	Stream Subsystem Perennial AIntermittent II Tidal Stream Type
	Stream Origin Catchment Areakm ² Glacial Spring-fed Non-glacial montane Swamp and bog Other

.

Stream & just updream of Stream 10

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

WATERSHED FEATURES	Def Forest Commercial Def Def Field/Pasture Industrial Def Def Agricultural Other Def Descidential Jo Jo	cal Watershed NPS Pollution No evidence Some potential sources Obvious sources cal Watershed Erosion None Moderate Heavy
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant subscription of the dominant species present <u>Sugar maple</u> , bach	sees present A Herbaceous sees present A Herbaceous spicebush woodnettle, bassund, fer
INSTREAM FEATURES	Estimated Stream Width $\frac{1000}{55.07 \text{ m}^2}$ Hi Sampling Reach Area $\frac{55.77 \text{ m}^2}{55.77 \text{ m}^2}$ Hi Area in km ² (m ² x1000) $\cdot 0000558 \text{ km}^2$ M Estimated Stream Depth 40108 m 0.5-310. Str Surface Velocity 0.07 m/sec Ch	nopy Cover Partly open Partly shaded A Shaded gh Water Mark <u>1.83 m C Fy</u> , oportion of Reach Represented by Stream orphology Types Rifle 20 % A Run 20 % Pool 20 % nannelized Pyes No m Present Pyes A No
LARGE WOODY DEBRIS	LWD <u>4</u> m ² Density of LWD 7 <u>169</u> 4,5 m ² /km ² (LWD/ reach are	ea)
AQUATIC VEGETATION	Indicate the dominant type and record the dominant s Rooted emergent Rooted submergent d Floating Algae Attached Algae dominant species present N/A Portion of the reach with aquatic vegetation 8/4	Decies present
WATER QUALITY	Specific Conductance 0.309 mS/cm Dissolved Oxygen 6.25 mg/L pH_7.34 Turkidity 9/.6	ater Odors Normal/None □ Sewage Petroleum □ Chemical Fishy □ Other ater Surface Oils Slick □ Sheen □ Globs □ Flecks None □ Other Irbidity (if not measured) Clear □ Slightly turbid □ Turbid Opaque □ Stained □ Other
SEDIMENT/ SUBSTRATE	Withormal D Sewage D Petroleum Chemical D Anaerobic D None O Other Lo Oils ar	eposits None Sludge Sawdust Paper fiber Sand Relict shells Other booking at stones which are not deeply embedded, e the undersides black in color? Yes No
L		

INC	RGANIC SUBSTRATE (should add up to 1			ORGANIC SUBSTRATE C (does not necessarily add	OMPONENTS up to 100%)
Substrate Type			Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	25%
Boulder	>256 mm (10")	30%		materials (CPOM)	2018
Cobble	64-256 mm (2.5"-10")	30%	Muck-Mud	black, very fine organic (FPOM)	0%
Gravel	2-64 mm (0.1"-2.5")	35%			06
Sand	0.06-2mm (gritty)		Marl	grey, shell fragments	00/
Silt	0.004-0.06 mm	5%			0%
Clay	< 0.004 mm (slick)		}		

A-6 Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 1

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

Just upst	ream of conflu	ong with Stream	m10		
STREAM NAME 5	tream 8	LOCATION M/tchell L	and All, Cresap, Marshall Co., W		
STATION #	RIVERMILE	STREAM CLASS Inter	mittent		
LAT 39°49'47,15	N LONG 046 12, 75 W		River		
STORET #		AGENCY			
INVESTIGATORS	D.Goder, G.	Serke	LOT NUMBER		
FORM COMPLETED	DBYD. Godee	DATE 8/14/11	REASON FOR SURVEY AEP Mitcle // Landfill Project		
HABITAT TYPES	Indicate the percentage of Cobble 70 % Sa Sa Submerged Macrophytes	agsくち % 🛛 Vegetated Ba	anks% 🗅 Sand%		
SAMPLE COLLECTION	Gear used D-frame kick-net Cother Grab sample; Aqvarive How were the samples collected? A wading A from bank I from boat Indicate the number of jabs/klcks taken in each habitat type. O Vegetated Banks I Sand Cobble A Snags O Vegetated Banks Sand Submerged Macrophytes A Other (rifle); pools)				
GENERAL COMMENTS		nanders (adults)			

QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	0 1 2 3 4	Slimes	(0) 1 2 3 4
Filamentous Algae	1 2 3 4	Macroinvertebrates	0 1 2 (3) 4
Macrophytes		Fish	01234

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3= Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	1	2	(3)	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1		3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other	0	1	2	<u> </u>	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	1	2	3	4					-	
Oligochaeta	0	1	2	3	4	Sialidae	0	1	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	1	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4						
Gastropoda	0	I	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4						
						Culcidae	0	1	2	3	4						

]	HABITAT AS Downe	SSESSMENT FIELI Strean Scample P	
ſ	STREAM NAME	Stream 8	LOCATION MHChell Land Fill, Cresal, Makhall Co., WV
ľ	STATION #	RIVERMILE	STREAM CLASS Intermittent

STATION # RIVERMILE	STREAM CLASS Internittent
LAT 39.49'36.74"LONG 80°46'0.51"	RIVER BASIN OLDO RIVER
STORET #	AGENCY
INVESTIGATORS DI GODEL, G.G.	160
FORM COMPLETED BY D, Gollec	TIME 7:00 AM PM AEP Mitchell Cand fill

	Habitat		Condition	Calegory	
	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 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 (5	20, 19, 18, 17 16	15 14 13 12 11	10 <u>9 8</u> 7 6	5 4 3 2 1 0
a 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 (6	20 19 18 17 16	<u>15 14 1</u> 3 12 11	<u>10 9 8 7 6</u>	<u>157473</u> 210
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). FastShallow slow Get P	Dominated by I velocity/ depth regime (usually slow-deep).
Ē	score 0	20 19 18 17 16	<u>15 14 13 12 11 </u>	0 9 8 7 6	25243210
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.
1	SCORE 14	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.
1	SCORE 7	20 19 18 17 16	<u>15 14 13 12 11</u>	10 9 (8) 7 6	5 4 3 2 1 0

A-7

Streyn & (Downstrian Sample Reach) - Cont. HABITAT ASSESSMENT FIELD DATA SHEET-HIGH GRADIENT STREAMS (BACK)

	Habitat	Condition Category										
-	Parameter	Optimal	Suboptimal	Margînal	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.							
ļ	score 20	20) 19 18 17 16	<u>15 14</u> 13 12 11	10 9 8 7 6	5 4 3 2 1 0							
oung reach	7. Frequency of Riffles (or bends) Gistance between riffles of distance between riffles divided by width of the stream <7:1 (generally to 7); variety of habitat key. In streams where riffles are continuous, placement of boulders o 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 S	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.							
c ev:	SCORE (LB)	Left Bank 10	8 (7) 6	5 4 3	2 1 0							
top	SCORE (RB)	Right Bank 10 9	8 🕢 6	<u> </u>	2 2 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 (LB)	Left Bank 10 9	8 7 - 6	5 4 3	2 1 0							
	SCORE (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 (LB)	Left Bank 10 9	8/// 7 6 -	5 4 3 3	2 1 0							
	SCORE (RB)	Right Bank (10) 9_	8 7 6	5 4 3	<u></u> 10							

Total Score 153

A-8 Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 2

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

Downstream S	ample Reach	V	
STREAM NAME STOR	m 8	LOCATION Mitchell Landfill, Marshall Co., W	٧٧
STATION # RI	VERMILE	STREAM CLASS Intermittent	
LAT 39949'36, 74" LO	NG 80°46'0.51"	RIVER BASIN Ohio River	
STORET #		AGENCY	
INVESTIGATORS D,	Godec, G.	, Gerke	
FORM COMPLETED BY D. Godec		DATE 8/14/11 TIME 1:00 AM (M) AEP M/tchell Landfi	ill Project
WEATHER CONDITIONS	50 % a cl	Past 24 Has there been a heavy rain in the hours Ayes No n (steady rain) Air Temperature 75 °C ers (intermittent) Other Light Nath at tim clear/sunny	ļ
SITE LOCATION/MAP	Draw a map of the si	site and indicate the areas sampled (or attach a photograph)	
	See Figure Delihea	re 5 from Jurisdictional Worters ation Report and Photographs rendix B	5
	in App	2endix B	
STREAM CHARACTERIZATION	Stream Subsystem		
	Stream Origin Glacial XNon-glacial montar Swamp and bog	Catchment Areakm ² ane D Mixture of origins D Other	

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Stream & sample reach upstream of project boundary PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

WATERSHED Predominant Surrounding Landuse Local Watershed NPS Pollution FEATURES Predominant Surrounding Landuse Industrial One ovidence Some potential sources Predominant Surrounding Landuse Industrial Obvious sources Some potential sources Predominant Surrounding Landuse Industrial Obvious sources Some potential sources Predominant Surrounding Landuse Industrial Obvious sources Dovious sources REPARIAN Indicate the dominant type and record the dominant species present Herbaceous VEGETATION Indicate the dominant species present Offerses VEGETATION Indicate species present Offerses VEGETATION Ominant species present Offerses VEGETATION Spiral vsh, Tmpe Herbaceous (18 meter buffer) Differses present Spiral vsh, Tmpe VEGETATION Spiral vsh, Tmpe Herbaceous dominant species present Spiral vsh, Tmpe Herbaceous Moderate Defense over Woll Spiral vsh, Tmpe	
RIPARIAN VEGETATION (18 meter buffer) Idominant species present (18 meter buffer) Idominant species present Idominant species present	
	lens capersis
INSTREAM FEATURESEstimated Reach Length $\frac{30.48}{4.6}$ m 100 ft. Canopy Cover (Parity open \Box Parity shaded \Box ShadedEstimated Stream Width $\frac{4.6}{4.6}$ m 16 ft.High Water Mark 3 -4.6 m 10 ft.Sampling Reach Area 1 $\frac{40.28}{4.2}$ m²Proportion of Reach Represented by Stream Morphology Types \Box Run 0 % \Box Run 0 %Area In km² (m²x1000) 1001 43 km² Estimated Stream Depth $\frac{100}{4.5}$ ft.Proportion of Reach Represented by Stream Morphology Types \Box Run 0 % \Box Run 0 %Surface Velocity (at thalweg) 0.2 m/secChannelized \Box Yes Dam Present \Box Yes XNo	000 e vê 44.0
LARGE WOODY DEBRIS Density of LWD & 9.4.30 m ² /km ² (LWD/ reach area)	
AQUATIC Indicate the dominant type and record the dominant species present VEGETATION Rooted emergent Rooted submergent Rooted floating Free floating Indicate the dominant type and record the dominant species present Rooted emergent Rooted floating Free floating Indicate the dominant type and record the dominant species present Rooted emergent Rooted floating Free floating Indicate the dominant species present Rooted Algae Rooted floating Free floating Indicate the dominant species present Rooted Algae Rooted floating Free floating Indicate the dominant species present Rooted floating Rooted floating Rooted floating Indicate the dominant species present Rooted floating Rooted floating Rooted floating Indicate the dominant species present Rooted floating Rooted floating Rooted floating Indicate the dominant species present Rooted floating Rooted floating Rooted floating Indicate the dominant species present Rooted floating Rooted floating Rooted floating Indicate the dominant species present Rooted floating Rooted floating Rooted floating Indit floating <t< td=""><td></td></t<>	
WATER QUALITY Temperature [8.5] °C Water Odors Specific Conductance 0.267 mS/cm Detroleum Chemical Dissolved Oxygen 7.09 mg/L Pishy Other pH 7.16 Slick Sheen Globs Turbidity 34.9 Turbidity 64.9 Slick Slightly turbid Turbid WQ Instrument Used Horipg U-52 Turbidity (if not measured) Slightly turbid Turbid	
SEDIMENT/ SUBSTRATE Odors Deposits None Chemical Anaerobic None Sludge Sawdust Paper fiber Sand Other Other Other Looking at stones which are not deeply embedded, are the undersides black in color? Uses Yes No	

INC	RGANIC SUBSTRATE (should add up to 1		ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)				
Substrate Type			Characteristic	% Composition in Sampling Area			
Bedrock		-	Detritus	sticks, wood, coarse plant materials (CPOM)	5%		
Boulder	> 256 mm (10")	30%	ļ	materiais (CPOM)			
Cobble	64-256 mm (2.5°-10")	40%	Muck-Mud	black, very fine organic	0%		
Gravel	2-64 mm (0.1"-2.5")	25%]	(FPOM)	0p		
Sand	0.06-2mm (gritty)		Marl	grey, shell fragments	0%		
Silt	0.004-0.06 mm]				
Clay	< 0.004 mm (slick)						

Near P	(Died Brundan	(downstream sam			
STREAM NAME	Stream 8	LOCATION MILEROLI	ndfill, Marshall Co., WV		
STATION #		STREAM CLASS INTER			
LAT 39049'36.74	"NLONG 80°46'0.51"W	RIVER BASIN Oho			
STORET #		AGENCY			
INVESTIGATORS	P.Godec, G.C	Serke	LOT NUMBER		
	DBY /	DATE <u>8/14/11</u> TIME <u>7:00 </u>	REASON FOR SURVEY		
HABITAT TYPES	A Cobble % A Snags 5 % □ Vegetated Banks % □ Sand % Submerged Macrophytes 0 % □ Other (// <i>F</i> µs, ρools) %				
SAMPLE COLLECTION	Gear used & D-frame is kick-net & Other <u>Grap Sample</u> , <u>Aqually net</u> How were the samples collected? Xwading & from bank is from boat Indicate the number of jabs/kicks taken in each habitat type.				
GENERAL COMMENTS	MCobble A Snags D Vegetated Banks D Sand D Submerged Macrophytes A Other (n/4/13, f wils) MOST 9911110 Life present in drener papers				

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

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QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	0 1 2 3 4	Slimes	(0) 1 2 3 4
Filamentous Algae	① 1 2 3 4	Macroinvertebrates	0 1 2 (3) 4
Macrophytes	<u>01234</u>	Fish	(0) 1 2 3 4

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3 = Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	Õ	1	_	Č٢.	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	Õ	i	Ī.	ž	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other	0	1	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	1	2	3	4		-	_	_	- ·	Ì
Oligochaeta	0	1	2	3	4	Sialidae	0	1	2	3	4						
Isopoda	0	i	2	3	4	<u>Corydalidae</u>	0	(\mathbf{i})	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	$\widetilde{1}$	2	3	4						
Decapoda	0	1	2	3	ⓓ	Empididae	0	1	2	3	4						
Gastropoda	0	1	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4						
				-		Culcidae	0	_1_	2	3	4						

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

STREAM NAME Stream 8A	LOCATION Mitchell Ladrill, Cresap, MarshallCo., WV						
STATION # RIVERMILE	STREAM CLASS Ephemeral						
LAT 310 49'54.69"N LONG 80°4612.87"W	RIVER BASIN Obio River						
STORET #	AGENCY						
INVESTIGATORS D. Godec, G. G	erke						
FORM COMPLETED BY D. Godee	TIME 5130 AM (EM) AEP Mitchellandfill Project						

	II-black		Condition	Category	
	Habitat 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	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.
edii	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).
Lan	score ()	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
1	SCORE X	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 ()	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Noflow

No Flow pools

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A-7

Stream 8A-ephenaral portian (cont.)

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

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	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 20	20 19 18 17 16	<u>15 14 13 12 11</u>	10 9 8 7 <u>6</u>	<u>5 4 3 2 1 0</u>		
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.	frequent; distance bottom contours provide tween riffles divided by some habitat; distance e width of the stream is between riffles divided by			
samp	SCORE Ø	20 19 18 17 <u>16</u>	<u>15 14 13 12 11</u>	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.		
be ev:	SCORE (LB) SCORE (RB)	Left Bank 10 9 Right Bank 10 9	8 7 6 8 7 6	<u>5</u> <u>4</u> <u>3</u>	2 <u>10</u> 210		
Parameters to	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 $\underline{7}$ (LB)	Left Bank 10 9	8 () 6 -	5 4 3	2 1 0		
	SCORE $\underline{7}$ (RB)	Right Bank 10 9	8. 7 6	5	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 $\frac{10}{10}$ (LB)	Left Bank (10) 9	8 7 6	1000-5 400-00-3 800-00-	2		
	score D(RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0		

Total Score 10

A-8 Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 2

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

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STREAM NAME SWOGM 8A	LOCATION Mirchall Landfill, Cresap, Marshall Co., WV				
STATION # RIVERMILE	STREAM CLASS Informittent				
LAT 39 49 53, 42" N LONG 2 4612, 70" W	RIVER BASIN OLio RMQr				
STORET #	AGENCY				
INVESTIGATORS D. Godec. G.	Gerlee,				
FORM COMPLETED BY D. Godec	TIME 6:30 AM M AEP Mitchell Landfill Project				

	Habitat		Condition Category			
	Parameter	Optimal	Suboptimal	Marginal	Poor	
Parameters to be evaluated in sampling reach	1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover, mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <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	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 9	20 19 (18) 17 16	<u>15 14 13</u> 12 11	10 9 8 7 6	5 4 3 2 1 0	
	3. Velocity/Depti Regime	deep, slow-shallow, fast- deep, fast-shallow). (Slow is < 0.3 m/s , deep is > 0.5 m)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast- shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).	
	SCORE 2	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.	
	SCORE	0 20 19 18 17 (16	<u>15</u> 14 13 12 11	<u>10 9 8 7 6</u>	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 O	20 19 18 17 16	15 14 13 12 11	10, 9 (8) 7 6	5 4 3 2 1 0	

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Stream 8A Intermittent Portion (cont.)

		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 20		15 <u>14 13 12</u> 11	<u>10 9 8 7 6 </u>	5 4 3 2 1 0					
ling reach	7. Frequency of Riffies (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	<u>20 19 18 17 16</u>	<u>15 14 13 12 11</u>	10 9 8 7 6	<u>5 4 3 2 1 0</u>					
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.					
to be eva	$\frac{2}{\text{SCORE} (LB)}$	Left Bank 10 9 Right Bank 10 9	8 7 6 1 8 7 6	<u>5</u> 4 3	2 1 0 2 1 0					
Parameters 1	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 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0					
	SCORE (RB)	Right Bank-10 9	8 7 6	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 (LB) SCORE (RB)	Left Bank 10 2 9 Right Bank 10 9	8 7 6 (8) 7 6	5 4 3 3 4 3	2 1 <u>0</u> 2 1 0					
	SCOKE 0 (RB)	I KIBUC DANK <u>⊴TU Dagat</u> 9,:	<u>∽≞\o,/≞≥</u> #≊/∋_::::0.0.⊒≧ 							

Total Score 2

A-8 Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 2

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME Stream 8A	LOCATIONAEP Mitchell Landfill, Cresap, Marshall Co. WV
STATION # RIVERMILE	STREAM CLASS Intermittent
LAT 39°49'53.42"N LONG 80'46'12.70" W	RIVER BASIN ONIO RIVEr
STORET #	AGENCY
INVESTIGATORS D. GODEC, G.G.	
FORM COMPLETED BY D. GODEC	TIME 6:30 AM (FM) REASON FOR SURVEY

WEATHER CONDITIONS	Now Past 24 hours Has there been a heavy rain in the last 7 days? I storm (heavy rain) Image: Storm (heavy rain) Image: Im
SITE LOCATION/MAP	Draw a map of the site and indicate the areas sampled (or attach a photograph)
	See photographs & figure 5 of the duraidictional Wasters delineation nepura
STREAM CHARACTERIZATION	Stream Subsystem/ Intermittent Tidal Stream Type Perennial Intermittent Tidal Coldwater Warmwater Stream Origin Spring-fed Catchment Areakm² Glacial Mixture of origins Mixture of origins Swamp and bog Other Other
STREAM CHARACTERIZATION	Stream Origin A Catchment Areakm ²

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PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK) 5 dream 8 A (Ont.)-Intermittent Portion

· · · · ·			_
WATERSHED FEATURES	Predominant Surrounding Landuse A Forest Commercial Field/Pasture Industrial Agricultural Other Residential	Local Watershed NPS Pollution No evidence Some potential sources Obvious sources Local Watershed Erosion None Moderate Heavy	
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the A Trees dominant species present Carya or h	e dominant species present Grasses 3, Spice bush, MultiFlam (OSP, Chinitina) for OFA. Canopy Cover Partly shaded D Shaded	sugar maple
INSTREAM FEATURES	Estimated Stream Width 2.5 m 7 Sampling Reach Area 45.72 m^2	A Canopy Cover Party shaded Shaded Party open Party shaded Shaded High Water Mark <u>1.5</u> m 5.74, Proportion of Reach Represented by Stream Morphology Types Rittle % Run 10 % Channelized Yes No Dam Present Yes No	Inparlies Opposis
LARGE WOODY DEBRIS	LWDm ² Density of LWD \52/1.4 m ² /km ² (LW	D/ reach area)	
AQUATIC VEGETATION	Indicate the dominant type and record the Rooted emergent Rooted subme Floating Algae Attached Alga dominant species present Portion of the reach with aquatic vegetation	ae	
WATER QUALITY	Temperature 20.44°C Specific Conductance 0.335 MS/CN Dissolved Oxygen 4.98 mg/L pH 6.6 Turbidity 175 WQ Instrument Used Hor1ba U-S	Water Surface Oils Slick Sheen Globs Flecks None Other	·
SEDIMENT/ SUBSTRATE	Odors Normal Sewage Petroleu Chemical Anaerobic None Other Ojis MAbsent Slight Moderate Pro-	Deposits Vor Slidge Sawdust Paper fiber Sawdust Relict shells Other Looking at stones which are not deeply embedded, are the undersides black in color? Ves No	
INORGANIC SU	BSTRATE COMPONENTS	ORGANIC SUBSTRATE COMPONENTS]

INC	RGANIC SUBSTRATE (should add up to		ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)							
Substrate Diameter Type		% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling A rea					
Bedrock		40%	Detritus	sticks, wood, coarse plant materials (CPOM)	<5%					
Boulder	> 256 mm (10")	20%]	materiais (CFOM)						
Cobble .	64-256 mm (2.5"-10")	20%	Muck-Mud black, very fine organic		\wedge $^{}/$					
Gravel	2-64 mm (0.1"-2.5")	10%]	(FPOM)	\mathcal{O}					
Sand	0.06-2mm (gritty)	,.	Marl	grey, shell fragments	~0/					
Silt 0.004-0,06 mm					06					
Clay	< 0,004 mm (slick)	10%								

A-6

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME STREAM 8A	LOCATION Middell Land GIJ, Cresap, Marshall County, WV					
STATION # RIVERMILE	STREAM CLASS Internitiont					
LAT 31049 53.42"N LONG 80046 12.70 "W	RIVER BASIN Ohlo RIVE-					
STORET #	AGENCY					
INVESTIGATORS D. Godel, G. G	erke	LOT NUMBER				
FORM COMPLETED BY D. Godec	DATE 8/13/11 TIME 6:30 AM PR	REASON FOR SURVEY				

HABITAT TYPES	Indicate the percentage of each habitat type present ACobble 20% AS Snags 5% Uvegetated Banks 7% Sand % Submerged Macrophytes 6% Other ()%
SAMPLE COLLECTION	Gear used D-frame Dikick-net Mother GrabSample, Aquant Net
	How were the samples collected? Awading A from bank D from boat
	Indicate the number of jabs/kicks taken in each habitat (ype. ACobble Snags Vegetated Banks Sand Submerged Macrophytes AOther (shallow backack)
GENERAL	poor
COMMENTS	

QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	0 1 2 3 4	Slimes	0 1 2 3 4
Filamentous Algae	(0) 1 2 3 4	Macroinvertebrates	0 1 2 3 4
Macrophytes	01234	Fish	(0) 1 2 3 4

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3= Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	$\widehat{(1)}$	2	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	ĭ	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0		2	3	4	Other	0	1	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	1	2	3	4						·
Oligochaeta	0	(1^{2})	2	3	4	Sialidae	0	1	2	3	4						
Isopoda	0	$\underline{1}$	2	3	4	Corydalidae	0	0	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4						
Gastropoda	0	1	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4						
L						Culcidae	0	1	2	3	4						

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STREAM NAME STREAM 8B	LOCATION Mildrell Land Fill, Cresap, Maghall Co., WV
STATION # RIVERMILE	STREAM CLASS EPhemeral
LAT 39°49'52.19'N LONG 20°46'13,55"W	RIVER BASIN OL'O River
STORET #	AGENCY
INVESTIGATORS D. Godec, G. Ger	ke , ,
FORM COMPLETED BY D. Godec	TIME 8:30 AM PM REASON FOR SURVEY AEP Mildel / Land All PO ject

	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	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.	
ed in	score 19	20 19 18 17 16	13 14 13 12 11	<u>10 9 8 7 6</u>	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).	No Flow
HEL.	score U	20 19 18 17 16	15_14 13 12 11	10 9 8 7 6	5 4 3 2 1 🙆	
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 <u>1</u> 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 nifile substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.	Nowate
	score ()	20 19 18 17 16	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3 2 1 0	

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Stream 8B (cont.)

			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 20	20 19.518 17.516	<u>15 14 13 12 11</u>	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 (20 19 <u>18</u> 1 <u>7 16</u>	<u>15 14</u> 13 12 <u>11</u>	10 9 2 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.		
to be cv3	SCORE S (LB) SCORE S (RB)	Left Bank 10 9 Right Bank 10 9	3 7 6 3 7 6	5 4 3 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 <u>(</u> LB)	Left Bank = 10 - 9 -	8 7 0	4 3	2 1 0		
	SCORE (RB)	Right Bank 10 - 9	8 7 6	2015 5 10 4 10 13 18 10	2 1 0		
	10. Riparlan 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 $\frac{10}{10}$ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1		
	SCORE 10 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0		

Total Score 113

STREAM NAME Stream 9	LOCATION Mitchell Landfill, (rogp, Marshall Co., WV		
STATION # RIVERMILE	STREAM CLASS Ephomoru/		
LAT39º49'50.47"NLONG80.489.27"W	RIVER BASIN Ohio River		
STORET #	AGENCY		
INVESTIGATORS D, Godec, G. C	berte		
FORM COMPLETED BY D, Godec	TIME 10:30 AM PM AEP Mitchell Land fill Ploject		

	Habitat	Condition Category				
	Parameter	Optimal	Suboptimal	Marginal	Poor	1
	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 🕉	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0	
t 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.	
ed i	score しつ	20 19 18 <u>17</u> <u>16</u>	14 13 12-11	<u>10 9 8 7 6</u>	5 4 3 2 1 0	
Parameters to be cvaluated 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).	no flow, Tustisolade Small pools
Lam(SCORE	20 19 18 17 16	15 14 13 12 11	<u>10 9 8 7 6</u>	5 4 3 2 1 🕥	
Pa	4. Sediment Deposition	¹ 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 <u>19 18 17 16</u>	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.	som small Pools pront
	SCORE 7	20 19 18 17 16	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3 2(1)0	

no flow, Tust isoladed Small pools

Stregm 9-ephoneral portion (cont.)

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

	TT-1 24-4	itat Condition Category			
	Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
	6. Chaonel 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 ZO	20 19 18 17 16	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3 2 1 0
ag reach	7. Frequency of Riffes (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	<u>15 14 13 12 11</u>	10 9 8 7	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 (LB)	Left Bank 10 9		5 4 3	2 1 0
s to b	$\text{SCORE} \underline{\bigcap} (\text{RB})$	Right Bank 10 9	8 (7) 6		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 <u>5</u> (lb) score <u>5</u> (rb)	Left Bank 10 9 Right Bank 10 9	8 7 6 8 7 6		2 1 0 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.
	$s_{\text{CORE}} \frac{0}{10} (\text{LB})$	Left Bank (10) 9	8 2 6	5 4 3	2
	SCORE 10(RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total Score 107

STREAM NAME STORY M9	LOCATION Mitchell Land Fill, Cresap, Marshall Co., WV		
STATION # RIVERMILE	STREAM CLASS Intermittert		
LAT39°49'50.01"N LONG80°46'11.11" W	RIVER BASIN OHIO RIVER		
STORET #	AGENCY		
INVESTIGATORS D. GOOL, G. GE	ke ,		
FORM COMPLETED BY D. Godec	TIME 10100 M PM REASON FOR SURVEY		

	Habitat	Condition Category			
	Parameter	Optimal	Suboptimal	Marginal	Poor
	1. Eplfaunal 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 habital; 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 3	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 ir	score 17	20 19 18 17 16	<u>15 14 13</u> 12 11	<u>10 9 8 7 6</u>	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).
and a	$_{\text{score}}$ 2	20 19 18 17 16	<u>15 14 13 12 11</u>	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 15	20 19 18 17 16	(3) 14 (13) 12 11.	<u>10 9 8 7 6</u>	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	<u>15 14 13 12 11 </u>	10 9 8 7 6	5 4 3 2 1/0

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Stream 9-intermittent portion (cont.)

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

Γ	Habitat	itat 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 20	20 19 18 17 16		10 9 8 7 6	5 4 3 2 1 0	
ing reach	7. Frequency of RiMes (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.	
lines	SCORE 🚫	20 19 18 17 16	15 <u>14 1</u> 3 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 cach 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.	
s to be e	$\frac{\text{SCORE} (LB)}{\text{SCORE} (RB)}$	Left Bank 10 9 Right Bank 10 9	i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i	5 4 3 5 4 3	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
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 <u>5</u> (lb) score <u>5</u> (rb)	Left Bank 10 9 Right Bank 10 9	8776 8776		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.	2 2 1 0 Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.	
	SCORE <u> 0</u> (LB) SCORE 0 (RB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 2 0	
	SCORE IV (RB)	Right Bank (10) 9	8.7-6	5 4 3	1 0	

Total Score 125

A-8 Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 2

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME STREAM 9	LOCATION AEP Mitchell Landfill, Cresap, Marshall Co, WV		
STATION # RIVERMILE	STREAM CLASS INTERMITTENT		
LAT39949'5001"N LONG 80'46'11,11"W	M RIVER BASIN Ohio Kivtor		
STORET #	AGENCY		
INVESTIGATORS D.GOdec, G. Gey			
FORM COMPLETED BY	TIME <u>10:00</u> AM PM REASON FOR SURVEY A&P Mitchell Landfill Project		

WEATHER CONDITIONS	Now Past 24 hours Has there been a heavy rain in the last 7 days? Image: storm (heavy rain) rain (steady rain) showers (intermittent) clear/sunny Air Temperature 0 C
SITE LOCATION/MAP	Draw a map of the site and indicate the areas sampled (or attach a photograph) See photographs and Figure 5 from the Jursi dictional Waters delineation Report
STREAM CHARACTERIZATION	Stream Subsystem Stream Type Perennial Aintermittent Stream Origin Catchment Area Glacial Spring-fed Mixture of origins Other

Stream 9-intermittent portion (cond.)

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

WATERSHED FEATURES	Predominant Surrounding Landuse A Forest Commercial O Field/Pasture I Industrial A gricultural O ther C Residential	Local Watershed NPS Pollution No evidence Some potential sources Obvious sources Local Watershed Erosion
		None Moderate Heavy
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the do A Trees Shrubs dominant species present Sym raph, be	minant species present A Herbaceous li Grasses ech, red maple, 5 picebish, Christmas Fern, ASV
INSTREAM FEATURES	Estimated Reach Length $\frac{30.48}{20.9}$ m 100% Estimated Stream Width $\frac{20.9}{200}$ m 3.64 Sampling Reach Area $2.7.43$ m ² Area in km ² (m ² x1000) $\frac{00002.74}{20002.74}$ km ² Estimated Stream Depth 0.03 m 1.42 Surface Velocity 0.05 m/sec (at thalweg)	 Canopy Cover Partly open □ Partly shaded □ Shaded High Water Mark <u>^0.9</u> m 3 € 4, Proportion of Reach Represented by Stream Morphology Types PRUP 0 %
LARGE WOODY DEBRIS	LWD <u>2</u> m ² Density of LWD 72 <u>913</u> m ² /km ² (LWD/1	reach area)
AQUATIC VEGETATION	Indicate the dominant type and record the do Rooted emergent Rooted submerge Floating Algae Attached Algae	minant species present int
	dominant species present	
	Portion of the reach with aquatic vegetation _	0_%
WATER QUALITY	Temperature 19,02 °C Specific Conductance 0.286 MS/cm Dissolved Oxygen 5,38 mg/L	Water Odors XI Normal/None Sewage OPetroleum Chemical Fishy Other
	рн_1,04	Water Surface Oils Slick Sheen Globs Flecks None Other
	Turbidity 87.4 WQ Instrument Used Horib9	Turbidity (if not measured) StClear I Slightly turbid I Turbid Opaque I Stained Other
SEDIMENT/ SUBSTRATE	Odors XNormal Q Sewage Q Petroleum Chemical Q Anaerobic Q None	Deposits None Sludge Sawdust Paper fiber Sand Relict shells Other
	□ Other Oils Absent □ Slight □ Moderate □ Profu	Looking at stones which are not deeply embedded, are the undersides black in color? se Yes ANO
INORGANIC SU	BSTRATE COMPONENTS	ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)		ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)			
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock		30%	Detritus	sticks, wood, coarse plant materials (CPOM)	25%
Boulder	>256 mm (10")	10%		materials (CI OM)	2370
Cobble	64-256 mm (2.5"-10")	50%	Muck-Mud	black, very fine organic (FPOM)	
Gravel	2-64 mm (0.1"-2.5")	10%			
Sand	0.06-2mm (gritty)		Marl	grey, shell fragments	
Silt	0.004-0.06 mm				
Clay	< 0.004 mm (slick)				

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME SVRGM O	LOCATION MILLON	dfill, Cresap, Marshall Co., WV
STATION # RIVERMILE	nittent	
LAT 31 49'50.07"N LONG 9046 11.11"W	River	
STORET #	AGENCY	
INVESTIGATORS D. Godec		LOT NUMBER
FORM COMPLETED BY D. Godec, G. Gerfe	DATE <u>8/14/11</u> TIME 1 <u>0:00</u> (AM) pm	REASON FOR SURVEY AEP Millen ILand fill Project

HABITAT TYPES	Indicate the percentage of each habitat type present Cobble 50 % Snags () % Vegetated Banks () % Sand () % Submerged Macrophytes () %			
SAMPLE COLLECTION	Gear used D-frame kick-net Other Grab Sample, Aquation net How were the samples collected? Wading from bank from boat Indicate the number of jabs/kicks taken in each habitat type. A Cobble Snags Vegetated Banks Sand Submerged Macrophytes A Other (NAC); Sand			
GENERAL COMMENTS	Sample reach begins at epheneral intermittent break point, N. Dusley Salamanders observed (adults)			

QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	0 1 2 3	4 Slimes	
Filamentous Algae	Ø 1 2 3	4 Macroinvertebrates	
Macrophytes	<u>()</u> 1 2 3	4 Fish	01234

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3 = Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	1	2	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other	0	1	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	1	2	3	4						•
Oligochaeta	0	1	2	3	4	Sialidae	0	1	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	1	(2)	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	1	$\underbrace{\checkmark}_2$	3	4						
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4						
Gastropoda	0	1	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4						
	-					Culcidae	0	1	2	3	4						

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STREAM NAME STREAM 10	LOCATION Mitchell Landfill, Cresap, Marshyll Co., WV				
STATION # RIVERMILE	STREAM CLASS Ephemera				
LAT 39" 49 49.75" N LONG 60 46 18.26" W	RIVER BASIN Ohi'O River				
STORET #	AGENCY				
INVESTIGATORS D. GODEC, G.G.	ier ka				
FORM COMPLETED BY D. Godec	TIME 11130 AM M AEP Mitchell Land fill Project				

Habitat		Condition	Category	
Parameter	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Avallable 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 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 く	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0- 25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25- 50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50- 75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
score 13	20 19 18 17 16	15 14 🛈 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness SCORE 3. Velocity/Depth Regime SCORE	All four velocity/depth regimes present (slow- deep, slow-shallow, fast- deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast- shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	10.9.8.7.6	5 4 3 2 (1) 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 (1)	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	20 <u>19</u> 18 17 <u>16</u>	15 14 13 12 11	10 9 8 7 6	(5) <u>4</u> <u>3</u> <u>2</u> <u>1</u> <u>0</u>

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Score based On 81/13/11 Stream distribus

Stream 10 - ephenoral + Ortion (cont.) HABITAT ASSESSMENT FIELD DATA SHEET-HIGH GRADIENT STREAMS (BACK)

-			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	<u>15 14 13 12 11</u>	<u>10 9 8</u> 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 O	20 19 <u>18 17 16</u>	15 14 <u>13 12</u> 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 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
stob	SCORE (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.
	$s_{\text{CORE}} \underline{\mathcal{U}}_{(\text{LB})}$	Left Bank 10 9	8 7 6	5 🚯 3	2 1 - 0
	$\underline{SCORE} \underline{U}_{(RB)}$	Right Bank 10 9	8 7 6	5 (4) 3	2 1 0
	10. Riparian Vegetative Zonc 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.
1	SCORE (LB)	Left Bank 10	8 8 7 6		2 1 0
	SCORE (RB)	Right Bank 10 (9)	8 7 1 25 6 12	5 4 3	2 1 0

Total Score 92

HADITAT ASSESSMENT FIELD DZ	
STREAM NAME Stream O	LOCATION Mildrell Landfill, Cresap, Marshall Co., WV
STATION # RIVERMILE	STREAM CLASS Intermittent
LAT39°49'48.34"N LONG 80°46'15.00"W	RIVER BASIN OLIO RIVER
STORET #	AGENCY
INVESTIGATORS D. Rodec G.	Serke

DATE 8/14/11 TIME 115

ам РМ

FORM COMPLETED BY,

D. Godec

REASON FOR SURVEY AEP Mitchell Landfill Project

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

	TT-14-4		Condition	Category	
	Habitat 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 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 13	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.
ed it	SCORE 17	20 19 18 17 16	15 14 13 12 11	10 <u>9 8</u> 7 <u>6</u>	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).
ran(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.
1	score (O	20 <u>19 18</u> 17 <u>16</u>	15 14 13 12 11	0 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	20 19 18 17 16	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3 2 1 0

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Stream 10-intermittent portion (cont.)

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

			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 20	19 18 17 16	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3 2 1 0
ling reach	7. Frequency of RiMes (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 16	20 19 18 17 16	<u>15 1</u> 4 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.
to be eva	score $\underline{7}$ (LB) score $\underline{7}$ (RB)	Left Bank 10 9 Right Bank 10 9	8 (7) 6 8 (7) 6	<u>5</u> <u>4</u> 3 <u>5</u> <u>4</u> 3	2 1 0 2 1 0
Parameters to	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 $\underline{\underline{3}}$ (LB) SCORE $\underline{\underline{5}}$ (RB)	Left Bank, 10, 9 Right Bank-10, 9	8 7 6 (8) 7 6	5 4 <u>3</u> 5 4 <u>3</u>	$\begin{array}{c c} 2 & 1 & \dots & 0 \\ \hline 2 & 1 & \dots & 0 \\ \hline \end{array}$
	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 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	SCORE 0 (RB)	Right Bank 10 9	8	5 4 3	2 1 0

Total Score 137

A-8 Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 2

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME	ean 10	LOCATION Mitchell Landfill, Cresap, Marshall Co, WV
STATION # RI	VERMILE	STREAM CLASS Internittent
LAT39049'48,34"N LC	NG 2046 15.00W	RIVER BASIN ONIO RIVEY
STORET #		AGENCY
INVESTIGATORS D,C	vodec, G.Ger	Ke
FORM COMPLETED BY	. GodeC	DATE 0/14/11 TIME 1:15 AM (PM) REASON FOR SURVEY AEP Mitchell Landfill Project
WEATHER CONDITIONS	in rain (shower 100 % (20) % c	Past 24 hours Yes No (heavy rain) Alr Temperature 20 °C s (intermittent) Other loud cover %
SITE LOCATION/MAP	Draw a map of the si	te and indicate the areas sampled (or attach a photograph)
	ť	Photographs and figure 5 of the Jurisdictional Waters delineation eport
STREAM CHARACTERIZATION	Stream Subsystem/ Perennial Vin Stream Origin Glacial St Non-glacial montar Swamp and bog	termittent 🗆 Tidal Stream Type Coldwater 🗆 Warmwater Catchment Areakm ² Mixture of origins Other

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Stream 10 (cont.)

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

				7
WATERSHED FEATURES	Predominant Surrounding Land Forest Commer Field/Pasture Industria Agricultural Other Residential	cial	Local Watershed NPS Pollution No evidence Some potential sources Obvious sources Local Watershed Erosion Mone Moderate Heavy	
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and A Trees dominant species present 5059	record the domin	ant species present Herbaccous IGrasses a pla, tul 10 poplar, An. elm, spica bush, we	od no tile,
INSTREAM FEATURES	Estimated Reach Length 30.4 Estimated Stream Width 1.6-2 Sampling Reach Area	13 m 100ft <u>H</u> m 6-8ft <u>10</u> m ² <u>10</u> ⁶ m 1+2 had on avg	Canopy Cover Partly open Partly shaded Shaded High Water Mark 16-2.4 m 6-8+4, Proportion of Reach Represented by Stream Morphology Types Riffle % QRun %	Aure Lern
LARGE WOODY DEBRIS	LWD <u>2</u> m ² Density of LWD <u>3 245,1</u> m	²/km² (LWD/ reac	h area)	
AQUATIC VEGETATION	Indicate the dominant type and O Rooted emergent O Ro O Floating Algae O Att dominant species present O Portion of the reach with aquati	tached Algae	Ant species present Rooted floating 	
WATER QUALITY	Temperature 8.17 °C Specific Conductance 0.311 Dissolved Oxygen 8.43 Yr pH 7.24 Turbidity 357 WQ Instrument Used Horuge	m5/cm 19/1	Water Odors Normal/None Sewage Petroleum Chemical Fishy Other Water Surface Oils Slick Slick Sheen Globs Vater Surface Oils Flecks Slick Other Turbidity (if not measured) Turbid McClear Slightly turbid Turbid Opaque Stained Other	-
SEDIMENT/ SUBSTRATE	Odors Normal Sewage Chemical Anacrobic Other Olls Absent Slight Moderat	Petroleum None	Deposits NOAR Sludge Sawdust Paper fiber Sand Relict shells Other Looking at stones which are not deeply embedded, are the undersides black in color? Yes ANO	
	BSTRATE COMPONENTS d add up to 100%)	O	RGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)]

INC	RGANIC SUBSTRATE (should add up to)		(does not necessarily add up to 100%)				
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition In Sampling Area		
Bedrock		15%	Detritus	sticks, wood, coarse plant materials (CPOM)	1501		
Boulder	>256 mm (10")	25%		materials (CrOw)	<5%		
Cobble	64-256 mm (2.5"-10")	30%	Muck-Mud	black, very fine organic (FPOM)	~~~~		
Gravel	2-64 mm (0.1"-2.5")	20%		(PFOM)			
Sand	0.06-2mm (gritty)		Marl	grey, shell fragments	a %		
Silt	0.004-0,06 mm	10%			0/0		
Clay	< 0.004 mm (slick)]				

STREAM NAME Stream 10	LOCATION Mitchell Land Pill, Cresap, Marshall	TCO.,WV	
STATION # RIVERMILE	STREAM CLASS Intermittent		
LAT 31 49 48.34 N LONG 80 46 15,00 W	RIVER BASIN OHIO RIVER		
STORET #	AGENCY		
INVESTIGATORS D. GODEC, G.	Gerko, LOT NUMBER		
FORM COMPLETED BY D. Godel	TIME 1:30 AM (P) REASON FOR SURVEY	<i>}) </i>	

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

• ;

HABITAT TYPES	Indicate the percentage of each habitat type present Cobble 70% ASnags 5% Uvegetated Banks % Sand % Submerged Macrophytes % A Other (rifflas, pools) 70%
SAMPLE	Gear used & D-frame kick-net & Other Grab Sam 10, Aquartur net
COLLECTION	How were the samples collected? wading A from bank D from boat
	Indicate the number of jabs/kicks taken in each habitat type. A Cobble A Snags D Vegetated Banks D Sand D Submerged Macrophytes A Other (r / ff af, foots)
GENERAL COMMENTS	N. Dusky Salamanders (Adults)

QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton		Slimes	(0) 1 2 3 4
Filamentous Algae	(2) 1 2 3 4	Macroinvertebrates	0 1 2 3 4
Macrophytes	(0) 1 2 3 4	Fish	01234

FIELD OBSERVATIONS OF MACROBENTHOS

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Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3= Abundant (>10 organisms), 4 = Dominant (>50 organisms)

			_							_							_
Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	1	2 (3	4
Platyhelminthes	0	I	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	(Γ)	2	3	4	Other	0	1	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	ĭ	2	3	4						
Oligochaeta	0	1	2	3	4	Sialidae	0	1	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	1	(A)	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	1	$\tilde{2}$	3	4						
Decanoda,	0	1	(2)) 3	4	Empididae	0	1	2	3	4						
Gastropoda	0	1	2	3	4	Simuliidae	0	í	2	3	4						
Bivalvia	0	1	2	3	4,	Tabinidae	0	1	2	3	4						
1.						Culcidae	0	1	2	3	4						
1. Contraction of the second s																	
e_																	

Rapid Bioassessment Protocols For Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Edition - Form 1



STREAM NAME STREAM 10A	LOCATION Mitchell Land Fill, Cresap, MarshallCo, WV
STATION # RIVERMILE	STREAM CLASS E Dhem Pra
LAT39º49'49.26'N LONG 00'46 18,79"W	RIVER BASIN OLIO RIVER
STORET #	AGENCY
INVESTIGATORS D. Goder, G.G.	erke
FORM COMPLETED BY D. Godec	TIME 12:30 AM ED AEP Mitchell Lund All Maje

	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 6	20 19 18 17 16	<u>15 14 13 12 11</u>	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.	
ed in	SCORE	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).	Scone bastdon Iack of Flow observe On S /13/11
Lam($_{\text{score}}$ U	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 3	20 19 18 17 16	15 14 (13) 12 11	<u>10 9 8 7 6</u>	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.	Sconobased an Inckofflow Orpsols Observed an
	SCORE U	<u>20 19 18 17 16</u>	<u>15 14 13 12 11</u>	10 9 8 7 6	<u>5 4 3</u> 2 1 ()	8 /13/11

Scone bashdon Iack of Flow observed Un 8/13/11

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Stream 10 A (cont.) HABITAT ASSESSMENT FIELD DATA SHEET-HIGH GRADIENT STREAMS (BACK)

	Tabiaa		Condition	Category	· <u>-</u> · · · ·
1	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 9	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
vling 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 🛇	20 19 18 17 16	<u>15 14 13 12 11</u>	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 croded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
to be ev	facing downstream. SCORE $\underline{\mathcal{T}}$ (LB) SCORE $\underline{\mathcal{T}}$ (RB)	Left Bank109Right Bank109	8 (7) 6 8 (7) 6	<u>5</u> 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 $\frac{1}{7}$ (LB)	Left Bank 10 9	8 0 6		2 1 0
	SCORE (RB)	Right Bank 10 9	8 🕢 6		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.
	$\frac{\text{SCORE}}{\text{SCORE}} \underbrace{(LB)}{(RB)}$	Left Bank 10 9 Right Bank 10 9.	<u>8 7 6</u> 8 7 6	5 4 3 5 4 3	2 1 0 2 1 0

Total Score 103

Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 2 A-8

STREAM NAME Stream 11	LOCATION Mitchell Landvill, Cresap, Marshall G., WV
STATION # RIVERMILE	STREAM CLASS Bohlmeral
LAT 39949 44. 88"N LONG 1046 12,92"W	RIVER BASIN OLIO RIMER
STORET #	AGENCY
INVESTIGATORS D. Godec. G.G.	erke
FORM COMPLETED BY	TIME 2:30 AM M AEP Mitchell Cardfill Project

	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 (5	20 19 18 17 16,	(15) 14 13 12 <u>11</u>	10 9 8 7 6	5 4 3 2 1 0	
a 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 i	SCORE 6	20 19 18 17 16	15 <u>14 13 12 11</u>	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).	Score basedo. lack of flow observedom 8/13/11
Lan	score ()	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1	
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 15	20 <u>19 18 17 16</u>	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 riftle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.	Scone based on 19ck of flow Observed on 8/13/11
1	SCORE	20 19 18 17 16	<u>15 14 13</u> 12 11	10 9 8 7 6	5 4 3 2 1 🖉	

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Stream 11 (cont.)

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

		Γ	Condition		
	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 20	20 19 18 17 16	15 14 13 12 11	10 9 8 7 5 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 6	20 19 18 17 16	<u>15 14</u> 13 12 11	<u>10 9 8 7</u>	543210
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 cva	SCORE 8 (LB)	Left Bank 10 9	3 7 6	5 4 3	2 1 0
s to be	SCORE 8 (RB)	Right Bank 10 9	3 -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 (LB)	Left Bank 10 9	8 7 6	4 3 	2 1 0
	SCORE C (RB)	Right Bank 10 9	(8) 7 6	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 activilies have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
	score 0 (LB)	Left Bank (10) 449	8 7 6	5 4 3	2 1 0
	SCORE (CRB)	Right Bank 10 9	8	<u> </u>	2 1 0

Total Score 124

Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 2

A-8

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STREAM NAME STREAM 12	LOCATION Mitchell Land Fill, CresaD, Marshall Co., WV
STATION # RIVERMILE	STREAM CLASS E PHEMENE
LAT 39º 49' 44,13"N LONG 80'46' 653" W	RIVER BASIN OHIO RIVEC
STORET #	AGENCY
INVESTIGATORS D, GODOC, G, GP	rk .
FORM COMPLETED BY D, Godec	TIME \$100 AM P AEP Mitchell Land fill Project

	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 3	<u>20 19 18 17 16</u>	15 14 13 12 11	10 9 8 7 6	<u>5</u> <u>4</u> <u>3</u> <u>2</u> <u>1</u> <u>0</u>	
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.	
ed in	score , 16	20 19 18 17 (6)	15 14 13 12 11	<u>10 9 8 7 6</u>	<u>5 4 3 2 1 0</u>	
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).	score based on lack of flow observed UN 8/13/11
Lan	score ()	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 3	20 <u>19</u> 18 17 16	15 14 13 12 11	10 9 8 7 6	5143210	
	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 niffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.	Score basedon lack of flow and pool observed on
	SCORE	20 19 18 17 16	<u>15</u> 14 <u>13 12 11</u>	10 9 8 7 6	5 4 3 2 1 0	8/13/11

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Stream 12 (cont.)

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

_	Habitat		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 20	20 19 18 17 16	<u>15</u> 14 <u>13 12 11</u>	10 9 8 7 6	5 4 3 2 1 0
tg 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 🛇	20 <u>19 18 17 16</u>	15 14 13 12 11	10 9 8 7 6	5 4 <u>3 2 1 0</u>
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 S (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
s to b	SCORE <u>8</u> (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
Parameters to	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	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 $\underline{3}$ (LB) score $\underline{3}$ (RB)	to grow naturally. Left Bank 10 9 Right Bank 10 9	8 7 6	5 4 (j)	2 1 0 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 <u>10</u> (lb)	Left Bank 10 9	8 7 6	5 4 4 3	2 1 0
	SCORE (0 (RB)	Right Bank (10)	8 7 6	5 4 3	2 - 1 - <u>0</u> - <u>0</u>

Total Score |||

A-8 Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 2

STREAM NAME Stream 3	LOCATION Mitchell Landfill, Cresap, Marshall Co., WV					
STATION # RIVERMILE	STREAM CLASS CPhemeral					
LAT 39º 49'38.27"N LONG 80º46' 11.39 "W	RIVER BASIN Ohio River					
STORET #	AGENCY					
INVESTIGATORS D, Godec, G.G.	er ke					
FORM COMPLETED BY. D. Godec	TIME UISO AN D REASON FOR SURVEY					

	Habitat		Condition	Category	
	Parameter	Optimal	Suboptimal	Marginal	Poor
	1. Eplfaunal 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 3	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.
Parameters to be evaluated in sampling reach	score 15	20 19 18 17 16	(15) 14 13 12 11	<u>10 9 8 7 6</u>	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). S 0WSh9 low
ΠĘ	score <u>S</u>	20 19 18 17 16	<u>15 14 13 12 11</u>	10 9 8 7 6	3 4 3 2 1 0
Para	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 4 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 nffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE 1	20 <u>19</u> 18 <u>17 16</u>	<u>15 14 13 12 11</u>	10 9 8 7 6	5 4 3 2 1 0

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Stream 13 - ephemeral portion (cont.)

ga Nord The

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

		<u>_</u>	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 20	20 19 18 17 16		10 9 8 7 6	<u>5</u> 4 3 2 <u>1</u> 0
g 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.
sampl	score 6	20 19 18 17 16	15 <u>14 13 12</u> 11	10 9 8 7 3	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.
to be ev:	SCORE (LB) SCORE (RB)	Left Bank109Right Bank109	3 7 6 3 7 6		2 1 0 2 1 0
Parameters to b	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 (LB)	Left Bank 10. 94	8' (1) - 6	5 4 3	2 1 0
	SCORE (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 $\frac{10}{10}$ (LB)	Left Bank 10 2	27 6 8 2 7 6	5 4 3	2 1 2 0
	SCORE U (RB)	Right Bank (10) 9	8 7 6	5 4 3	1 2 1 0

Total Score 129

STREAM NAME Stream 3	LOCATION Mitchell Land fill, Cresap, Marshall Co., W
STATION # RIVERMILE	STREAM CLASS INtermittent
LAT 39 49 38.81"N LONG 1046 10,38 "W	RIVER BASIN Ohio River
STORET #	AGENCY
INVESTIGATORS D, Godec, G, GE	rke ,
FORM COMPLETED BY D. GODOC	TIME 4115 AM PM AEP Mitchell Landvill Project

	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 14	20 19 18 17 16	15 (14) 13 12 11	10 <u>9</u> 87 <u>6</u>	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.	
<u>e</u> r E	score 15	20 19 18 17 16	14 - 13 - 12 - 11	<u>10 9 8 7 67</u>	5 4 3 2 1 0	
Parameters to be evaluated in sampling reach	3. Velocity/Depth All four velocity/depth regime 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).	slight slow shullow flow in sona parting of channel (likelydvato rainfallpartos night)
LI RI	SCORE	20 19 18 17 16	15 <u>14 13 12 11</u>	10 9 8 7 6	5 4 3 2 0 0	night)
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 3	20 <u>19 18 17 16</u>	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0	
	5. Channel Flow Status		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 Z	<u>20 19 18 17 16</u>	<u>[5 14 13 12 11</u>	<u>10 9</u> 8 7 6	5 4 3 2 1 0	

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Stream 13-intermittent portion (cont.) HABITAT ASSESSMENT FIELD DATA SHEET-HIGH GRADIENT STREAMS (BACK)

			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 20	20 19 18 17 16	<u>15 14 13 12 11</u>	<u>10 9 8 7</u> 6	5 4 3 2 1 0		
ig 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 habital; distance between riffles divided by the width of the stream is a ratio of >25.		
differs	SCORE 6	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.		
to be ev:	SCORE $\underline{\neg}$ (LB) SCORE $\underline{\neg}$ (RB)	Left Bank 10 9 Right Bank 10 9	8 () 6 8 () 6	5 4 3 5 4 3	2 1 0 2 1 0		
Parameters to b	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 <u>S</u> (LB)	Left Bank 10 9	8 7 6	<u>3</u> 4 3	2 1 0		
1	score」(RB)	Right Bank-10 9	8 7 6	(5) 4 3	2 1 01		
	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 (0) (LB)	Left Bank (10) 9	7 6	4 3 3 1 4 3 3 1 4 4 5 3 1 4 4 5 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1 4 5 1	2 1 <u>0</u>		
	SCORE (O (RB)	Right Bank(10) 9	8 7 6	5 4 3			

Total Score 125

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME STREAM	am (3	LOCATION Mitchell Landfill, Cresap, Marshall Co., W					
	VERMILE	STREAM CLASS INTERMITTENT					
LAT39049'38.91"N LO	NG 80 46 10.38 W	RIVER BASIN OHIO RIVEY					
STORET #		AGENCY					
	bodec, G.Ger	erke					
FORM COMPLETED BY).Godec	DATE 8/14/11 TIME 415 AM M REASON FOR SURVEY AED Mitchell Landfill Project					
WEATHER CONDITIONS	Now	Past 24 Has there been a heavy rain in the last 7 days? hours Yes No					
	□ rain (□ showers ₩0_%24 %c	m (heavy rain) Air Temperature 23 ° C n (steady rain) Of Air Temperature 23 ° C ers (intermittent) Of Other clear/sunny St					
SITE LOCATION/MAP	Draw a map of the sid	site and indicate the areas sampled (or attach a photograph)					
	Sec	: Photographs + figure 5 of the					
		: Photography + figure 5 of the Jurisdictional Watery delineation					
		report					
		ų					
STREAM CHARACTERIZATION	Stream Subsystem						
	Stream Origin Glacial Non-glacial montan Swamp and bog	Catchment Areakm ²					

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PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

- TEAM I	/(
WATERSHED FEATURES	Predominant Surrounding Landuse Forest Commercial Field/Pasture Industrial Agricultural Other Residential	Local Watershed NPS Pollution No evidence Some potential sources Obvious sources Local Watershed Erosion None Moderate Heavy
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the domin of Trees Shrubs dominant species present Survey white	Herbaceous Kash, Am, elm, Spicebush, wood nettle, ter,
INSTREAM FEATURES	Estimated Reach Length $\frac{30.48}{1.8}$ m 100 ft. Estimated Stream Width $\frac{-1.8}{1.8}$ m 6 ft. Sampling Reach Area $\frac{54.9}{1.9}$ m ² Area in km ² (m ² x1000) $\frac{000454}{1.0254}$ km ² Estimated Stream Depth $\frac{0.0254}{1.0254}$ m 1 inch. Surface Velocity 0.1 m/sec	Canopy Cover Partly open Partly shaded Shaded High Water Mark ~1.2 m 674, Proportion of Reach Represented by Stream Morphology Types
	(at thalweg)	Dam Present D Yes XNo
LARGE WOODY DEBRIS	LWDm ² Density of LWD 7 <u>2,581,7</u> m ² /km ² (LWD/ reac	h area)
AQUATIC VEGETATION	Indicate the dominant type and record the domin Control Rooted submergent Floating Algae dominant species present Control Control	Ant species present Rooted floating Free floating
WATER QUALITY	Portion of the reach with aquatic vegetation () Temperature <u>19.42</u> ° C Specific Conductance <u>0.299</u> MS/CM Dissolved Oxygen <u>6.16</u> mg/L pH <u>6.87</u>	Water Odors Normal/None Sewage Petroleum Chemical Fishy Other Water Surface Oils Slick Sheen Globs Flecks
	Turbidity <u>400</u> WQ Instrument Used <u>Horiba</u>	QNone Other Turbidity (if not measured) Turbid QClear Slightly turbid Turbid Opaque Stained Other
SEDIMENT/ SUBSTRATE	Otors Normal Sewage Petroleum Chemical Anaerobic None Other	Deposits None_ Galudge Sawdust C Paper fiber Sand Relict shells C Other
	Oils A Absent I Slight I Moderate I Profuse	Looking at stones which are not deeply embedded, are the undersides black in color? U Yes 2000

1NC	ORGANIC SUBSTRATE (should add up to 1		ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)				
Substrate Type	Diameter	% Composition In Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area		
Bedrock	Irock 0%		Detritus	sticks, wood, coarse plant materials (CPOM)	Ω^{q}		
Boulder	>256 mm (10")	30%			070		
Cobble	64-256 mm (2.5"-10")	30%	Muck-Mud	black, very fine organic (FPOM)	May		
Gravel	2-64 mm (0.1"-2.5")	25%		(FFOM)	0		
Sand	0.06-2mm (gritty)		Marl	grey, shell fragments	A 11		
Silt	0,004-0,06 mm	- X-			0%		
Clay	< 0.004 mm (slick)	5%]				

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME	itream 13	LOCATION Mile	hell La	nd AM, Crosup, Marshall Co., WV				
STATION #	STREAM CLASS	STREAM CLASS Intermitient						
LAT 39°49' 38.81"	V LONG 10'46'10 28"W	RIVER BASIN	Ohio	River				
STORET #		AGENCY						
INVESTIGATORS	erke	_	LOT NUMBER					
FORM COMPLETED	DATE <u>8/14/1</u>) TIME <u>4:30</u>	ам РМ	REASON FOR SURVEY AEP Mitobell Landfill Project					
HABITAT TYPES	Indicate the percentage of Cobble%	ags% ÜŪVe	egetated Ba	anks%				
SAMPLE COLLECTION	How were the samples coll Indicate the number of jab	Submerged Macrophytes % Other (r) + Flos % Gear used D-frame kick-net Mother Grap 5 ample, aquarbum not How were the samples collected? Wading from bank Indicate the number of jabs/kicks taken in each habitat type. ACobble Snags Wegetated Banks						
GENERAL COMMENTS				sàndj#rniles)				

QUALITATIVE LISTING OF AQUATIC BIOTA

.,

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	01234	4 Slimes	(0) 1 2 3 4
Filamentous Algae	() 1 2 3 4	4 Macroinvertebrates	
Macrophytes	0123	4 Fish	(0) 1 2 3 4

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rarc (1-3 organisms), 2 = Common (3-9 organisms), 3= Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1 2 3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	1 ② 3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1 ② 3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other	0	1 2 3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	1	2	3	4				•
Oligochaeta	0	1	2	3	4	Sialidae	0	1	2	3	4				
Isopoda	0	1	2	3	4	Corydalidae	0	1	2	3	4				
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4				
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4				
Gastropoda	0	1	2	3	4	Simuliidae	0	1	2	3	4				
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4				
						Culcidae	0	1	2	3	4				

STREAM NAME Strey M 14	LOCATION Mitchell Land fill, Crosap, Marshall Co., WV		
STATION # RIVERMILE	STREAM CLASS - E phenera		
LAT 39049 36.14"NLONG 80465.38"W	RIVER BASIN OLO RIVEY		
STORET #	AGENCY		
INVESTIGATORS D, Godec, G.G.	erke		
FORM COMPLETED BY D, Gordec	TIME 6130 AM (M) AEP MitchellLand fill Praject		

	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 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 13	20 19 18 17 16.	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
rarameters to be evaluated in sampling rear	2. Embeddedness	Gravel, cobble, and boulder particles are 0- 25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25- 50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50- 75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
	score 13	20 19 18 17 16	15 14 🚯 12 11	10 9 8 7 6	5 4 3 2 1 0
sters to be charte	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).
ALL	score 🔿	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5.432.10
	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 <u>19</u> 18 17 <u>16</u>	15 14 🚯 12 11		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 ()	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

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No Flow

No flow Pools

Stream 14 - ephemeral portion (cont.)

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

	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 20	20 19 18 17 16		<u>10</u> 9 8 7 <u>6</u>	5 4 3 2 1 0
ng 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	<u>20 19 18 17</u> 16	<u>15 14 13 12</u> 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 dowpstream.	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.
be eva	SCORE (LB)	Left Bank 10 9	3 (7, 6	5 4 3	2 1 0
s to	SCORE <u> (</u> RB)	Right Bank 10 9	7 6	5 4 3	
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.
	$score \frac{\mu}{\lambda}$ (LB)	Left Bank = 10 9) +	8 7 6	5 4 3	2 1 0
	SCORE (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 от по riparian vegetation due to human activities.
	$\text{SCORE}\left(\frac{0}{\sqrt{2}}\right)$ (LB)	Left Bank 109	8	5 <u>4</u> <u>3</u>	2 1 0
	SCORE 10 (RB)	Right Bank 10 9	8-117-16	-5	. 2 1 0.

Total Score 09

A-8 Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 2

STREAM NAME STREAM 14	LOCATION Mitchell Landfill, Gregge, Marshall Co., WV			
STATION # RIVERMILE	STREAM CLASS Internetter t			
LAT 3994937.74"N LONG 8044441"W	RIVER BASIN Ohio RNGC			
STORET #	AGENCY			
INVESTIGATORS 17. GODEL/Greg Gerke,				
FORM COMPLETED BY	DATE 8/14/11 REASON FOR SURVEY			
D. Godel	TIME 6:30 AM (AEP Mitchel/ Land All Project			

	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 8	20 19 182 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.
ied ir	score (6	20 19 18 17 18	15 14 13 12 11	<u>10 9 8 7 6</u>	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).
Гар	score 3	20 19 18 17 16	<u>15</u> 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 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 6	<u>20 19 18 17 16</u>	15 14 13 12 11	10 9 8 7 6	543210

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Stream 14 Intermittent portion (cont.)

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

			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 20	20 19 18 17 16	<u>15 14 13 12 11</u>	10 9 8 <u>7, 6</u>	5 4 3 2 1 0
ling reach	7. Frequency of RiMes (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.
sampl	SCORE 6	20 19 18 17 6	<u>15 14 13 12</u> 11	<u>10 9 8 7 6</u>	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 croded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
to be eva	SCORE (LB) SCORE (RB)	Left Bank 10 9 Right Bank 10 9	a 7 6 b 7 6	5 4 3 5 4 3	2 <u>1</u> 0 2 <u>1</u> 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 (LB)	Left Bank 10 9	8 7 6 8 7 6	5 4 3 5 4 3	2 1 0 2 1 0
	SCORE (RB) 10. Riparian Vegetative Zone Width (score each bank riparian zone)	Right Bank 10 9 Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	8 7 6 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 $\frac{\rho}{(LB)}$	Left Bank (10)	8 7 6	5 4 3	2
	$_{\text{SCORE}} / (RB)$	Right Bank 10 9	8 7 6 1	3	2 1 0

Total Score 140

A-8

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME Stream	1m/4	LOCATION Mitchell Landfill, Cresap, Marshall Co, WV
STATION # RI	VERMILE	stream class Intermittent
LAT 31 49 37.74"N LO	мб <u>@ЧСЧ41''W</u>	RIVER BASIN Ohio River
STORET #		AGENCY
INVESTIGATORS D.	Sodec, Giger	
FORM COMPLETED BY).Gode C	DATE <u>814.11</u> TIME <u>6:30</u> AM (PM) REASON FOR SURVEY APP Mitchell Landfill Project
WEATHER CONDITIONS	u rain (shower ₩ ₩	Past 24 Has there been a heavy rain in the last 7 days? (heavy rain) Air Temperature 20 ° C s (intermittent) Other
SITE LOCATION/MAP		te and indicate the areas sampled (or attach a photograph) photographs and figure Softhe Jurisdictional Waters Dehineation Repurt
STREAM CHARACTERIZATION	Stream Subsystem Perennial A In Stream Origin Glacial ZiNon-glacial montan D Swamp and bog	termittent

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A-5

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

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Stream 1	4 (cont.) (BACK)		
WATERSHED FEATURES	Predominant Surrounding Land A Forest Commerce Field/Pasture Industrial	cial	Local Watershed NPS Pollution SMO evidence Some potential sources Obvious sources	
	Q Agricultural Other Residential		Local Watershed Erosion	
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and in Trees Shr dominant species present <u>517</u>	gor maple, 5	pice bush, Importanspalleda, woo	dnevyle, baswood
INSTREAM FEATURES	Estimated Reach Length 30.43 Estimated Stream Width ~ 1.8 Sampling Reach Area 54.84 Area in km ² (m ² x1000) , 0000 Estimated Stream Depth $101-0$ Surface Velocity 0.1 m/	$\frac{11}{548} \frac{6}{m^2} \frac{6}{12} \frac{6}{m^2} $	Al Partiy open D Partiy shaded D Shaded High Water Markm Proportion of Reach Represented by Stream Morphology Types D Riffle 5 % D Run% Pool% Channelized D Yes No	m
			Dam Present QYes No	
LARGE WOODY DEBRIS	LWDm ² Density of LWD 54,684 m ²	²/km² (LWD/ reac	h area)	
AQUATIC VEGETATION	G Floating Algae Att	oted submergent ached Algae	Ant species present Rooted floating Pall/Jg _%	
WATER QUALITY	Temperature 18.67 °C Specific Conductance 0,229 Dissolved Oxygen 5.45 mg	1mS/cm g/L	Water Odors ONormal/None Sewage Petroleum Fishy Other Slick Slick Other Other Flecks None Other	
	Turbidity <u>70,3</u> WQ Instrument Used <u>Horib</u>	9	Turbidity (if not measured) Clear I Slightly turbid Opaque I Stained I Other	
SEDIMENT/ SUBSTRATE	Odors DYNormal D Sewage Chemical D Anaerobic D Other	Petroleum None	Deposits None O Sludge O Sawdust O Paper fiber O Relict shells O Other	□ Sand
	Olls A Absent Slight Moderate	e 🛛 Profuse	Looking at stones which are not deeply cm are the undersides black in color? Q Yes ANO	bedded,
INORGANIC SUB	STRATE COMPONENTS	01	RGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)	

INC	RGANIC SUBSTRATE (should add up to			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)						
Substrate Type	Diameter	% Composition In Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area					
Bedrock		570 %		sticks, wood, coarse plant materials (CPOM)	15%					
Boulder	> 256 mm (10")	10%		materiais (CLOM)	///					
Cobble	64-256 mm (2.5"-10")	10%	Muck-Mud	black, very fine organic (FPOM)	00/					
Gravel	2-64 mm (0.1"-2.5")	10%		Пому	0 /0					
Sand	0.06-2mm (gritty)		Marl	grey, shell fragments	001					
Silt	0.004-0,06 mm				$\cup D$					
Clay	< 0.004 mm (slick)									

A-6 Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 1

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BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME	tream 14	LOCATION Mitchell La	ndfill, Cresap, Marshall Co., WV				
STATION #	_ RIVERMILE	STREAM CLASS Intermittent					
lat <u>39°49'31,74'</u> '	V LONG <u>10046'4,47" W</u>	RIVER BASIN Oh/O					
STORET #		AGENCY					
INVESTIGATORS	D. Godec, G.G	erre	LOT NUMBER				
FORM COMPLETED		DATE 8/14/11	REASON FOR SURVEY AEPM, telo1/Land fill				
HABITAT TYPES	Indicate the percentage of Cobble 20_%	ags% Q Vegetated B	anks% 🗅 Sand% bodrock)_JD_%				
SAMPLE COLLECTION	Gear used D D frame D How were the samples coll	Ν	Srub sample; Aquan ^{Sirm} Net tom bank 🛛 from boat				
	Indicate the number of jabs/klcks taken in each habitat type. Cobble Snags Vegetated Banks Sand Submerged Macrophytes Sicher (Bedrack & Barberts)						
GENERAL COMMENTS							

QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	0 1 2 3 4	Slimes	0 1 2 3 4
Filamentous Algae	(1) $\overline{1}$ 2 3 4	Macroinvertebrates	0 1 2 3 4
Macrophytes	0 1 (2) 3 4	Fish	(0) 1 2 3 4

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rarc (1-3 organisms), 2 = Common (3-9 organisms), 3= Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera_	0	1	I)	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1	${\mathcal O}$	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other .	0	1	2	3	4
<u>Hirudinea</u>	0	ľ	2) 3	4	Lepidoptera	0	1	2	3	4						•
Oligochaeta	0	1	2	3	4	Sialidae	0	1	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	1	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4						
Gastropoda	0	1	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia ,	0	1	2	3	4	Tabinidae	0	1	2	3	4						
						Culcidae	0	1	2	3	4						

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

.

STREAM NAME STOCAM 15	LOCATION Mitchell Landfill, Creap, Marshall Co., WV				
STATION # RIVERMILE	STREAM CLASS EPHEMENG				
LAT 31949 4047 N LONG 809463,47"W	RIVER BASIN ON'S RIVER				
STORET #	AGENCY				
INVESTIGATORS D. GOOLOG					
FORM COMPLETED BY D, Godec	TIME 10:30 M PM AFP Mitchell Landfill Project				

	TT-14-4		Condition	Category	
	Habitat 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 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; Iack of habitat is obvious; substrate unstable or lacking.
	SCORE Z	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.
ed in	score /5	20 19 18 17 16	(15)14 13 12 11	10 9 8 7 6	<u>5 4 3</u> 2 i 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).
Lan	SCORE ()	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 🜒
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.
1	score 3	20 <u>19</u> 18 1 <u>7 16</u>	215 14 (13)12 2112	10 9 8 7 6	5/1/3/2 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 charnel 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 U	20 <u>19 18 17</u> 16	<u>15 14 13</u> 12 11	<u>10 9 8 7 6</u>	5 4 3 2 1 0

Naflow

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No Flow

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Stream 15 (cont.)HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

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			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 20	(20) 19 18 17 516	<u>15 14 13 12 11</u>	10 <u>9 8</u> 7 <u>6</u>	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.
sampl	SCORE 6	20 19 <u>18 17</u> 16	<u>15 14 13 12 11</u>	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.
to be eva	$\frac{1}{3}$ (LB) $\frac{1}{2}$ (RB)	Left Bank = 10 9 Right Bank = 10 9	8 ⑦ 6 8 ⑦ 6	5 4 3 5 4 3	$\begin{array}{c c} 2 & \cdots & 1 & 0 \\ \hline \hline \hline 2 & 2 & 1 & 0 \end{array}$
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.
	$\frac{7}{100000000000000000000000000000000000$	Left Bank 10 9	8 (1) 6 8 (1) 6	5 4 3	
	$\text{SCORE} \underline{\mathcal{T}}(\text{RB})$	Right Bank 10 9			
	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 zong.	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 (LB)	Left Bank 10 9	3 7 6	5 3	2 1 0
	SCORE (RB)	Right Bank 10 9	0 7 6	5 4 3	2 1 0

Total Score 112

Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 2 A-8

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

- -----

STREAM NAME Stream 16	LOCATION Mitchel H Land Fill, (Norse, Marshall Co., WV
STATION # RIVERMILE	STREAM CLASS INFORMITED
LAT 31049 24.84 NLONG 80046 20.74 W	RIVER BASIN Ohio River
STORET #	AGENCY
INVESTIGATORS D. Godes	
FORM COMPLETED BY D. Godec	TIME 2:30 AM D REASON FOR SURVEY

	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 3	20. 19 <u>18 17</u> 16	<u>15 14 13 12 11</u>	10 9 8 7 6	(5) 4 (3) 2 1 0
a 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 i	SCORE	20 19 18 17 16	15 14 13 12 (1)	<u>10</u> 9 8 7 2 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). Slow Shall Ow
ram	SCORE	20 19 18 17 16	<u>15 14</u> 13 12 11	<u>10 9 8 7</u> 6	5 4 3 2 1 2 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 J	20 19 18 17 16	<u>15 14 13 12 11 </u>	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	<u>515</u> 14 <u>13_12_11</u>	10 9 8 7 6	5 4 3 2 1 0

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Stream 16 (cont.)

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

		<u></u>	Condition	Category	
ł	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 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.
sampl	SCORE 6	20	<u>15 14 13</u> 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.
to be ev	$\frac{\mathcal{U}_{(LB)}}{\mathcal{U}_{(RB)}}$	Left Bank 10 9 Right Bank 10 9	8 7 6) 8 7 (6	5 <u>(4)</u> 3 5 <u>(4)</u> 3	$\frac{2}{1-2} = \frac{1}{1-0}$
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.
	$score \frac{4}{1}$ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	$\underline{\text{SCORE}}$ (RB)	Right Bank 10 9	8 7 6	5 🕢 3	2 2 1 2 0
	10. Riparian Vegetative Zone Wldth (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.
	$score \underline{\gamma}_{(LB)}$	Left Bank 10 - S	8 7 6	3	2 1 0
	SCORE (RB)	Right Bank 10	8 7 6	<u>5</u> 4	2 1 0

Total Score _____

Appendix A-1: Habitat Assessment and Physicochemical Characterization Field Data Sheets - Form 2

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME STA	ean 16	LOCATION	· · ·	, W
	VERMILE	STREAM CLASS	Inte	ermittent
LAT39 49 24.84"N LO	NG 90 46'20.74"W	RIVER BASIN	Ohic	04100
STORET #		AGENCY		
INVESTIGATORS D	Gode C			
FORM COMPLETED BY).Godec	DATE 8/15/10 TIME 2:30	AM (PM	AEPMitchell and fill flojat
WEATHER CONDITIONS SITE LOCATION/MAP	rain (shower ch	(heavy rain) (steady rain) s (intermittent) loud cover ear/sunny		Has there been a heavy rain in the last 7 days? A Yes No Air Temperature 2 °C Other pled (or attach a photograph)
	See	photogra ne Juri De	aphs is dic et ine	6 figure 5 d ction al Waters eation Report
STREAM CHARACTERIZATION	Stream Subsystem Perennial OIn Stream Origin Glacial On-glacial montar Swamp and bog	□ Spring-fed	origins	Stream Type Warmwater Coldwater Km ²

.

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

۴

Stream			
WATERSHED FEATURES	Predominaut Surrounding Landuse Protest Commercial Predd/Pasture Industrial Agricultural Other proting Row Residential	Local Watershed NPS Pollution Device Down potential sources Obvious sources Local Watershed Erosion Mone Moderate Heavy	
RIPARIAN VEGETATION (18 meter buffer) INSTREAM FEATURES	Indicate the dominant type and record the domin dominant species present $\frac{M_1}{M_1}$ are $\frac{M_2}{M_2}$ for $\frac{M_2}{M_2}$ Estimated Reach Length $\frac{30.40}{M_2}$ m $\frac{10064}{M_2}$. Estimated Stream Width $\frac{0.91}{M_2}$ m $\frac{3.61}{M_2}$ Sampling Reach Area $\frac{27.714}{M_2}$ m ² Area in km ² (m ² x1000), $\frac{00023}{M_2}$ km ² Estimated Stream Deptth $\frac{0.127}{M_2}$ m $0_151/4$, Surface Velocity $\frac{0.05}{M_2}$ m/sec (at thalweg)	boxelder while git, Anus huneysuckle, Vilas	`y5¢0,
LARGE WOODY DEBRIS	LWD <u>2</u> m ² Density of LWD 1128.6 m ² /km ² (LWD/ reac		
AQUATIC VEGETATION	Indicate the dominant type and record the domin Rooted emergent Rooted submergent Floating Algae Attached Algae dominant species present Portion of the reach with aquatic vegetation	Rooted floating Free floating	
WATER QUALITY	Temperature <u>20.56</u> °C Specific Conductance <u>0,343</u> MS/CM Dissolved Oxygen <u>6,30</u> mg/L pH <u>7.23</u> Turbidity <u>229</u> NTV WQ Instrument Used <u>Horlbo</u>	Water Odors Mater Odors Petroleum Chemical Fishy Other Water Surface Oils Slick Slick Sheen Globs Vater Surface Oils Flecks Vater Surface Oils Globs Flecks Usick Sheen Globs Flecks Vone Other Other Globs Flecks Turbidity (if not measured) Turbid Turbid Other Opaque Staned Other Other	
SEDIMENT/ SUBSTRATE	Odors Of Normal Sewage Petroleum Ochemical Anaerobic None Other Oils Poils Othsent Slight Moderate Profuse	Deposits NOAQ Sludge Sawdust Paper fiber Sand Relict shells Other Looking at stones which are not deeply embedded, are the undersides black in color? Yes No	

INC	DRGANIC SUBSTRATE (should add up fo i		ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)						
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition In Sampling Area				
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	15%				
Boulder	> 256 mm (10")	5%			- 3 / 6				
Cobble	64-256 mm (2.5"-10")	15%	Muck-Mud	black, very fine organic (FPOM)	19				
Gravel	2-64 mm (0.1"-2.5")	10%		(FFOM)	0/a				
Sand	0.06-2mm (gritty)		Mari	grey, shell fragments	$\cap n!$				
Silt	0.004-0.06 mm	35%			0%				
Clay	< 0.004 mm (slick)	35%]						

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME 5	tream 16	LOCATION Mitchell Land Fill, Gresap, MarshullCo., WV								
STATION #	RIVERMILE	STREAM CLASS Inte	rmittont							
LAT 39°49'24.8	4, LONG 80°46'20.74	RIVER BASIN Ohio	RNOr							
STORET #		AGENCY								
INVESTIGATORS	D. Gudec		LOT NUMBER							
FORM COMPLETED	D. Goder	DATE <u>8//S//</u> TIME <u>2:30</u> am PM	REASON FOR SURVEY AEP Mitchell Lundfill Project							
HABITAT TYPES Indicate the percentage of each habitat type present ACobble 1,5% G Snags% G Vegetated Banks% GSand% G Submerged Macrophytes% GOther (bodders)) 5%										
SAMPLE COLLECTION	Gear used D-frame Dick-net Souther Deb Sample, Aquanium not									
GENERAL COMMENTS	Macromuertebr		y Trichopterg Observed							

QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	0 1 2 3 4	Slimes	(0) 1 2 3 4
Filamentous Algae	0 1 2 3 4	Macroinvertebrates	0(1) 2 3 4
Macrophytes	(0) 1 2 3 4	Fish	01234

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3 = Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	1	2	3	4
Platyhelminthes	0	1	- 2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1	(2)	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other	0	1	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	1	2	3	4						
Oligochaeta	0	1	2	3	4	Sialidae	0	1	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	1	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4						
Gastropoda	0	1	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4						
						Culcidae	0	1	2	3	4						

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Т



APPENDIX D

USACE HIGH-GRADIENT HEADWATER STREAM DATA FORMS

Before Project

1 Eph

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: AEP Mitchell Landfill Project Location: Stream 1 Ephemeral Portion, Cresap, Marshall Co., WV Sampling Date: 27 Sept 2011 Project Site

Subclass for this SAR:

Functional Results Summary:

Ephemeral Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

Enter Results in Section A of the Mitigation Sufficiency Calculator

SAR number:

Function	Functional Capacity Index
Hydrology	0.93
Biogeochemical Cycling	0.85
Habitat	0.74

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	59.00	0.62
V _{EMBED}	Average embeddedness of channel.	2.77	0.74
V _{SUBSTRATE}	Median stream channel substrate particle size.	4.00	1.00
V _{BERO}	Total percent of eroded stream channel bank.	5.00	1.00
V _{LWD}	Number of down woody stems per 100 feet of stream.	12.00	1.00
V _{TDBH}	Average dbh of trees.	11.25	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
VDETRITUS	Average percent cover of leaves, sticks, etc.	73.13	0.89
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

									Versi	ion 1-25-11			
High	-Gradient	Headwat				-		ern Wes	t Virginia	a			
				Data She	et and C	alculato							
Tea	m: <mark>Dawn York</mark>	and Mary C	ailmore				Latitude/UTI	M Northing:	39.829327				
Project Nam	ne: <mark>AEP Mitch</mark>	ell Landfill P	roject			L	ongitude/U1	FM Easting:	80.776429				
Locatio	on: <mark>Stream 1 E</mark>	phemeral P	ortion, Cres	ap, Marshal	l Co., WV	_	Sam	pling Date:	27 Sept 201	1			
SAR Numbe	er: 1 Eph	Reach	Length (ft):	100	Stream T	ype: Ephe	meral Stream	1		•			
Top Strata: Tree/Sapling Strata (determined from percent calculated in V _{CCANOPY})													
ite and Timing: Project Site Before Project													
ple Variable	es 1-4 in strea												
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 percent cover measurements at each point below:												
10	15	85	100	95	5	10	80	100	90				
	-					at no fewer							
V _{EMBED}	along the s surface and to the follow of 1. If the	tream. Sele d area surro wing table. I bed is comp	ect a particle unding the p If the bed is posed of bec	from the be particle that i an artificial s drock, use a	ed. Before r is covered b surface, or o rating score	noving it, de by fine sedim composed of	termine the nent, and en f fine sedime	percentage ter the rating ents, use a r	of the g according rating score	2.8			
	Minshall 19		3 , -					-,	,				
	Rating	Rating Des	scription										
	5	<5 percent	of surface c	overed, suri	rounded, or	buried by fir	ne sediment	(or bedrock	()				
	4					d, or buried b							
	3					ed, or buried							
	2					ed, or buried							
	1			covered, su	rrounded, o	r buried by f	ine sedimer	nt (or artificia	al surface)				
List the r	atings at each	point below	:	-	-				-				
2	3	1	5	4	3								
5	2	1	3	3	3								
3	1	2	3	3	3								
4	4	3	4	1	2								
1	2	4	3	2	3								

4.00 in

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

2

Site and Timing: Project Site Sample Variables 1-4 in stream

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

	01 00110101	o do 010 m, o		partioloo ao	0.00 mj.						-
	0.50	8.00	7.00	3.50	10.50	99.00					
	2.50	4.40	2.10	99.00	4.50	0.50					
	16.00	1.00	7.10	7.00	4.00	10.00					
	0.50	0.70	11.10	2.10	3.50	5.10					
	4.00	2.00	0.50	7.00	1.50	1.00					
4 V _{BERO} Total percent of eroded stream channel bank. Enter the total number of feet of eroded bank on each side and the total percentage will be calculated. If both banks are eroded, total erosion for the stream may be up to 200%.											
			Left Bank:	0	ft		Right Bank:	5	ft		

Sampl	e Variable	s 5-9 within the	e entire ri	parian/buffe	er zone adj	acent to th	e stream ch	annel (25 f	eet from ea	ach bank).	
5	V _{LWD}	Number of do stream reach per 100 feet	n. Enter th	e number fro	om the entir						12.0
		F				f downed w	oody stems:	-	12		
6	V _{TDBH}	Average dbh inches (10 cr					ng cover is a	t least 20%)). Trees are	e at least 4	11.3
		List the dbh r	,				n) within the	buffer on ea	ach side of		
		the stream b				· ·	,				_
			Left Side					Right Side			
	13					22					
	5					9					
	5 21										
	13										
	7.5										
	4										
	13										
7	V _{SNAG}	Number of sr side of the st						Enter numb	per of snags	on each	0.0
			Left Side:	()		Right Side:		0		
8	V_{SSD}	Number of sa									
		if tree cover i per 100 ft of				gs and shru	ibs on each :	side of the s	stream, and	the amount	Not Used
		•	Left Side:		8		Right Side:	, ,	25		
9	V _{SRICH}	Riparian veg									
		Group 1 in th richness per							I strata. Sp	ecies	0.00
		-	1 = 1.0								
	Acer rubr	•		Magnolia tr	ipetala		Ailanthus a		2 (-1.0)	Lonicera ja	iponica
~	Acer sace			Nyssa sylva			Albizia julik			Lonicera ta	-
	Aesculus			Oxydendrum			Alliaria peti			Lotus corn	
	Asimina t			Prunus ser						Lythrum sa	
							Alternanthe philoxeroio			-	
	Betula ler	eghaniensis		Quercus all						Microstegiur	
				Quercus co			Aster tatari				tomentosa
	Carya alb			Quercus im			Cerastium			Polygonum	
	Carya gla			Quercus pr			Coronilla v			Pueraria m	
	Carya ova			Quercus ru			Elaeagnus u	ımbellata		Rosa multi	
	Carya ova	ata		Quercus ve	lutina		Lespedeza	bicolor		Sorghum h	alepense
	Cornus fle	orida		Sassafras a	albidum		rasiliensis				
	Fagus gra	andifolia		Tilia americ	ana		Ligustrum ol	btusifolium			
1	Fraxinus	americana		Tsuga cana	adensis		Ligustrum	sinense			
	Liriodendro	on tulipifera		Ulmus ame	ricana						
	Magnolia	acuminata									
				<u> </u>						<u> </u>	
		2 5	Species in	Group 1				2	Species in	Group 2	

	e Variables The four sub								one within	25 feet from	n each
10	V _{DETRITUS}				ticks, or othe				<4" diamete	er and <36"	73.13 %
			Left	Side			Righ	t Side] '	
		90	75	100	80	60	50	50	80		
11	V _{HERB}	Average pe	rcentage co	over of herba	aceous vege	etation (mea	sure only if	tree cover is	s <20%). De	o not	
			percentages		h and 36" ta 1 200% are a						Not Used
		·		Side			Right	t Side	-] '	
Sample	e Variable 1	2 within the	entire cat	chment of t	he stream						
12	V _{WLUSE}				e for watersh	ed:					
	WLUSE		ge en e								1.00
			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	100	100
								•			
								•			
								•			
								•			
	-							•			
								-			
	1	Eph					No	tes:			
Va	ariable	Value	VSI								
Vc	CANOPY	59 %	0.62								
V _{EI}	MBED	2.8	0.74								
Vs	UBSTRATE	4.00 in	1.00								
VB	ERO	5 %	1.00								
VL	WD	12.0	1.00								
V _{TI}	DBH	11.3	1.00								
Vsi	NAG	0.0	0.10								
Vs		Not Used	Not Used								
	RICH	0.00	0.00								
	ETRITUS	73.1 %	0.89								
V _H	ERB	Not Used	Not Used								
Vw	LUSE	1	1.00								

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: AEP Mitchell Landfill Project

Location: Stream 1 Lower Sample Reach, Cresap, Marshall Co, WV

Sampling Date: 8/13/11

Functional Results Summary:

Project Site Befo

Before Project

1

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number:

Function	Functional Capacity Index
Hydrology	0.98
Biogeochemical Cycling	0.93
Habitat	0.94

Variable Measure and Subindex Summary:

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	87.00	0.99
V _{EMBED}	Average embeddedness of channel.	4.17	0.92
V _{SUBSTRATE}	Median stream channel substrate particle size.	3.95	1.00
V _{BERO}	Total percent of eroded stream channel bank.	15.00	0.99
V _{LWD}	Number of down woody stems per 100 feet of stream.	20.00	1.00
V _{TDBH}	Average dbh of trees.	9.45	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	3.00	1.00
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	3.60	1.00
VDETRITUS	Average percent cover of leaves, sticks, etc.	55.31	0.67
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

Enter Results in Section A of the Mitigation Sufficiency Calculator

										Vers	ion 1-25-11
	High-G	Gradient	Headwat	er Strea	ms in ea	stern Ke	entucky a	and west	tern Wes	st Virgini	а
				Field [Data She	et and C	alculato	r			
	Team:	D. Godec,	G. Gerke					Latitude/UT	M Northing:	39°49'13.90	D"N
Pr	oject Name:	AEP Mitche	ell Landfill Pi		L	ongitude/U ⁻	TM Easting:	80°46'35.08	B"W		
	Location:	Stream 1 L	ower Sampl	e Reach, Cr	resap,Marsh	nall Co,WV		San	npling Date:	8/13/11	
S	AR Number:	1	Reach	Length (ft):	100	Stream Ty	/pe: Inter	mittent Strea	m		•
	Top Strata:	Tre	e/Sapling St	rata	(determine	d from perce	ent calculate	d in V _{CCANO}	_{PY})		
Site	and Timing:	Project Site				•	Before Proje	ct			
Sample	e Variables	1-4 in strea	m channel				-				
1	V _{CCANOPY}	equidistant	points along	g the stream	. Measure	only if tree/s	anopy. Mea apling cove Top Strata c	r is at least			87.0 %
	List the per	cent cover r	neasuremer	nts at each p	point below:						
	80	70	90	95	100	100	90	80	90	75	
				6.11 · · ·							
2	V_{EMBED}						at no fewer i noving it, de				4.2
							y fine sedim				
				• •			composed of			• •	
				osed of bec						Ū	
		Embedded	ness rating f	or gravel, co	obble and b	oulder partic	cles (rescale	d from Platt	s, Megahan	, and	
		Minshall 19		0		•	,				
		Rating	Rating Des	scription							
		5	<5 percent	of surface c	overed, sur	rounded, or	buried by fir	le sediment	(or bedrock	()	
		4					l, or buried b				
		3					ed, or buried				
		2				,	ed, or buried	,			
	List the roti	ngs at each			covered, su	irrounded, o	r buried by f	ine seaimer	it (or artificia	al surface)	l
		1			5	4					
	4	4	4	4 5	5	4					
	4	4	4	5	5 4	4					
	4 5		4	5 4							
	 	4			4	4					
3		Median stre	4	4	4	5 Moosuro a	t no fower t	an 20 roug	bly oquidict	ant points	
3	V SUBSTRATE						ed in V _{EMBED}			ani points	3.95 in
		Ū.		•	•		20020				
		cle size in in				i point below	/ (bedrock s	hould be co	unted as 99	in, asphalt	
		as 0.0 in, s		-		0.40					
	1.20	12.20	1.20	3.10	18.10	0.40					
	3.90	10.10	5.10	28.40	6.10	5.30					
	4.80	8.10	2.10	24.50	2.80	3.50					
	36.20	0.50	1.10	0.30	3.90	1.50					
	24.10	0.80	4.00	0.40	5.10	41.30	tal av s				
4	V_{BERO}	•					otal number o nks are eroo				45.00
		may be up	•	maye will D		i ii dolli dal	ווש מול פוטנ	ieu, iulai el		Sucalli	15 %
			Left Bank:	0	ft		Right Bank:	11	5 ft		
			Lon Dank.	0	14		i igin Dalik.	- Li	211		

Sampl	e Variable	s 5-9 within t	he entire rip	barian/buff	er zone adj	acent to th	e stream ch	annel (25 i	feet from ea	ach bank).	
5	V _{LWD}	stream read	•	e number fr	om the entir		ter and 36 in buffer and w		• / •		20.0
		•					oody stems:		20		
6	V_{TDBH}		h of trees (n cm) in diame				ng cover is a	t least 20%	b). Trees are	e at least 4	9.4
		List the dbh	measureme	ents of indiv	/idual trees	(at least 4 ir	n) within the	buffer on e	ach side of		
		the stream									•
			Left Side					Right Side			
	9	6	12	14	8	8	10	5	9	6	
	13 9	9	6 9	4 5	12 4	7	6	7	9	12	
	9 12	8	36	5	4	0					
	12	0	50								
	-										
7	V _{SNAG}		snags (at lea stream, and				t of stream. Iculated.	Enter numl	ber of snags	on each	3.0
			Left Side:		0		Right Side:		3		
8	V_{SSD}						nes dbh) per				
			r is <20%). f stream will			gs and shru	bs on each :	side of the s	stream, and	the amount	Not Used
			Left Side:	be calcula	ieu.		Right Side:				
9	V _{SRICH}						m reach. Cl	neck all spe			
							ve species p from these d		ll strata. Spo	ecies	3.60
		-	p 1 = 1.0				iroini these u		0 2 (-1.0)		
	Acer rubr		·	Magnolia ti	rinotala		Ailanthus a) 2 (-1.0)	Lonicera ja	nonica
	Acer sace				-					Lonicera ja	•
~				Nyssa sylv			Albizia julik				
	Aesculus			Oxydendrun			Alliaria peti	ioiata		Lotus corni	
~	Asimina t			Prunus sei	rotina		Alternanthe			Lythrum sa	licaria
	Betula alle	eghaniensis		Quercus a	lba		philoxeroia	es	~	Microstegiur	n vimineum
	Betula lei	nta		Quercus co	occinea		Aster tatar	icus		Paulownia	tomentosa
	Carya alb	Da		Quercus in	nbricaria		Cerastium	fontanum		Polygonum	cuspidatum
	Carya gla	abra		Quercus p	rinus		Coronilla v	aria		Pueraria m	ontana
	Carya ov	alis		Quercus ru	ıbra		Elaeagnus u	ımbellata		Rosa multi	flora
	Carya ov	ata		Quercus ve	elutina		Lespedeza	bicolor		Sorghum h	alepense
	Cornus fl	orida		Sassafras	albidum		Lespedeza	cuneata		Verbena bi	rasiliensis
	Fagus gra	andifolia	1	Tilia ameri	cana		Ligustrum ol	btusifolium			
		americana		Tsuga can	adensis		Ligustrum	sinense			
~	Liriodendro	on tulipifera		Ulmus ame			-				
		acuminata									
		5	Species in (Group 1				1	Species in	Group 2	

	e Variables The four sub								one within	25 feet from	n each
10	V _{DETRITUS}				ticks, or oth t cover of th				<4" diamete	er and <36"	55.31 %
				Side			Righ	t Side] '	
		60	50	60	60	50	40	40	50		
11	V _{HERB}	70 Average pe	60 ercentage co	75 over of herba	60 aceous vege	60 etation (mea	50 sure only if	50 tree cover is	50 s <20%). Do	o not	
		include woo	ody stems a percentages	t least 4" db	h and 36" ta 1 200% are a	II. Because	there may b	be several la	iyers of grou	und cover	Not Used
			Left	Side			Righ	t Side]	
Sample	e Variable 1	2 within the	entire cat	chment of t	he stream						
12	V _{WLUSE}				e for watersh	ed:					1.00
	-									1	1.00
			Land	Use (Choos	e From Dro	p List)			Runoff Score	% in Catch ment	Running Percent (not >100)
	Forest and n	ative range (>	>75% ground	cover)				-	1	100	100
								-			
								•			
								-			
								-			
								•			
								•			
								•			
	Summary:	SAA Numbe	er 1				No	tes:		-	
Va	ariable	Value	VSI								
Vc	CANOPY	87 %	0.99	1							
V _{EI}	MBED	4.2	0.92								
Vs	UBSTRATE	3.95 in	1.00								
VB	ERO	15 %	0.99								
VL	WD	20.0	1.00								
V _{TI}	DBH	9.4	1.00								
Vs	NAG	3.0	1.00								
Vs	SD	Not Used	Not Used								
Vs	RICH	3.60	1.00								
	ETRITUS	55.3 %	0.67								
V _H	ERB	Not Used	Not Used								
Vw	LUSE	1	1.00								

Before Project

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: AEP Mitchell Landfill Project

Location: Stream 1 Middle Sample Reach Cresap, Marshall Co, WV

Sampling Date: 8/12/11

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 1

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Project Site

Function	Functional Capacity Index
Hydrology	0.95
Biogeochemical Cycling	0.90
Habitat	0.89

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	93.50	1.00
V _{EMBED}	Average embeddedness of channel.	4.13	0.93
V _{SUBSTRATE}	Median stream channel substrate particle size.	4.55	1.00
V _{BERO}	Total percent of eroded stream channel bank.	10.00	1.00
V _{LWD}	Number of down woody stems per 100 feet of stream.	7.00	0.88
V _{TDBH}	Average dbh of trees.	8.75	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	3.00	1.00
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	5.00	1.00
VDETRITUS	Average percent cover of leaves, sticks, etc.	30.94	0.38
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

										Vers	ion 1-25-11
	High-G	Gradient	Headwat	er Strea	ms in ea	stern Ke	entucky a	and west	tern Wes	st Virgini	a
				Field [Data She	et and C	alculato	r			
	Team:	D. Godec, (G. Gerke				I	_atitude/UT	M Northing:	39°49'30.2	1"N
Pr	oject Name:	AEP Mitche	ell Landfill P	roject			L	ongitude/U ⁻	TM Easting:	80°46'32.40)"W
	Location:	Stream 1 N	liddle Samp	le Reach Cr	esap,Marsh	all Co,WV		San	pling Date:	8/12/11	
SA	AR Number:	1	Reach	Length (ft):	100	Stream Ty	vpe: Inter	mittent Strea	m		•
	Top Strata:	Tre	e/Sapling St	rata	(determine	d from perce	ent calculate	d in V _{CCANO}	>Y)		
Site	and Timing:	Proiect Site				•	Before Proje	ct			•
	e Variables	-									
1	V _{CCANOPY}			over channe	el by tree ar	nd sapling ca	anopy. Mea	sure at no f	ewer than 1	0 roughly	
		equidistant	points along	g the stream	. Measure	only if tree/s	apling cove Top Strata c	r is at least :			93.5 %
	List the per	cent cover r	neasuremer	nts at each p	oint below:						
	100	90	100	100	85	100	90	100	70	100	
2	V _{EMBED}						at no fewer i				4.1
							noving it, de y fine sedim				4.1
				• •			composed of			• •	
			bed is comp						51113, 030 a	rating score	
			-			-	les (rescale	d from Platt	s Megahar	and	
		Minshall 19		or graver, et					o, moganan	, and	
		Rating	Rating Des	cription							
		5			overed, sur	rounded, or	buried by fir	e sediment	(or bedrock	()	
		4					l, or buried b				
		3					ed, or buried				
		2					ed, or buried				
	l :	1	•		covered, su	rrounded, o	r buried by f	ine sedimer	nt (or artificia	al surface)	
		ngs at each			4	-					1
	5	4	4	4	4	5					
	5	4	4	4	4	5					
	3	4	4	4	4	5					
	3	4	4	4	3	5					
0	4	4	4	4	4	5	t no fewer th	20 20 roug	hly oquidiat	ont pointo	
3	VSUBSTRATE						ed in V _{EMBED}		niy equidist	ant points	4.55 in
		-									
						point below	/ (bedrock sl	hould be co	unted as 99	in, asphalt	
		as 0.0 in, s									1
	99.00	1.50	4.80	2.90	4.10	99.00					
	99.00	2.40	8.50	3.80	3.40	99.00					
	3.50	6.40	3.40	5.10	2.80	99.00					
	4.30	5.10	11.10	11.00	2.10	99.00					
<u> </u>	0.50	7.00	3.20	0.90	2.10	10.10		(())			
4	V_{BERO}	•					tal number o				10.01
		may be up	•	maye will D		i ii bulii bal	iks are eroc	ieu, iulai er		suediii	10 %
			Left Bank:	5	ft		Right Bank:	5	ft		
			LEIL DAHK.	5	16		i iigiit Dallik.	5	11		

Sampl	e Variable	s 5-9 within t	he entire ri	parian/buffe	er zone adj	acent to th	e stream ch	nannel (25 t	feet from ea	ich bank).			
5	V_{LWD}	stream read	lumber of down woody stems (at least 4 inches in diameter and 36 inches in length) per 100 feet of tream reach. Enter the number from the entire 50'-wide buffer and within the channel, and the amount er 100 feet of stream will be calculated.										
		P				f downed w	oody stems:		7				
6	V_{TDBH}			measure only eter. Enter t			ng cover is a	t least 20%). Trees are	e at least 4	8.8		
				ents of indiv			n) within the	buffer on e	ach side of				
		the stream				,	,				_		
			Left Side			Right Side							
	9	5	5			12	12	12	10	5			
7	V _{SNAG}			ast 4" dbh a I the amount				Enter numl	ber of snags	on each	3.0		
			Left Side:	3	3		Right Side:		0				
8	V_{SSD}			d shrubs (wo									
		if tree cover is <20%). Enter number of sapli per 100 ft of stream will be calculated.					bs on each :	side of the s	stream, and	the amount	Not Used		
			Left Side:		cu.		Right Side:						
9	V _{SRICH}			ecies richnes									
				tratum. Che Ind the subin					ll strata. Spe	ecies	5.00		
		-	p 1 = 1.0						0 2 (-1.0)				
	Acer rubr		<u>p i = 1.0</u>	Magnolia tri	ipetala		Ailanthus a			Lonicera ja	nonica		
	Acer sace			Nyssa sylva	-		Albizia julik			Lonicera ta	•		
	Aesculus			Oxydendrum			Alliaria peti			Lotus corn			
	Asimina ti			Prunus sero			-			Lythrum sa			
							Alternanthe philoxeroio			-			
		ghaniensis		Quercus all						Microstegiur			
	Betula ler			Quercus co			Aster tatari				tomentosa		
	Carya alb			Quercus im			Cerastium			Polygonum	-		
	Carya gla			Quercus pri			Coronilla v			Pueraria m			
	Carya ova	alis		Quercus ru	bra		Elaeagnus u	ımbellata		Rosa multi	flora		
1	Carya ova	ata		Quercus ve	elutina		Lespedeza	a bicolor		Sorghum h	alepense		
	Cornus fle	orida		Sassafras a	albidum		Lespedeza	a cuneata		Verbena bi	rasiliensis		
	Fagus gra	andifolia	\checkmark	Tilia americ	ana		Ligustrum ol	btusifolium					
1	Fraxinus	americana		Tsuga cana	adensis		Ligustrum	sinense					
	Liriodendro	on tulipifera	1	Ulmus ame	ricana								
	Magnolia	acuminata											
			o · ·	- ·						_			
		5	Species in	Group 1				0	Species in	Group 2			

					40" x 40", o equidistant				one within	25 feet from	n each
10	V _{DETRITUS}				sticks, or oth t cover of th				<4" diamete	er and <36"	30.94 %
			Left	Side	_		Righ	t Side	-] '	
		40	30	20	30	10	10	20	20		
11	V _{HERB}	50 Average pe	25 rcentage co	60 over of herb	60 aceous vege	25 etation (mea	25 asure only if	40 tree cover is	30 ≤<20%). D	o <i>not</i>	
	TILIND	include woo	ody stems a percentages	t least 4" db	h and 36" ta 1 200% are a	II. Because	there may b	be several la	iyers of grou	und cover	Not Used
			Left	Side			Righ	t Side	1		
		60				60					
	. M. 1.1.1. 4										
	e Variable 1										
12	V _{wluse}	Weighted A	verage of F	Runoff Score	e for watersh	ed:					1.00
			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	100	100
								•			
	•							•			
								-			
								-			
								• •			
	۰										
								•			
								•			
	Summary:	SAA Numbe	er 1				No	tes:			
Va	ariable	Value	VSI								
Vc	CANOPY	94 %	1.00								
V _{EI}	MBED	4.1	0.93								
Vs	UBSTRATE	4.55 in	1.00								
VB	ERO	10 %	1.00								
VL		7.0	0.88								
	ОВН	8.8	1.00								
	NAG	3.0	1.00								
Vs		Not Used	Not Used								
Vs	RICH	5.00	1.00								
	ETRITUS	30.9 %	0.38								
	ERB	Not Used	Not Used								
	LUSE	1	1.00								

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: AEP Mitchell Landfill Project

Location: Stream 1 Upper Sample Reach, Cresap, Marshall Co, WV Sampling Date: 8/12/2011

Project Site

Before Project

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 1

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.97
Biogeochemical Cycling	0.93
Habitat	0.88

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	88.50	1.00
V _{EMBED}	Average embeddedness of channel.	3.53	1.00
V _{SUBSTRATE}	Median stream channel substrate particle size.	3.15	1.00
V _{BERO}	Total percent of eroded stream channel bank.	35.00	0.89
V _{LWD}	Number of down woody stems per 100 feet of stream.	15.00	1.00
V _{TDBH}	Average dbh of trees.	8.87	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	7.00	0.60
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	5.40	1.00
VDETRITUS	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.	1.00	1.00

										Vers	ion 1-25-11
	High-G	Gradient	Headwat	er Strea	ms in ea	stern Ke	entucky a	and west	tern Wes	st Virgini	a
				Field [Data She	et and C	alculato	r			
	Team:	D. Godec, (G. Gerke				I	_atitude/UT	M Northing	: <mark>39°49'36.4</mark> 6	5"N
Pr	oject Name:	AEP Mitche	ell Landfill Pi	roject			L	ongitude/U ⁻	TM Easting	: <mark>80°46'32.4</mark> 3	3"W
	Location:	Stream 1 U	pper Sampl	e Reach, Cr	esap, Mars	hall Co, WV		San	pling Date	: <mark>8/12/2011</mark>	
S	AR Number:	1	Reach	Length (ft):	100	Stream Ty	vpe: Inter	mittent Strea	m		•
	Top Strata:	Tre	e/Sapling St	rata	(determine	d from perce	ent calculate	d in V _{CCANO}	> _Y)		
Site	and Timing:	Project Site				•	Before Proje	rt			•
	e Variables	-					belote troje				
1	V _{CCANOPY}			over channe	el by tree ar	nd sapling ca	anopy. Mea	sure at no f	ewer than 1	0 roughly	
		equidistant	points along	g the stream	. Measure	only if tree/s	apling cover Top Strata c	r is at least			88.5 %
	List the per	cent cover r	neasuremer	nts at each p	oint below:						
	80	95	100	100	100	100	25	100	95	90	
2	V_{EMBED}						at no fewer t				0 E
							noving it, det				3.5
				• •			•			ng according	-
			bed is comp					line seaim	ents, use a	rating score	
								d from Diott	. Magaba		
		Embeddedness rating for gravel, cobble and boulder particles (rescaled from Platts, Megahan, and Minshall 1983)									
		Rating	Rating Des								
		5					buried by fin			k)	
		4					l, or buried b				
		3					ed, or buried ed, or buried				
		1					r buried by f			al surface)	
	List the rati	ngs at each								u cunuco,	
	3	4	4	4	5	4					
	4	4	5	3	4	3					
	2	3	4	1	3	4					
	4	4	5	3	4	3					
	1	3	4	4	3	4					
3	=						t no fewer th	nan 30 roug	hlv equidist	tant points	
	OODOTTATE						ed in V _{EMBED}		, ,		3.15 in
	Enter partic	la siza in in	chas to the i	noarost () 1 i	inch at each	noint helow	/hedrock sl	hould be co	unted as QQ) in, asphalt	
		as 0.0 in, s							unieu as sa	aspirati	
	4.10	5.40	6.30	5.00	99.00	5.10					
	12.20	6.00	2.80	2.50	0.80	4.00					
	3.10	2.80	12.50	0.50	4.20	3.10					
	0.50	0.50	3.20	3.50	1.90	0.80					
	2.50	1.20	6.40	1.50	4.00	2.60					
4	V _{BERO}						tal number o	of feet of er	oded bank	on each	
	DLINU	•					iks are eroc				35 %
		may be up	•	-							
			Left Bank:	25	5 ft		Right Bank:	1() ft		

Sampl	e Variable	s 5-9 within th	ne entire ri	parian/buff	ier zone adj	acent to th	e stream ch	nannel (25	feet from ea	ich bank).	
5	V _{LWD}		h. Enter th	e number fi	least 4 inche rom the entir ulated.						15.0
							oody stems:		15		-
6	V_{TDBH}	Average dbl inches (10 c			lly if V _{CCANOP} tree DBHs in		ng cover is a	t least 20%). Trees are	e at least 4	8.9
		List the dbh	measurem	ents of indi	vidual trees	(at least 4 i	n) within the	buffer on e	ach side of		
		the stream b									
			Left Side					Right Side			
	10	16	5	4	16	9	11	6	6	9	
	8					10	7	6	10		
											1
7	V	Number of c	nogo (at la	oot 4" dbb (and 36" tall)	por 100 foo	t of stream	Entor num	bor of apaga	an aaah	
7	V_{SNAG}				it per 100 fee				ber of shays	on each	7.0
			Left Side:		4		Right Side:		3		
8	V_{SSD}				oody stems						N
		per 100 ft of			per of sapling ted.	gs and shru	los on each s	side of the s	stream, and	the amount	Not Used
			Left Side:				Right Side:				
9	V _{SRICH}				ess per 100 f						5.40
					eck all exotic ndex will be				ii strata. Spe	ecies	5.40
		-	o 1 = 1.0								
1	Acer rubr	um .		Magnolia t	ripetala		Ailanthus a		0 2 (-1.0)	Lonicera ja	ponica
~	Acer sace	charum		Nyssa sylv	vatica		Albizia julik	orissin		Lonicera ta	tarica
	Aesculus	flava		Oxydendrur	n arboreum		Alliaria peti	iolata		Lotus corni	iculatus
	Asimina t			Prunus sei			Alternanthe			Lythrum sa	
		eghaniensis		Quercus a			philoxeroia			Microstegiur	
	Betula lei	-		Quercus c			Aster tatari	icus		Paulownia	
	Carya alb	Da		Quercus in	nbricaria		Cerastium	fontanum		Polygonum	cuspidatum
	Carya gla	abra		Quercus p	rinus		Coronilla v	aria		Pueraria m	ontana
	Carya ov	alis		Quercus ru	ubra		Elaeagnus u	ımbellata		Rosa multi	flora
<i>✓</i>	Carya ov	ata		Quercus v	elutina		Lespedeza	bicolor		Sorghum h	alepense
	Cornus fl	orida		Sassafras	albidum		Lespedeza	a cuneata		Verbena bi	rasiliensis
1	Fagus gra	andifolia		Tilia ameri	cana		Ligustrum ol	btusifolium			
1	Fraxinus	americana		Tsuga can	adensis		Ligustrum	sinense			
	Liriodendro	on tulipifera		Ulmus am	ericana						
	Magnolia	acuminata									
			Creation in the	0					<u> </u>	0 0	
		7	Species in	Group 1				1	Species in	Group 2	

	e Variables The four sub								one within	25 feet from	n each
10	V _{DETRITUS}				sticks, or oth t cover of th				<4" diamete	er and <36"	19.38 %
				Side			· · · · · ·	t Side] '	
		15	20	10	10	40	20	25	30		
11	V _{HERB}	20 Average pe	5 ercentage co	10 over of herb	20 aceous vege	10 etation (mea	20 asure only if	15 tree cover is	40 s <20%). Do	o not	
	TILIND	include woo	ody stems a percentages	t least 4" db	h and 36" ta 1 200% are a	II. Because	there may b	e several la	iyers of grou	und cover	Not Used
			Left	Side			Righ	Side			
Sample	e Variable 1	2 within the	ontiro oct	abmont of t	the stream						
12					e for watersh	ed.					
12	V _{wluse}	Weighted A	werage of F		FIOT WATERST	eu.					1.00
			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	100	100
								-			
								•			
								-			
	•							•			
	•							-			
	r							-			
								-			
	Summary:	SAA Numbe	er 1				No	tes:			
Va	ariable	Value	VSI								
Vc	CANOPY	89 %	1.00								
V _{EI}	MBED	3.5	1.00								
Vs	UBSTRATE	3.15 in	1.00								
VB	ERO	35 %	0.89								
VL		15.0	1.00								
	DBH	8.9	1.00								
	NAG	7.0	0.60								
Vs		Not Used	Not Used								
	RICH	5.40	1.00								
	ETRITUS	19.4 %	0.24								
	ERB	Not Used	Not Used								
	LUSE	1	1.00								

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: AEP Mitchell Landfill Project Location: Stream 1a. Cresap, Marshall Co., WV Sampling Date: 27 Sept 2011

Project Site Be

Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 1a

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.98
Biogeochemical Cycling	0.96
Habitat	0.97

Variable	Name	Average Measure	Subindex
VCCANOPY	Percent canpoy over channel.	87.50	0.99
V _{EMBED}	Average embeddedness of channel.	3.30	0.93
V _{SUBSTRATE}	Median stream channel substrate particle size.	7.20	0.92
V _{BERO}	Total percent of eroded stream channel bank.	26.00	0.94
V _{LWD}	Number of down woody stems per 100 feet of stream.	15.00	1.00
V _{TDBH}	Average dbh of trees.	9.93	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	2.00	1.00
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	2.70	1.00
VDETRITUS	Average percent cover of leaves, sticks, etc.	78.75	0.96
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

										Vers	ion 1-25-11
	High-G	aradient	Headwat	er Strea	ms in ea	stern Ke	entucky a	and west	tern Wes	st Virginia	а
	-			Field [Data She	et and C	alculato	r		-	
	Team:	Dawn York	and Mary G	ilmore				Latitude/UT	M Northing:	39.828573	
Pro			ell Landfill Pi				L	.ongitude/U ⁻	TM Easting:	-80.776043	
	-		Cresap, Ma	•	NV			-	-	27 Sept 20	
SA	R Number:	1a	Reach	Length (ft):	100	Stream Ty	/pe: Ephe	meral Stream			-
	Top Strata:	Tre	e/Sapling St	rata	(determined	d from perce	ent calculate	d in Vermo	-x)		
					(CCANOI	- 17		
	-	Project Site					Before Proje	ect			
Sample		1-4 in strea									
1	V _{CCANOPY}	equidistant	ercent cover points alonç at least one	g the stream	. Measure	only if tree/s	apling cove	r is at least :			87.5 %
	List the per	cent cover r	neasuremer	nts at each p	oint below:						_
	50	100	100	80	75						
	100	100	100	90	80						
2	V_{EMBED}		nbeddednes								3.3
			tream. Sele								5.5
			d area surroi ving table. I	• .			•			• •	
			bed is comp						enis, use a i	alling score	
						-		d from Dlatt	a Magaban	and	
		Embeddedness rating for gravel, cobble and boulder particles (rescaled from Platts, Megahan, and Minshall 1983)									
		Rating	Rating Des								
		5					buried by fir			x)	
		4					l, or buried l				
		3					ed, or buried ed, or buried				
		1					r buried by f			al surface)	
	l ist the rati	ngs at each	point below		0000100, 30	nounaca, o	i bunca by i			a surace)	
	5	4	3	1	5	5					
	4	3	4	2	5	4					
	3	3	2	5	4	3					
	4	4	3	3	1	1					
	3	4	2	3	5	1					
3			eam channe				t no fewer t	han 30 roug	hlv equidist:	ant points	
Ū	SUBSTRATE		tream; use t						ing equilation	ant pointo	7.20 in
	Entor portio	la aiza in in	ahaa ta tha i		Inch at aach	naint halow	/hodrook o	hauld ha aa	unted as 00	in conholt	
			ches to the 1 and or finer			point below	V (DEULOCK S		unieu as 99	in, asphalt	
	16.30	9.10	10.50	0.70	11.00	2.60					
	12.00	99.00	16.80	8.50	5.50	1.75					
	99.00	22.50	2.00	5.50	99.00	2.30					
	2.90	10.50	2.20	5.40	2.20	13.50					
1	5.50	99.00	0.10 nt of eroded	5.00	7.20	7.20	tol number	of foot of an	adad bank a	n oach	
4	V _{BERO}	•	nt of erodeo e total perce								26.9/
		may be up		anage win b		. a both bal					26 %
			Left Bank:	14	l ft		Right Bank:	12	2 ft		

Sampl	e Variable:	s 5-9 within th	e entire r	iparian/buffer zone adj	acent to th	e stream ch	nannel (25 f	eet from ea	ach bank).	
5	V _{LWD}	stream reach	n. Enter th	ly stems (at least 4 inche ne number from the entin will be calculated.						15.0
		per 100 leet	or stream		f downed w	oody stems:	1	15		
6	V_{TDBH}	Average dbh	of trees (measure only if V _{CCANOP}					e at least 4	0.0
		inches (10 ci	m) in diam	eter. Enter tree DBHs i	n inches.					9.9
				nents of individual trees	(at least 4 ir	n) within the	buffer on ea	ach side of		
		the stream b	elow: Left Side				Right Side			1
	10.9	18.7	Leit Side		4.5	8.9				
	4.2	10.7			6.2	0.0				
	8.8				27.5					
	5.6				14.8					
	4.7				7.8					
	11.6				13					
	14.5				9.9					
	6.9 5.5				6.3					
7	5.5 V _{SNAG}	Number of s	nags (at le	east 4" dbh and 36" tall)	8.2 per 100 fee	t of stream.	Enter numb	er of snags	on each	
	• SNAG			d the amount per 100 fee				er er en age		2.0
			Left Side			Right Side:		2		
8	V_{SSD}			d shrubs (woody stems						Netlleed
				Enter number of sapling Il be calculated.	gs and shru	bs on each s	side of the s	tream, and	the amount	Not Used
		·	Left Side	42		Right Side:		4		
9	V _{SRICH}			ecies richness per 100 f						0.70
				tratum. Check all exotion the subindex will be				strata. Sp	ecles	2.70
		Group	1 = 1.0				Group	2 (-1.0)		
	Acer rubr	um		Magnolia tripetala		Ailanthus a	altissima		Lonicera ja	ponica
~	Acer sace	charum		Nyssa sylvatica		Albizia julik	orissin		Lonicera ta	tarica
	Aesculus	flava		Oxydendrum arboreum		Alliaria peti	iolata		Lotus corni	iculatus
	Asimina ti	riloba		Prunus serotina		Alternanthe			Lythrum sa	licaria
		ghaniensis		Quercus alba		philoxeroid			Microstegiur	
	Betula ler	-		Quercus coccinea		Aster tatari	icus		Paulownia	
	Carya alb	a		Quercus imbricaria		Cerastium	fontanum		Polygonum	cuspidatum
	Carya gla	bra		Quercus prinus		Coronilla v	aria		Pueraria m	ontana
	Carya ova	alis		Quercus rubra		Elaeagnus u	ımbellata		Rosa multi	flora
1	Carya ova	ata		Quercus velutina		Lespedeza	bicolor		Sorghum h	alepense
	Cornus flo	orida		Sassafras albidum		Lespedeza	a cuneata		Verbena bi	rasiliensis
	Fagus gra	andifolia		Tilia americana		Ligustrum ol	btusifolium			
	Fraxinus	americana		Tsuga canadensis		Ligustrum :	sinense			
	Liriodendro	on tulipifera		Ulmus americana						
	Magnolia	acuminata								
			Decis- !	Crown 1			Ŀ		0	
		4 5	Species in	Group			1	Species in	Group 2	

				subplots (4 ed roughly e					one within	25 feet fror	n each
10		Average pe	rcent cover	of leaves, st r the percent	ticks, or oth	er organic n	naterial. Wo	ody debris	<4" diamete	r and <36"	78.75 %
			Left	Side			Righ	t Side]	
		75	85			100	40			1	
11	V _{HERB}	90 Average pe	95 ercentage co	over of herba	aceous vege	65 etation (mea	80 asure only if	tree cover is	s <20%). Do	o not	
			percentages	t least 4" dbl s up through							Not Used
			Left	Side			Righ	t Side]	
Sample	e Variable 1	2 within the	entire cat	chment of tl	he stream.						
12	V _{WLUSE}			Runoff Score		ied:					1.00
			Land	Use (Choos	e From Dro	p List)			Runoff Score	% in Catch ment	Running Percent (not >100)
	Forest and n	ative range (>	>75% ground	cover)				•	1	100	100
								-			
	•							•			
								•			
								•			
								•			
	-							•			
								-			
		1a					No	tes:			
Va	ariable	Value	VSI								
Vc	CANOPY	88 %	0.99								
V _{EI}	MBED	3.3	0.93								
V _{SI}	UBSTRATE	7.20 in	0.92								
VB	ERO	26 %	0.94								
VLV	WD	15.0	1.00								
V _{TI}	DBH	9.9	1.00								
Vsi	NAG	2.0	1.00								
Vs	SD	Not Used	Not Used								
Vs	RICH	2.70	1.00								
	ETRITUS	78.8 %	0.96								
	ERB	Not Used	Not Used								
Vw	LUSE	1	1.00								

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: AEP Mitchell Landfill Project Location: Stream 1b. Cresap, Marshall Co., WV Sampling Date: 27 Sept 2011

Project Site Be

Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 1b

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.94
Biogeochemical Cycling	0.85
Habitat	0.61

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	21.00	0.11
V _{EMBED}	Average embeddedness of channel.	2.80	0.75
V _{SUBSTRATE}	Median stream channel substrate particle size.	3.40	1.00
V _{BERO}	Total percent of eroded stream channel bank.	32.00	0.90
V _{LWD}	Number of down woody stems per 100 feet of stream.	20.00	1.00
V _{TDBH}	Average dbh of trees.	8.25	0.91
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
VDETRITUS	Average percent cover of leaves, sticks, etc.	74.38	0.91
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

High-Gradient Headwater Streams in eastern Kentucky and western West Virgini Field Data Sheet and Calculator	
	a
Team: Dawn Verk and Mary Gilmere	
Team: Dawn York and Mary Gilmore Latitude/UTM Northing: 39.828573	
Project Name: AEP Mitchell Landfill Project Longitude/UTM Easting: -80.776341	1
Location: Stream 1b. Cresap, Marshall Co., WV Sampling Date: 27 Sept 20	11
SAR Number: 1b Reach Length (ft): 50 Stream Type: Ephemeral Stream	•
Top Strata: Tree/Sapling Strata (determined from percent calculated in V _{CCANOPY})	
Site and Timing: Project Site Before Project	•
Sample Variables 1-4 in stream channel	_
1 V _{CCANOPY} Average percent cover over channel by tree and sapling canopy. Measure at no fewer than 10 roughly	Т
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.)	21.0 %
List the percent cover measurements at each point below:	
0 10 50 40 0 0 50 20 10 30	-
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	2.8
surface and area surrounding the particle that is covered by fine sediment, and enter the rating according	
to the following table. If the bed is an artificial surface, or composed of fine sediments, use a rating score of 1. If the bed is composed of bedrock, use a rating score of 5.	
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)	-
4 5 to 25 percent of surface covered, surrounded, or buried by fine sediment	-
3 26 to 50 percent of surface covered, surrounded, or buried by fine sediment	
2 51 to 75 percent of surface covered, surrounded, or buried by fine sediment	4
1 >75 percent of surface covered, surrounded, or buried by fine sediment (or artificial surface)	
List the ratings at each point below:	1
3 4 1 3 2 1 4 3 1 2 5 4	-
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	-
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	-
	-
5 5 3 3 2 1	
553321Image: Second sec	3.40 in
553321Image: Second sec	
5 5 3 3 2 1 Image: Constraint of the stress of th	
5 5 3 3 2 1 Image: Second se	
5 5 3 3 2 1 Image: Constraint of the stress of th	
5 5 3 3 2 1 Image: Constraint of the stress of th	
553321Image: Constraint of the state of	
553321Image: Constraint of the state of	
553321Image: Constraint of the state of	
553321Image: Constraint of the state of	

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.									20.0
	Number of downed woody stems: 10										
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.								8.3	
		List the dbh measurements of individual trees (at least 4 in) within the buffer on each side of									
		the stream b									
		Left Side									
	8.9					9					
	8.2 6.9										
	0.0										
											1
7	V	Number of a	nono (ot lo	oot 4" dhh o	nd QC" toll)	nor 100 foo	t of otroom	Enter numk	our of opens	an aaah	
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.							oneach	4.0		
			Left Side:	1			Right Side:		1		
8	V _{SSD} Number of saplings and shrubs (woody stems up to 4 inches dbh) per 100 feet of stream (measure if tree cover is <20%). Enter number of saplings and shrubs on each side of the stream, and the a								N		
		per 100 ft of				gs and snru	lbs on each s	side of the s	stream, and	the amount	Not Used
		•	Left Side:	3	3		Right Side:		5		
9	V _{SRICH}				c and invasive species present in all strata. Species					0.00	
	richness per 100 feet and the subindex will be				calculated from these data. Group 2 (-1.0)						
		Group 1 = 1.0									
		Acer rubrum		Magnolia tripetala			Ailanthus altissima			Lonicera japonica	
\checkmark	Acer sace	Acer saccharum		Nyssa sylvatica			Albizia julibrissin			Lonicera tatarica	
		Aesculus flava		Oxydendrum arboreum			Alliaria petiolata			Lotus corniculatus	
	Asimina t	Asimina triloba		Prunus serotina		Alternanthera				Lythrum salicaria	
	Betula alle	Betula alleghaniensis		Quercus alba		philoxeroides			Microstegium vimineum		
	Betula ler	Betula lenta		Quercus coccinea			Aster tataricus			Paulownia tomentos	
	Carya alb	Carya alba		Quercus imbricaria			Cerastium fontanum			Polygonum cuspida	
	Carya gla	Carya glabra		Quercus prinus		Coronilla varia			Pueraria montana		
	Carya ova	Carya ovalis		Quercus rubra			Elaeagnus umbellata			Rosa multiflora	
	Carya ova	Carya ovata		Quercus velutina			Lespedeza bicolor			Sorghum halepense	
	Cornus fle	Cornus florida		Sassafras albidum		Lespedeza cuneata			Verbena brasiliensis		
		Fagus grandifolia		Tilia americana		Ligustrum obtusifolium					
	Fraxinus americana			Tsuga canadensis		Ligustrum sinense					
		Liriodendron tulipifera		Ulmus americana			0				
		acuminata									
	Magnolla	asanniata									
1 Species in Group 1							1	Species in	Group 2		

Sample Variables 10-11 within at least 8 subplots (40" x 40", or 1m x 1m) in the riparian/buffer zone within 25 feet from each bank. The four subplots should be placed roughly equidistantly along each side of the stream.											
10									er and <36"	74.38 %	
			Left Side				Righ	t Side]	
		10	75			100	100				
11	V _{HERB}	80 Average pe	50 ercentage co	ver of herbace	ous vede	80 etation (mea	100 Isure only if	tree cover is	20%) D	o <i>not</i>	
	• HERB	Average percentage cover of herbaceous vegetation (measure only if tree cover is <20%). Do <i>not</i> include woody stems at least 4" dbh and 36" tall. Because there may be several layers of ground cover vegetation percentages up through 200% are accepted. Enter the percent cover of ground vegetation at each subplot.									
	Left Side Right Side										
		10 40	80 45			100 50	20 50			-	
Comple	Verieble 1			abmont of the	otroom	- 50	50				
				chment of the							
12	V _{WLUSE} Weighted Average of Runoff Score for watershed: 1.00										1.00
	Land Use (Choose From Drop List)							Runoff Score	% in Catch- ment	Running Percent (not >100)	
	Forest and n	ative range (>	>75% ground	cover)				•	1	100	100
								•			
	▼										
		-									
								•			
	1b							tes:			
Variable		Value	VSI	Very large tre	ees dow	n and acro	oss stream.				
V _{CCANOPY}		21 %	0.11								
V _{EMBED}		2.8	0.75								
V _{SUBSTRATE}		3.40 in	1.00								
V _{BERO}		32 %	0.90								
V _{LWD}		20.0	1.00								
V _{TDBH}		8.3	0.91								
V _{SNAG}		4.0	0.90								
V _{SSD}		Not Used	Not Used								
Vs	RICH	0.00	0.00								
	ETRITUS	74.4 %	0.91								
	ERB	Not Used	Not Used								
V _{WLUSE}		1	1.00								

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: AEP Mitchell Landfill Project Location: Sampling Date: 27 Sept 2011

Project Site Be

Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR:

Shrub/Herb Strata

SAR number: 1c

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.67
Biogeochemical Cycling	0.48
Habitat	0.42

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	Not Used, <20%	Not Used
V _{EMBED}	Average embeddedness of channel.	2.60	0.68
V _{SUBSTRATE}	Median stream channel substrate particle size.	3.50	1.00
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.	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.	1.43	0.02
V _{SRICH}	Riparian vegetation species richness.	0.00	0.00
VDETRITUS	V _{DETRITUS} Average percent cover of leaves, sticks, etc.		0.47
V _{HERB}	Average percent cover of herbaceous vegetation.	90.00	1.00
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

Version 1	-25-11
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	Hign-G	Gradient	Headwat				entucky a alculato		tern Wes	t Virgini	а
	Team:	Dawn York	and Mary G	ailmore				Latitude/UT	M Northing:	39.828561	
Pro			ell Landfill P						TM Easting:)
	Location:						. –	-	npling Date:		
								Oun	iping Date.		
_	R Number:			Length (ft):		Stream Ty		meral Stream			
	Top Strata:	Sh	rub/Herb Sti	rata	(determine	d from perce	ent calculate	d in V _{CCANO}	⊳ү)		
Site a	and Timing:	Project Site	1				Before Proje	ct			•
Sample	Variables	1-4 in strea	m channel								
										Not Used, <20%	
List the percent cover measurements at each point below:											
	10	5	0	10	10	5	0	0	25	15	1
											1
2										2.6	
							y fine sedim				
	to the following table. If the bed is an artificial surface, or composed of fine sediments, use a rating score of 1. If the bed is composed of bedrock, use a rating score of 5.										
		Embedded Minshall 19		for gravel, c	obble and b	oulder partic	cles (rescale	d from Platt	s, Megahan	, and	
		Rating	Rating Des	scription							
		5	<5 percent	of surface c	overed, sur	rounded, or	buried by fir	ne sediment	(or bedrock	.)	
		4					l, or buried b				
		3	26 to 50 pe			d, surrounde	ed, or buried	by fine sed	iment		
······································											
	List the rati	2 1	>75 percen	t of surface			ed, or buried			al surface)	
		1 ings at each	>75 percen point below	t of surface	covered, su	rrounded, o	ed, or buried r buried by f	ine sedimer	nt (or artificia]
	5	1 ings at each 4	>75 percen point below 3	t of surface : 3	covered, su	rrounded, o	ed, or buried r buried by f <u>3</u>	ine sedimer	nt (or artificia	3]
	5 2	1 ings at each	>75 percen point below 3 4	t of surface : 3 2	covered, su	rrounded, o 4 3	ed, or buried r buried by f <u>3</u> 1	ine sedimer 2 3	nt (or artificia 2 2		
	5	1 ings at each 4	>75 percen point below 3	t of surface : 3	covered, su	rrounded, o	ed, or buried r buried by f <u>3</u>	ine sedimer	nt (or artificia	3	
	5 2	1 ings at each 4	>75 percen point below 3 4	t of surface : 3 2	covered, su	rrounded, o 4 3	ed, or buried r buried by f <u>3</u> 1	ine sedimer 2 3	nt (or artificia 2 2	3	
	5 2 3	1 Ings at each 4 3 4	>75 percent point below 3 4 3	t of surface : 3 2 2	covered, su 1 3 2	rrounded, o 4 3 2	ed, or buried r buried by f 3 1 1	ine sedimer 2 3 2	nt (or artificia 2 2 3	3 2 1	
3	5 2 3	1 ings at each 4 3 4 4 Median stre	>75 percen point below 3 4 3 eam channe	t of surface : 2 2 substrate p	covered, su	rrounded, o 4 3 2 Measure a	ed, or buried r buried by f <u>3</u> 1	ine sedimer 2 3 2 nan 30 roug	nt (or artificia 2 2 3	3 2 1	3.50 in
3	5 2 3 V _{SUBSTRATE} Enter partic	1 ings at each 4 3 4 Median stra along the s cle size in in	>75 percen point below 3 4 3 eam channe tream; use t ches to the	t of surface : 2 2 I substrate p he same po nearest 0.1	covered, su 1 3 2 Dearticle size. ints and par inch at each	rrounded, o 4 3 2 Measure a ticles as use	ed, or buried r buried by f 3 1 1 1 1 t no fewer th	ine sedimer 2 3 2 nan 30 roug	nt (or artificia 2 3 hly equidista	3 2 1 ant points	3.50 in
3	5 2 3 V _{SUBSTRATE} Enter partic or concrete	1 ings at each 4 3 4 Median stre along the s cle size in in a as 0.0 in, s	>75 percent point below 3 4 3 eam channet tream; use t ches to the and or finer	t of surface 3 2 2 I substrate p he same po nearest 0.1 particles as	covered, su	rrounded, o 4 3 2 Measure a ticles as use	ed, or buried r buried by f 3 1 1 1 t no fewer th ed in V _{EMBED} v (bedrock s	ine sedimer 2 3 2 nan 30 roug hould be co	nt (or artificia 2 3 hly equidista unted as 99	3 2 1 ant points in, asphalt	3.50 in
3	5 2 3 V _{SUBSTRATE} Enter partic or concrete 2.30	1 ings at each 4 3 4 Median stro along the s cle size in in as 0.0 in, s 1.50	>75 percen point below 3 4 3 eam channe tream; use t ches to the and or finer 6.50	t of surface 3 2 2 I substrate p he same po nearest 0.1 particles as 3.50	covered, su	rrounded, o 4 3 2 Measure a ticles as use point below 13.00	ed, or buried r buried by f 3 1 1 1 t no fewer th ed in V _{EMBED} v (bedrock s 5.50	ne sedimer 2 3 2 nan 30 roug hould be co 9.50	nt (or artificia 2 3 hly equidista unted as 99 3.00	3 2 1 ant points in, asphalt 3.00	3.50 in
3	5 2 3 V _{SUBSTRATE} Enter partic or concrete 2.30 4.00	1 ings at each 4 3 4 Median stro along the s cle size in in a s 0.0 in, s 1.50 4.00	>75 percent point below 3 4 3 eam channet tream; use t ches to the and or finer 6.50 6.00	t of surface 3 2 2 1 substrate p he same po nearest 0.1 particles as 3.50 9.50	covered, su	rrounded, o 4 3 2 Measure a ticles as use point below 13.00 3.50	ed, or buried r buried by f 3 1 1 1 2 3 3 4 4 5.50 3.00	ine sedimer 2 3 2 nan 30 roug hould be co 9.50 2.50	nt (or artificia 2 3 hly equidista unted as 99 3.00 0.50	3 2 1 ant points in, asphalt 3.00 0.50	3.50 in
3	5 2 3 V _{SUBSTRATE} Enter partic or concrete 2.30	1 ings at each 4 3 4 Median stro along the s cle size in in as 0.0 in, s 1.50	>75 percen point below 3 4 3 eam channe tream; use t ches to the and or finer 6.50	t of surface 3 2 2 I substrate p he same po nearest 0.1 particles as 3.50	covered, su	rrounded, o 4 3 2 Measure a ticles as use point below 13.00	ed, or buried r buried by f 3 1 1 1 t no fewer th ed in V _{EMBED} v (bedrock s 5.50	ne sedimer 2 3 2 nan 30 roug hould be co 9.50	nt (or artificia 2 3 hly equidista unted as 99 3.00	3 2 1 ant points in, asphalt 3.00	3.50 in
	5 2 3 V _{SUBSTRATE} Enter partic or concrete 2.30 4.00 0.50	1 ings at each 4 3 4 along the streating along the streat al	>75 percen point below 3 4 3 eam channe tream; use t ches to the and or finer 6.50 6.00 5.50	t of surface 3 2 2 I substrate p he same po nearest 0.1 particles as 3.50 9.50 12.00	covered, su	rrounded, o 4 3 2 Measure a ticles as use point below 13.00 3.50 1.50	ed, or buried r buried by f 3 1 1 1 t no fewer th ed in V _{EMBED} v (bedrock s 5.50 3.00 3.00	ine sedimer 2 3 2 nan 30 roug hould be co 9.50 2.50 4.50	t (or artificia 2 3 hly equidista unted as 99 3.00 0.50 3.50	3 2 1 ant points in, asphalt 3.00 0.50 10.00	3.50 in
3	5 2 3 V _{SUBSTRATE} Enter partic or concrete 2.30 4.00	1 ings at each 4 3 4 Median streation along the s cle size in in a s 0.0 in, s 1.50 4.00 0.70 Total perce	>75 percent point below 3 4 3 	t of surface 3 2 2 1 substrate p he same po nearest 0.1 particles as 3.50 9.50 12.00 I stream cha	covered, su	rrounded, o 4 3 2 Measure a ticles as use point below 13.00 3.50 1.50 Enter the to	ed, or buried r buried by f 3 1 1 1 2 3 3 4 4 5.50 3.00	ine sedimer 2 3 2 han 30 roug hould be co 9.50 2.50 4.50 0 feet of ere	t (or artificia 2 2 3 hly equidista unted as 99 3.00 0.50 3.50 0.50 3.50	3 2 1 ant points in, asphalt 3.00 0.50 10.00 n each	3.50 in

Sampl	e Variable	s 5-9 within t	he entire ri	parian/buffer zone	e adjace	ent to th	e stream ch	annel (25 f	eet from ea	ich bank).	
5	V_{LWD}	stream read	ch. Enter th	y stems (at least 4 i e number from the will be calculated.				-			0.0
							oody stems:		0		-
6	V_{TDBH}			measure only if V _{CC}			ng cover is a	t least 20%)). Trees are	e at least 4	Not Used
			,	eter. Enter tree DE				h			
		the stream		ents of individual tr	ees (at	ieast 4 ir	i) within the	buffer on ea	ach side of		
			Left Side					Right Side	1		1
	4	5	4.5			8.9	20				
7	V_{SNAG}			ast 4" dbh and 36"				Enter numb	per of snags	on each	
		side of the	stream, and	the amount per 10	iu teet w	/III be ca	iculated.				0.0
			Left Side:	0			Right Side:		0		
8	V_{SSD}			d shrubs (woody st							
				Enter number of sa I be calculated.	aplings a	and shru	bs on each s	side of the s	tream, and	the amount	1.4
		•	Left Side:	1			Right Side:				
9	V _{SRICH}			ecies richness per							
				tratum. Check all e nd the subindex wi					i strata. Spe	ecies	0.00
			p 1 = 1.0			Group 2 (-1.0)					
	Acer rubr	um		Magnolia tripetala			Ailanthus a	altissima		Lonicera ja	ponica
	Acer sace	charum		Nyssa sylvatica			Albizia julik	orissin		Lonicera ta	tarica
	Aesculus	flava		Oxydendrum arbore	eum		Alliaria peti	iolata		Lotus corn	iculatus
	Asimina t			Prunus serotina			' Alternanthe			Lythrum sa	
		eghaniensis		Quercus alba			philoxeroid			Microstegiur	
	Betula ler	•		Quercus coccinea			Aster tatari	icus		Paulownia	
	Carya alb			Quercus imbricaria			Cerastium			Polygonum	
	-				a						
	Carya gla			Quercus prinus			Coronilla v			Pueraria m	
	Carya ova			Quercus rubra			Elaeagnus u			Rosa multi	
	Carya ova			Quercus velutina			Lespedeza			Sorghum h	-
	Cornus flo			Sassafras albidum	ו		Lespedeza			Verbena bi	rasılıensis
	Fagus gra	andifolia		Tilia americana			Ligustrum ol	btusifolium			
	Fraxinus	americana		Tsuga canadensis	;		Ligustrum	sinense			
	Liriodendro	on tulipifera	1	Ulmus americana							
	Magnolia	acuminata									
		1	Species in	Group 1				1	Species in	Group 2	
		I	000000					I	opecies III		

				subplots (40' d roughly eq					one within	25 feet from	n each
10	V _{DETRITUS}			of leaves, stic the percent c					<4" diamete	er and <36"	38.75 %
			Left	Side			Righ	t Side			
		10	30			60	50				
11	V _{HERB}	40 Average pe	20 rcentage.cc	over of herbace	eous vege	60 etation (mea	40 asure only if	tree cover is	s<20%), D	o not	
	• HEND	include woo	ody stems a percentages ot.	t least 4" dbh a s up through 20	and 36" ta	II. Because	there may tenter the per	be several la cent cover c	yers of gro	und cover	90 %
				Side			-	t Side			
		100 90	60 90			100 90	90 100				
Somple	Voriabla 1			abmont of the	otroom	50	100				
-				chment of the		!-					
12	V _{WLUSE}	weighted A	verage of F	Runoff Score fo	or watersn	iea:					1.00
			Land	Use (Choose I	From Dro	p List)			Runoff Score	% in Catch- ment	Running Percent (not >100)
	Forest and n	ative range (>	>75% ground	cover)				-	1	100	100
								•			
	•							-			
								-			
								-			
								•			
		1c						tes:			
Va	ariable	Value	VSI	Stream reac	h riparia	n - domina	int forb, Ve	rbisina alte	rnifolia. Ve	ery little shr	ub layer.
Vc	CANOPY	Not Used, <20%	Not Used								
V _{EI}	MBED	2.6	0.68								
	UBSTRATE	3.50 in	1.00								
VB	ERO	0 %	1.00								
VL		0.0	0.00								
	ОВН	Not Used	Not Used								
	NAG	0.0	0.10								
V _{SS}		1.4	0.02								
	RICH	0.00	0.00								
	RICH ETRITUS	38.8 %	0.00								
	ETRITUS	90 %	1.00								
			1.00								
۷w	LUSE	1	1.00								

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: AEP Mitchell Landfill Project Location: Stream 1d, Cresap, Marshall Co., WV Sampling Date: 27 Sept 2011

Project Site Bef

Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 1d

1

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.93
Biogeochemical Cycling	0.92
Habitat	0.73

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	54.50	0.56
V _{EMBED}	Average embeddedness of channel.	3.27	0.92
V _{SUBSTRATE}	Median stream channel substrate particle size.	8.15	0.86
V _{BERO}	Total percent of eroded stream channel bank.	65.00	0.73
V _{LWD}	Number of down woody stems per 100 feet of stream.	12.00	1.00
V _{TDBH}	Average dbh of trees.	11.79	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	27.00	0.50
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
VDETRITUS	Average percent cover of leaves, sticks, etc.	42.50	0.52
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

										Vers	ion 1-25-11
	High-G	aradient	Headwat	er Strea	ms in ea	stern Ke	entucky a	and west	ern Wes	st Virgini	а
	Ū						alculato			Ū	
	Team:	Dawn York	and Mary G	ilmore				_atitude/UT	M Northina:	39.829293	
Pro			ell Landfill Pi				•		-	-80.776827	,
			Cresap, Ma		NV		. –			27 Sept 20	
~			·			о. т				27 000120	
SP	R Number:	1d	Reach	Length (ft):	100	Stream Ty	/pe: Ephe	meral Stream)		
	Top Strata:	Tre	e/Sapling St	rata	(determined	d from perce	ent calculate	d in V _{CCANOF}	эγ)		
Site a	and Timing:	Proiect Site				•	Before Proje	ct			•
Sample Variables 1-4 in stream channel											
I	V _{CCANOPY}	equidistant	points along	g the stream	. Measure	only if tree/s	apling cover Top Strata c	r is at least a			54.5 %
	List the per	cent cover r	neasuremer	nts at each p	oint below:						
	50	50	85	50	40	40	60	80	50	40	
2	V _{EMBED}						at no fewer t noving it, de				3.3
		•		•			y fine sedim				
							omposed of				
		of 1. If the	bed is comp	osed of bed	Irock, use a	rating score	e of 5.				
				or gravel, co	obble and b	oulder partic	cles (rescale	d from Platt	s, Megahar	i, and	
		Minshall 19	83)								
		Rating	Rating Des								
		5					buried by fir			<)	
		4					l, or buried b				
		3					ed, or buried ed, or buried				
		1					r buried by f			al surface)	
	l ist the rati	nas at each	point below		0010100, 00	noundou, o	r barloa by r				
1	4	3	4	2	3	3					
	4	3	4	1	4	4					
	5	3	3	3	4	4					
	3	2	1	4	3	4					
	5	3	1	5	3	3					
3							it no fewer th	nan 30 roug	hlv eauidist	ant points	
-	SUBSTRATE						ed in V _{EMBED}		,		8.15 in
	Enter partic	la siza in in	ches to the i	noarost 0 1 i	inch at each	point below	/ (bedrock sl	hould be co	unted as 90	in asphalt	
			and or finer						unieu as es	ni, aspitali	
	9.00	0.50	14.00	1.00	8.00	99.00					
	4.50	99.00	15.00	0.20	22.00	8.90					
	12.00	7.00	6.50	9.00	9.00	8.10					
	8.50	13.00	0.10	5.00	2.00	4.00					
	14.00	4.00	2.00	99.00	8.20	4.00 5.50					
4	V _{BERO}						tal number o	of feet of er	ded bank o	n each	
+	■ BERÓ	•					nks are eroc				65 %
		may be up	•					.,			00 /8
			Left Bank:	20) ft		Right Bank:	45	5 ft		

Sampl	e Variable:	s 5-9 within the	e entire ri	parian/buffe	er zone adj	acent to th	e stream ch	annel (25 f	eet from ea	ach bank).	
5	V _{LWD}	Number of do stream reach per 100 feet	n. Enter th	e number fro	om the entir						12.0
						f downed w	oody stems:	-	12		
6	V_{TDBH}	Average dbh					ng cover is a	t least 20%)). Trees are	e at least 4	11.8
		inches (10 cr	,				.				11.0
		List the dbh r the stream be		ients of indiv	idual trees	(at least 4 ir	n) within the	buffer on ea	ach side of		
			Left Side					Right Side			
	18.5					13.5					
	9.8					6.9					
	7.8					9					
						17					
7	V _{SNAG}	Number of sr side of the st						Enter numb	per of snags	s on each	27.0
			Left Side:				Right Side:	2	27		
8	V_{SSD}	Number of sa									
		if tree cover i per 100 ft of				gs and shru	bs on each s	side of the s	tream, and	the amount	Not Used
		•	Left Side:				Right Side:	2	27		
9	V _{SRICH}	Riparian veg Group 1 in th richness per	ne tallest s	tratum. Che	ck all exotic	and invasi	ve species p	resent in al			0.00
			1 = 1.0						2 (-1.0)		
	Acer rubr			Magnolia tri	ipetala		Ailanthus a			Lonicera ja	ponica
~	Acer sace	harum		Nyssa sylva	atica		Albizia julib	orissin		Lonicera ta	-
	Aesculus	flava		Oxydendrum			Alliaria peti			Lotus corn	culatus
	Asimina ti			Prunus sero			, Alternanthe			Lythrum sa	
		ghaniensis		Quercus all			philoxeroid			Microstegiur	
	Betula ler	-		Quercus co			Aster tatari	cus		Paulownia	
	Carya alb			Quercus im			Cerastium			Polygonum	
	Carya gla			Quercus pr			Coronilla va	aria		Pueraria m	
	Carya ova			Quercus rui			Elaeagnus u		~	Rosa multi	flora
	Carya ova			Quercus ve			Lespedeza			Sorghum h	
	Cornus flo			Sassafras a			Lespedeza			Verbena bi	-
	Fagus gra			Tilia americ			Ligustrum ob			. croona bi	
		americana		Tsuga cana			Ligustrum s				
	Liriodendro			Ulmus ame							
		acuminata		Sindo ante	nounu						
	waynona	ασυππαία									
		1 S	Species in	Group 1				3	Species in	Group 2	

	cample Variables 10-11 within at least 8 subplots (40" x 40", or 1m x 1m) in the riparian/buffer zone within 25 feet from each bank. The four subplots should be placed roughly equidistantly along each side of the stream.									
10		Average pe	ercent cover	of leaves, sticks, or oth r the percent cover of th	ier organic n	naterial. Wo	ody debris	<4" diamete	er and <36"	42.50 %
			Left	Side		Righ	t Side]	
		35	70		20	25				
11	V _{HERB}	60 Average pe	90 ercentage co	over of herbaceous veg	10 etation (mea	30 asure only if	tree cover is	s <20%). Do	o not	
		include woo	ody stems a percentages	t least 4" dbh and 36" t s up through 200% are	all. Because	there may b	be several la	ivers of grou	und cover	Not Used
				Side			t Side			
		70 80	30 10		30 100	25 20				
0	. Mariahla d					20				
				chment of the stream.						
12	V _{WLUSE}	Weighted A	verage of F	Runoff Score for waters	ied:			-	-	1.00
			Land	Use (Choose From Dro	p List)			Runoff Score	% in Catch ment	Running Percent (not >100)
	Forest and n	ative range (>	>75% ground	l cover)			•	1	100	100
							-			
							-			
							•			
	•						-			
	•						-			
	-						•			
							-			
		1d				No	tes:			
Va	ariable	Value	VSI							
Vc	CANOPY	55 %	0.56							
	MBED	3.3	0.92							
	UBSTRATE	8.15 in	0.86							
	ERO	65 %	0.73							
VL		12.0	1.00							
	ОВН	11.8	1.00							
	NAG	27.0	0.50							
Vs		Not Used	Not Used							
	RICH	0.00	0.00							
	ETRITUS	42.5 %	0.52							
	ERB	Not Used	Not Used							
	LUSE	1	1.00							

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: AEP Mitchell Landfill Project Location: Cresap, Marshall County, WV Sampling Date: 8/12/11

Project Site E

Before Project

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 2

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.98
Biogeochemical Cycling	0.94
Habitat	0.89

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	83.00	0.93
V _{EMBED}	Average embeddedness of channel.	3.80	1.00
V _{SUBSTRATE}	Median stream channel substrate particle size.	3.15	1.00
V _{BERO}	Total percent of eroded stream channel bank.	30.00	0.91
V _{LWD}	Number of down woody stems per 100 feet of stream.	10.00	1.00
V _{TDBH}	Average dbh of trees.	10.23	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	3.00	1.00
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	5.40	1.00
VDETRITUS	Average percent cover of leaves, sticks, etc.	22.81	0.28
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

	High-G	Gradient	Headwat				entucky a alculato		ern Wes	t Virginia	a
	Team:	D. Godec,	. G. Gerke					Latitude/UT	M Northing:	39°49'37.36	5"N
Pr	oject Name:			roiect					TM Easting:		
	-		arshall Coun					-	pling Date:		
S/	AR Number:	2		Length (ft):	100	Stream Ty	vpe: Inter	mittent Strea			•
	Top Strata:	Tre	e/Sapling St	rata	(determine	d from perce	ent calculate	d in V _{CCANO}	у)		
Site	and Timing:	Project Site	2			•	Before Proje	ct			•
Sample	e Variables										-
1	V _{CCANOPY}	equidistant	ercent cover points along at least one	g the stream	. Measure	only if tree/s	apling cover	r is at least :			83.0 %
	List the per	cent cover r	measuremer	nts at each p	point below:						
	10	90	100	80	90	100	80	90	100	90	
2	V _{EMBED}	along the s	nbeddednes tream. Sele	ct a particle	from the be	ed. Before n	noving it, de	termine the	percentage	of the	3.8
			d area surro ving table. I								
			bed is comp						51110, 000 u 1		
		Embedded Minshall 19	ness rating f 183)	for gravel, co	obble and b	oulder partic	les (rescale	d from Platt	s, Megahan	, and	
		Rating	Rating Des	scription							
		5					buried by fir)	
		4					I, or buried b				
		3					ed, or buried ed, or buried				
		1					r buried by f			l surface)	
	List the rati		point below		0010100,00	inoundou, o	i bulloù by i			a banabo)	
	4	4	4	4	3	4					
	4	4	5	4	4	4					
	4	3	4	4	4	3					
	3	4	4	4	5	4					
	3	3	3	3	4	4					
3	V _{SUBSTRATE}		eam channe tream; use t						hly equidista	ant points	3.15 in
			ches to the i and or finer			n point below	/ (bedrock s	hould be co	unted as 99	in, asphalt	
	2.20	2.20	1.50	12.50	4.50	8.00					
	3.10	99.00	2.50	2.00	2.50	5.50					
	1.00	16.00	5.40	8.50	3.50	1.50					
	14.50	32.00	3.20	0.50	1.00	1.00					
	3.50	0.50	2.40	0.80	5.50	99.00					
4	V _{BERO}	Total perce	nt of erodec e total perce	l stream cha	annel bank.	Enter the to					30 %
			Left Bank:	10) ft		Right Bank:	20) ft		

Sampl	e Variable	s 5-9 within th	ne entire ri	parian/buff	er zone adj	acent to th	e stream ch	annel (25	feet from ea	ich bank).				
5	V _{LWD}	Number of c stream reac per 100 feet	h. Enter th	e number fr	om the entir		ter and 36 in buffer and w				10.0			
			Number of downed woody stems: 10 verage dbh of trees (measure only if V _{CCANOPY} tree/sapling cover is at least 20%). Trees are at least 4											
6	V _{TDBH}	Average dbl inches (10 c					ng cover is a	t least 20%). Trees are	e at least 4	10.2			
		List the dbh	measurem	ents of indiv	vidual trees	(at least 4 i	n) within the	buffer on e	ach side of					
		the stream b				-					•			
			Left Side	1				Right Side						
	10	14	10	6	6	23	6	13	13	5				
	8	7				12								
		Neuropean of a		+ 411 -11- h			t - { - }	E e t e e e e e e						
7	V _{SNAG}	side of the s					t of stream. Iculated.	Enter num	ber of snags	on each	3.0			
			Left Side:		3		Right Side:		0					
8	V_{SSD}						nes dbh) per							
		per 100 ft of				gs and shru	bs on each s	side of the s	stream, and	the amount	Not Used			
			Left Side:				Right Side:							
9	V_{SRICH}						m reach. Cl							
							ve species p from these d		li strata. Spe	ecies	5.40			
		-	o 1 = 1.0						0 2 (-1.0)					
	Acer rubr			Magnolia ti	ripetala	1	Lonicera ja	ponica						
~	Acer sace	charum		Nyssa sylv	-		Albizia julik	orissin		Lonicera ta	Itarica			
	Aesculus	flava		Oxydendrun			, Alliaria peti			Lotus corni	iculatus			
~	Asimina t			Prunus sei						Lythrum sa				
		eghaniensis		Quercus a			Alternanthe philoxeroid			Microstegiur				
	Betula lei	-		Quercus co			' Aster tatari			Paulownia				
	Carya alb			Quercus in			Cerastium			Polygonum				
	-						Coronilla v			Pueraria m	-			
	Carya gla			Quercus p										
	Carya ov			Quercus ru			Elaeagnus u			Rosa multi				
	Carya ov			Quercus ve			Lespedeza			Sorghum h	-			
	Cornus fl			Sassafras			Lespedeza			Verbena bi	rasiliensis			
<i>✓</i>	Fagus gra		~	Tilia ameri			Ligustrum ol							
1		americana		Tsuga can			Ligustrum	sinense						
	Liriodendro	on tulipifera	~	Ulmus ame	ericana									
	Magnolia	acuminata												
		7	Species in	Group 1				1	Species in	Group 2				
		1						1		aroup 2				

	e Variables The four sub								one within	25 feet from	n each
10	V _{DETRITUS}				ticks, or oth t cover of th				<4" diamete	er and <36"	22.81 %
			Left	Side			· · · · ·	t Side] '	
		30	20	20	30	30	20	25	30		
11	V _{HERB}	25 Average pe	10 rcentage co	25 over of herba	25 aceous vege	20 etation (mea	10 asure only if	20 tree cover is	25 s <20%). Do	o not	
		include woo	ody stems a percentages	t least 4" db	h and 36" ta 1 200% are a	II. Because	there may b	be several la	yers of grou	und cover	Not Used
			Left	Side			Righ	t Side			
Sample	e Variable 1	2 within the	entire cat	chment of t	he stream						
12	V _{WLUSE}				e for watersh	ed:					1.00
										_	1.00
			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	100	100
								•			
								•			
								-			
								•			
								•			
								•			
								•			
	Summary:	SAA Numbe	er 2				No	tes:			
Va	ariable	Value	VSI								
Vc	CANOPY	83 %	0.93								
V _{EI}	MBED	3.8	1.00								
Vs	UBSTRATE	3.15 in	1.00								
VB	ERO	30 %	0.91								
VL	WD	10.0	1.00								
V _{TI}	DBH	10.2	1.00								
	NAG	3.0	1.00								
Vs		Not Used	Not Used								
	RICH	5.40	1.00								
	ETRITUS	22.8 %	0.28								
	ERB	Not Used	Not Used								
Vw	LUSE	1	1.00								

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

Project Name: AEP Mitchell Landfill Project

Location: Stream 2a Ephemeral Portion, Cresap, Marshall Co., WV

Sampling Date: 27 Sept 2011

Project Site

Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

2a Eph

SAR number:

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.92
Biogeochemical Cycling	0.88
Habitat	0.71

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	33.50	0.28
V _{EMBED}	Average embeddedness of channel.	3.00	0.82
V _{SUBSTRATE}	Median stream channel substrate particle size.	6.00	1.00
V _{BERO}	Total percent of eroded stream channel bank.	5.00	1.00
V _{LWD}	Number of down woody stems per 100 feet of stream.	7.00	0.88
V _{TDBH}	Average dbh of trees.	13.25	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	3.00	1.00
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	1.80	0.86
VDETRITUS	Average percent cover of leaves, sticks, etc.	66.25	0.81
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

										Vers	ion 1-25-11
	High-G	aradient	Headwat	er Strea	ms in ea	stern Ke	entucky a	and west	tern Wes	st Virginia	a
				Field D	Data She	et and C	alculato	r			
	Team:	Dawn York	and Mary G	ilmore				Latitude/UT	M Northing:	39.828091	
Pro		AEP Mitche							-	-80.774447	,
-		Stream 2a			sap. Marsha	all Co., WV	Sampling Date: 27 Sept 2011				
64	R Number:						<u> </u>				
34	In Number.	2a Eph	neach	Length (ft):	100	Stream Ty	/pe. Ephe	meral Stream	1		
	Top Strata: Tree/Sapling Strata (determined from percent calculated in V _{CCANOPY})										
	Top Strata. Tree/Sapling Strata (determined from percent calculated in V _{CCANOPY})										
Site a	and Timing:	Project Site					Before Proje	ct			
Comple	Verieblee	1 1 in atree	m ohonnol			_	-				-
		1-4 in strea		over ehenn	al hy trac ar	d copling of	anopy. Mea	ouro et po f	ower then 1	0 roughly	
1	V _{CCANOPY}						anopy. Mea				00 5 0/
							Top Strata c		2078. (11163	Sthan	33.5 %
	l ist the ner	cent cover r				33	-1	/			
	5	5	50	60	50	5	20	50	50	40	
	5	5		00	50	5	20		50	40	
2	V _{EMBED}	Average en	nheddednes	s of the stre	am channe	Measure	at no fewer	than 30 rou	ahly equidis	tant points	
2	• EMBED						noving it, de				3.0
		•		•			y fine sedim				
		to the follow	ving table. I	f the bed is	an artificial s	surface, or c	composed of	f fine sedime	ents, use a	rating score	
		of 1. If the	bed is comp	osed of bec	Irock, use a	rating score	e of 5.				
		Embedded	ness rating f	or gravel, co	obble and b	oulder partic	cles (rescale	d from Platt	s, Megahar	i, and	
		Minshall 19	83)								
		Rating	Rating Des	cription							
		5	<5 percent	of surface c	overed, suri	rounded, or	buried by fir	ne sediment	(or bedrock	()	
		4					d, or buried b				
		3					ed, or buried				
		2					ed, or buried r buried by f			al aurfaga)	
	List the rati	ngs at each			coverea, su	rrounded, o	r buried by i	ine sedimer	it (or anincia	al sunace)	
	5	3	1	2	4	Λ					
	5				2	4					
	5	3 3	2 4	4	3	4					
	3	2	4	2	4	4					
	4	2	2	3	3	3					
3						_	at no fewer th	han 30 roug	hly equidist	ant points	
0	SUBSTRATE						ed in V _{EMBED}			ant points	6.00 in
		-			-						
						point below	v (bedrock s	hould be co	unted as 99	in, asphalt	
		as 0.0 in, s				0.00					l
	25.20	33.00	0.70	0.90	8.90	0.60					
	4.10	99.00	6.00	3.30	4.50	0.70					
	8.00	5.40	7.50	6.90	14.00	2.70					
	6.50	7.90	5.40	6.00	4.40	6.90					
	11.90	2.90	4.00	10.90	1.00	8.00					
4	V _{BERO}	•					tal number o				
		may be up	•	maye will b	e calculateo	a n both bar	nks are eroo	ieu, iotal er	USION IOF INE	stream	5 %
		may be up	Left Bank:				Diaht Donk	-	ft	, I	
			LEIL Dalik.				Right Bank:	5	it i		

Sampl	e Variable	s 5-9 within th	e entire ri	parian/buffe	r zone adj	acent to th	e stream ch	annel (25 f	eet from ea	ach bank).	
5	V _{LWD}	stream reach	n. Enter th	y stems (at le ne number fro will be calcula	m the entir						7.0
						f downed w	oody stems:		7		
6	V_{TDBH}			measure only eter. Enter tr			ng cover is a	t least 20%)). Trees are	e at least 4	13.3
			,	nents of individ			n) within the	buffer on ea	ach side of		
		the stream b	elow:			,					-
			Left Side					Right Side			
	4					11					
	13					22					
	14 25			<u> </u>		12					
	5										
7	V _{SNAG}			ast 4" dbh an I the amount p				Enter numb	per of snags	on each	3.0
			Left Side:	1			Right Side:		2		
8	V_{SSD}			d shrubs (woo							
				Enter numbe Il be calculate		gs and shru	bs on each s	side of the s	stream, and	the amount	Not Used
		•	Left Side:				Right Side:	(31		
9	V _{SRICH}			ecies richnes: tratum. Chec							4.00
				and the subinc					i strata. Sp	ecies	1.80
		Group	1 = 1.0					Group	2 (-1.0)		
	Acer rubr	um		Magnolia trip	oetala		Ailanthus a	ltissima		Lonicera ja	ponica
	Acer sace	charum		Nyssa sylva	tica		Albizia julib	orissin		Lonicera ta	tarica
	Aesculus	flava		Oxydendrum	arboreum		Alliaria peti	iolata		Lotus corni	iculatus
	Asimina t			Prunus sero			Alternanthe			Lythrum sa	
		eghaniensis		Quercus alb			philoxeroid			Microstegiur	
	Betula lei	nta		Quercus cod	cinea		Aster tatari	cus		Paulownia	tomentosa
	Carya alb	Da		Quercus imb	oricaria		Cerastium	fontanum		Polygonum d	cuspidatum
	Carya gla	abra		Quercus prir	nus		Coronilla v	aria		Pueraria m	ontana
	Carya ov	alis		Quercus rub	ra		Elaeagnus u	ımbellata		Rosa multi	flora
<i>✓</i>	Carya ov	ata		Quercus vel	utina		Lespedeza	bicolor		Sorghum h	alepense
	Cornus fl	orida		Sassafras al	bidum		Lespedeza	cuneata		Verbena br	rasiliensis
	Fagus gra	andifolia		Tilia america	ina		Ligustrum ol	btusifolium			
7	Fraxinus	americana		Tsuga canad	densis		Ligustrum :	sinense			
	Liriodendro	on tulipifera		Ulmus amer	icana						
		acuminata									
	<u> </u>			_							
		3 5	Species in	Group 1				1	Species in	Group 2	

	e Variables The four sub								one within	25 feet from	n each
10	V _{DETRITUS}	Average pe long are inc							<4" diamete	er and <36"	66.25 %
			Left	Side			Righ	t Side] '	
		100	60			60	50				
11	V _{HERB}	80 Average pe	100 rcentage cc	over of herba	aceous vege	10 etation (mea	70 sure only if	tree cover is	s <20%). De	o not	
		include woo vegetation (each subplo	ody stems a percentages	t least 4" db	h and 36" ta	II. Because	there may b	oe several la	yers of grou	und cover	Not Used
			Left	Side			Righ	t Side			
		100				90					
Sample	e Variable 1	2 within the	entire cat	chment of t	he stream						
12	V _{WLUSE}				e for watersh	ed:					1.00
											
			Land	Use (Choos	e From Dro	p List)			Runoff Score	% in Catch ment	Running Percent (not >100)
	Forest and n	ative range (>	>75% ground	cover)				•	1	100	100
								•			
								•			
								•			
								•			
								•			
								-			
								•			
	23	a Eph					No	tes:			
V	ariable	Value	VSI								
Vc	CANOPY	34 %	0.28								
VE	MBED	3.0	0.82								
Vs	UBSTRATE	6.00 in	1.00								
VB	ERO	5 %	1.00								
VL	WD	7.0	0.88								
VT	DBH	13.3	1.00								
Vs	NAG	3.0	1.00								
Vs		Not Used	Not Used								
	RICH	1.80	0.86								
	ETRITUS	66.3 %	0.81								
	ERB	Not Used	Not Used								
Vw	LUSE	1	1.00								

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: AEP Mitchell Landfill Project Location: Cresap, Marshall County, WV Sampling Date: 8/11/2011

Project Site

Before Project

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 2A

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.93
Biogeochemical Cycling	0.80
Habitat	0.61

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	30.00	0.23
V _{EMBED}	Average embeddedness of channel.	2.77	0.74
V _{SUBSTRATE}	Median stream channel substrate particle size.	1.50	0.75
V _{BERO}	Total percent of eroded stream channel bank.	60.00	0.75
V _{LWD}	Number of down woody stems per 100 feet of stream.	12.00	1.00
V _{TDBH}	Average dbh of trees.	9.54	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	5.00	0.80
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	1.80	0.86
VDETRITUS	Average percent cover of leaves, sticks, etc.	17.19	0.21
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

	High-G	aradient	Headwat				entucky a alculato		ern Wes	t Virginia	а
	Team:	D. Godec, 0	G. Gerke						M Northing:	39°49'39.73	3"N
Pro	oject Name:			roject					TM Easting:		
	-		arshall Coun						pling Date:		
SA	AR Number:	2A	Reach	Length (ft):	100	Stream Ty	/pe: Inter	mittent Strea	m		-
	Top Strata:	Tre	e/Sapling St	rata	(determined	d from perce	ent calculate	d in V _{CCANOF}	уу)		
	and Timing:	-					Before Proje	ect			•
Sample	e Variables										
1	V _{CCANOPY}	equidistant		g the stream	. Measure	only if tree/s	apling cove	r is at least a	ewer than 10 20%. (If less		30.0 %
	List the per	cent cover r	neasuremer	nts at each p	point below:						
	0	25	90	100	10	0	25	50	0	0	
2	V _{EMBED}	along the s	tream. Sele	ct a particle	from the be	d. Before n	noving it, de	termine the	ghly equidist percentage ter the rating	of the	2.8
									ents, use a ra		
			bed is comp								
		Embedded Minshall 19		or gravel, co	obble and b	oulder partic	cles (rescale	d from Platt	s, Megahan,	and	
		Rating	Rating Des	cription							
		5			overed, suri	rounded, or	buried by fir	ne sediment	(or bedrock))	
		4	5 to 25 perc								
		3	26 to 50 pe								
		2	51 to 75 pe						nt (or artificia	l surface)	
	List the rati		point below			nounded, o	i bulled by i	ine sedimer		i sunace)	l
	2	3	3	3	2	3					
	2	3	3	3	2	3					
	3	3	3	3	3	3					
	2	2	2	2	3	2					
	4	3	4	3	3	3					
3		Median stre		l substrate p	oarticle size.	Measure a			hly equidista	int points	1.50 in
			ches to the r and or finer			point below	/ (bedrock s	hould be co	unted as 99	in, asphalt	
	2.10	3.00	1.10	0.10	2.10	2.00					
	2.20	0.10	1.10	0.50	2.00	1.20					
	3.30	1.00	2.00	4.10	1.50	1.50					
	2.10	0.10	2.10	0.60	1.30	2.00					
	3.10	1.00	0.10	4.10	0.10	0.50					
4	V _{BERO}	Total perce	nt of eroded e total perce	l stream cha	nnel bank.	Enter the to			oded bank or osion for the		60 %
			Left Bank:	30) ft		Right Bank:	30) ft		

Version 1-25-11

Sampl	e Variable	s 5-9 within th	ne entire rip	parian/buff	er zone adj	acent to th	ie stream ch	annel (25 f	eet from ea	ich bank).	
5	V _{LWD}		h. Enter the	e number fr	om the entir		ter and 36 in buffer and w				12.0
		P				f downed w	oody stems:		12		
6	V _{TDBH}	Average dbł inches (10 c					ng cover is a	t least 20%). Trees are	e at least 4	9.5
		List the dbh	measurem	ents of indiv	vidual trees	(at least 4 i	n) within the	buffer on ea	ach side of		
		the stream b									
			Left Side					Right Side			
	7.5	13.1	14.1	4.1	6						
	17 9.1	4.1 8.5	12 4	12 4	18						
	5.1	0.0	4	4							
							_				
		Number		+ 4‼ - -			1 - 1 - 1	Eastern march			
7	V _{SNAG}	side of the s					et of stream. Ilculated.		per of snags	on each	5.0
			Left Side:	!	5		Right Side:		0		
8	V_{SSD}						hes dbh) per				NI . II . I
	if tree cover is <20%). Enter number of sapli per 100 ft of stream will be calculated.						ibs on each s	side of the s	stream, and	the amount	Not Used
		Left Side:					Right Side:				
9	V _{SRICH}						am reach. Cl				
							ive species p from these d		i strata. Spe	ecies	1.80
		-	o 1 = 1.0			Group 2 (-1.0)					
	Acer rubr			Magnolia tr	ripetala					Lonicera ja	ponica
	Acer sace	harum		Nyssa sylv	atica		Albizia julik	orissin		Lonicera ta	tarica
	Aesculus	flava		Oxydendrum			Alliaria peti			Lotus corni	culatus
	Asimina t			Prunus ser			Alternanthe			Lythrum sa	
		eghaniensis		Quercus al			philoxeroid			Microstegiur	
	Betula ler	-		Quercus co			Aster tatari			Paulownia	
	Carya alb			Quercus in			Cerastium			Polygonum	
	Carya gla			Quercus pr			Coronilla v			Pueraria m	
	Carya ova			Quercus ru			Elaeagnus u		~	Rosa multi	
	Carya ova			Quercus ve			Lespedeza			Sorghum h	
	Cornus flo			Sassafras a			Lespedeza			Verbena bi	-
	Fagus gra			Tilia americ			Lespeueza Ligustrum ol			V CIDEIIA DI	2011/21/010
							Ligustrum				
<i>✓</i>	Fraxinus americanaTsuga canadensisLiriodendron tulipiferaVUlmus americana						Ligustium	511151136			
			~	onnus ante	nuana						
	wagnolia	acuminata									
	3 Species in Group 1							1	Species in	Group 2	

	ample Variables 10-11 within at least 8 subplots (40" x 40", or 1m x 1m) in the riparian/buffer zone within 25 feet from each ank. The four subplots should be placed roughly equidistantly along each side of the stream. 10 V _{DETRITUS} Average percent cover of leaves, sticks, or other organic material. Woody debris <4" diameter and <36"											
10		Average pe	ercent cover	of leaves, s	ticks, or oth	er organic n		ody debris	<4" diamete	er and <36"	17.19 %	
			Left	Side			Righ	t Side] '		
		10 25	25 40	20 10	40 30	10 5	5 20	10 10	5 10			
11	V _{HERB}		-			_	sure only if			o <i>not</i>		
			percentages				there may t Enter the per				Not Used	
		•		Side			Righ	t Side]		
Sample	e Variable 1	2 within the	ontiro oct	abmont of t	ho stroom							
12	V _{WLUSE}				e for watersh	ed.						
12	* WLUSE	Weighted /	werage of t		, for watersh						1.00	
	Land Use (Choose From Drop List)										Running Percent (not >100)	
	Forest and n	ative range (>	-	1	100	100						
	▼											
								-				
								•				
	-							•				
	ε							-				
	•							-				
	.	2A					No	tes:				
Va	ariable	Value	VSI									
Vc	CANOPY	30 %	0.23									
V _{EI}	MBED	2.8	0.74									
Vs	UBSTRATE	1.50 in	0.75									
VB	ERO	60 %	0.75									
VL		12.0	1.00									
	ОВН	9.5	1.00									
	NAG	5.0	0.80									
V _S		Not Used	Not Used									
	RICH	1.80	0.86									
	rich Etritus	17.2 %	0.80									
	ERB	Not Used	Not Used									
	LUSE	1	1.00									

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: AEP Mitchell Landfill Project Location: Stream 2a-1, Cresap, Marshall Co., WV Sampling Date: 27 Sept 2011

Project Site Befe

Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 2a-1

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.98
Biogeochemical Cycling	0.91
Habitat	0.74

Variable	Name	Average Measure	Subindex
VCCANOPY	Percent canpoy over channel.	43.00	0.40
V _{EMBED}	Average embeddedness of channel.	3.23	0.90
V _{SUBSTRATE}	Median stream channel substrate particle size.	2.35	1.00
V _{BERO}	Total percent of eroded stream channel bank.	7.00	1.00
V _{LWD}	Number of down woody stems per 100 feet of stream.	9.00	1.00
V _{TDBH}	Average dbh of trees.	8.69	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	7.00	0.60
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	1.80	0.86
VDETRITUS	Average percent cover of leaves, sticks, etc.	40.00	0.49
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

	Version 1-2												
	High-G	Gradient	Headwat	er Strea	ms in ea	stern Ke	entucky a	and west	ern Wes	st Virgini	а		
	Ū						alculato						
	Team:	Dawn York	and Mary G	ilmore				Latitude/UT	M Northina:	39.828239			
Pro		AEP Mitche							-	-80.774231			
		Stream 2a-			WV		Sampling Date: 27 Sept 20						
~						Otra a m T				27 000120			
54	R Number:	2a-1	Reach	Length (ft):	100	Stream Ty	/pe: Ephe	meral Stream)				
	Top Strata:	Tre	e/Sapling St	rata	(determined	d from perce	ent calculate	d in Vector					
	-1	-			(- COANOI	17				
Site a	and Timing:	Project Site				•	Before Proje	ct			•		
Sample	Variables	1-4 in strea	m channel										
1	V _{CCANOPY}			over channe	el hv tree ar	nd sanling ca	anopy. Mea	sure at no f	ewer than 1	0 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 percent cover measurements at each point below:												
	50	80	50	20	40	45	85	10	0	50			
2	V _{EMBED}	Average en	nbeddednes	s of the stre	am channe	. Measure	at no fewer	than 30 roug	ghly equidis	tant points			
along the stream. Select a particle from the bed. Before moving it, determine the percentage of the 3.													
surface and area surrounding the particle that is covered by fine sediment, and enter the rating according													
	to the following table. If the bed is an artificial surface, or composed of fine sediments, use a rating score of 1. If the bed is composed of bedrock, use a rating score of 5.												
		Embeddedness rating for gravel, cobble and boulder particles (rescaled from Platts, Megahan, and											
		Minshall 19		or gravel, co	o one and o	buider partic	cies (rescale	d from Platt	s, weganar	i, and			
		Rating	Rating Des										
		5					buried by fir			<)			
		4					d, or buried b						
		3					ed, or buried ed, or buried						
		1					r buried by f	-		al surface)			
	List the rati	ngs at each			,,								
	2	4	5	3	4	1							
	4	5	3	3	3	1							
	5	5	5	1	3	1							
	3	5	4	3	3	1							
	2	5	5	4	3	1							
3						Measure a	it no fewer th	nan 30 roug	hly equidist	ant points			
	0000111112						ed in V _{EMBED}				2.35 in		
	Enter partic	le size in in	ches to the i	nearest 0 1 i	inch at each	point below	/ (bedrock s	hould be co	unted as 90	in asphalt			
		as 0.0 in, s								in, aophan			
	1.00	4.50	5.50	6.00	1.80	2.50							
	0.90	7.40	0.30	2.30	1.60	1.30							
	5.60	2.70	2.90	1.90	1.20	0.40							
	2.40	5.70	2.20	3.00	0.20	0.50							
	3.10	3.30	2.90	1.50	4.50	0.80							
4	V _{BERO}						tal number (of feet of erd	oded bank o	on each			
	22.10	•					nks are eroo				7 %		
		may be up	to 200%.										
			Left Bank:	2	ft		Right Bank:	5	ft				

Sampl	e Variable	s 5-9 within the	e entire ri	parian/buffer zone adj	acent to the	e stream ch	annel (25 f	ieet from ea	ach bank).		
5	V _{LWD}	stream reach	n. Enter th	y stems (at least 4 inche e number from the entin will be calculated.						9.0	
			01 01 00		f downed wo	oody stems:		9			
6	V_{TDBH}			measure only if V _{CCANOP}		ig cover is at	least 20%). Trees are	e at least 4	8.7	
				eter. Enter tree DBHs i						0.7	
		List the dbh r the stream be		ents of individual trees	es (at least 4 in) within the buffer on each side of						
			Left Side		Right Side						
	8.2		2011 0100		13.5	18.2	7.5				
	6.4				4.5	6					
	8.2				15.7	7.5					
					4	7.9					
	-				10.4	7					
					9.5	11					
					6.5 5.5	10.9 8.5	7				
					5.5 4	8.5 12	1				
7	V _{SNAG}	Number of sr	nags (at le	ast 4" dbh and 36" tall)	•		Enter numb	per of snags	on each		
	or a real	side of the st	ream, and	the amount per 100 fee	et will be cal	culated.		C C		7.0	
			Left Side:	3		Right Side:		4			
8	V _{SSD}			d shrubs (woody stems	up to 4 inch	-	100 feet of	•	asure only		
	002	if tree cover i	s <20%).	Enter number of sapling						Not Used	
		•	stream wil Left Side:	l be calculated.		Right Side:		61			
9	V _{SRICH}			ecies richness per 100 f	eet of strea	-			t from		
_	onion	Group 1 in th	e tallest s	tratum. Check all exotion	c and invasiv	/e species pi	resent in al			1.80	
				nd the subindex will be	calculated f	rom these da		2 (-1.0)			
_			1 = 1.0			1					
	Acer rubr			Magnolia tripetala		Ailanthus ai			Lonicera ja		
~	Acer sace			Nyssa sylvatica		Albizia julib			Lonicera ta		
	Aesculus			Oxydendrum arboreum		Alliaria petio	olata		Lotus corni		
	Asimina t	riloba		Prunus serotina		Alternanthe			Lythrum sa	licaria	
	Betula alle	eghaniensis		Quercus alba		philoxeroide	es		Microstegiur	n vimineum	
	Betula lei	nta		Quercus coccinea		Aster tatario	cus		Paulownia	tomentosa	
	Carya alb	a		Quercus imbricaria		Cerastium f	fontanum		Polygonum d	cuspidatum	
	Carya gla	ibra		Quercus prinus		Coronilla va	aria		Pueraria m	ontana	
	Carya ov	alis		Quercus rubra		Elaeagnus ui	mbellata		Rosa multi	flora	
	Carya ov	ata		Quercus velutina		Lespedeza	bicolor		Sorghum h	alepense	
	Cornus fl			Sassafras albidum		Lespedeza			Verbena bi	rasiliensis	
<i>✓</i>	Fagus gra			Tilia americana		Ligustrum ob					
		americana		Tsuga canadensis		Ligustrum s					
		on tulipifera		Ulmus americana							
		acuminata		ennas americana							
	wayii0iia	acuminald			<u> </u>						
		3 S	Species in	Group 1			1	Species in	Group 2		

	e Variables The four sul								one within	25 feet fror	n each
10	V _{DETRITUS}				ticks, or oth t cover of th				<4" diamete	er and <36"	40.00 %
			Left	Side			Righ	t Side] '	
		25	40			15	10				
11	V _{HERB}	10 Average pe	95 ercentage co	over of herba	aceous vege	40 etation (mea	85 sure only if	tree cover is	s <20%). D	o <i>not</i>	
	TILIND	include woo	ody stems a percentages	t least 4" db	h and 36" ta 1 200% are a	II. Because	there may b	be several la	iyers of grou	und cover	Not Used
			Left	Side			Righ	t Side]	
Somel	Variable 1	0 within the	ontino oot	abmont of t	he etreem						
12	e Variable 1				e for watersh	ad:					
12	V _{WLUSE}	Weighted A	werage of r		ior watersi	ieu.			-		1.00
	Land Use (Choose From Drop List) Runoff % in Catch- F Runoff (r										
	Forest and n	ative range (>	1	100	100						
	▼										
	▼										
	•							-			
								•			
	E							-			
								•			
		2a-1					No	tes:			
Va	ariable	Value	VSI	Lots of m	ultiflora ros	se and sna	gs. Heavy	shrub/sapli	ing layer		
Vc	CANOPY	43 %	0.40								
V _E	MBED	3.2	0.90								
	JBSTRATE	2.35 in	1.00								
	ERO	7 %	1.00								
VLV		9.0	1.00								
	овн	8.7	1.00								
	NAG	7.0	0.60								
		Not Used	Not Used								
V _S											
	RICH	1.80 40.0 %	0.86 0.49								
	ETRITUS ERB	40.0 % Not Used	0.49 Not Used								
vw	USE 1 1.00										

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

Project Name: AEP Mitchell Landfill Project Location: Stream 2a-2/ Cresap, Marshall Co., WV Sampling Date: 27 Sept 2011

Project Site

Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number:

2a-2

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.66
Biogeochemical Cycling	0.63
Habitat	0.63

Variable	Name	Average Measure	Subindex
VCCANOPY	Percent canpoy over channel.	64.00	0.68
V _{EMBED}	Average embeddedness of channel.	1.97	0.45
V _{SUBSTRATE}	Median stream channel substrate particle size.	0.75	0.38
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.	2.00	0.25
V _{TDBH}	Average dbh of trees.	9.29	1.00
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.	0.90	0.43
VDETRITUS	Average percent cover of leaves, sticks, etc.	86.88	1.00
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

	Version 1-2												
	High-G	Gradient	Headwat	er Strea	ms in ea	stern Ke	entucky a	and west	ern Wes	st Virginia	a		
	U						alculato			0			
	Team:	Dawn York	and Mary G	ilmore				Latitude/UT	M Northing:	39.827737			
Pro		AEP Mitche					Longitude/UTM Easting: -80.774394						
		Stream 2a-			WV		. –			27 Sept 20			
C A	R Number:					Ctroom Tu					· · ·		
54	R Number.	2a-2	Reach	Length (ft):	100	Stream Ty	pe. Ephe	meral Stream)				
	Top Strata:	Tre	e/Sapling Strata (determined from percent calculated in V _{CCANOPY})										
Site a	and Timing:	Project Site				•	Before Proje	ct			•		
Sample	Variables	1-4 in strea	m channel										
1	V _{CCANOPY}			over channe	el bv tree ar	nd sapling ca	anopy. Mea	sure at no f	ewer than 1	0 rouahlv			
	COANOFT	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 percent cover measurements at each point below:												
	50	80	85	50	60	30	80	90	45	70			
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 perceptage of the 2.0													
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													
								line seaime	ents, use a	rating score			
	of 1. If the bed is composed of bedrock, use a rating score of 5. Embeddedness rating for gravel, cobble and boulder particles (rescaled from Platts, Megahan, and												
		Embeddedi Minshall 19		or gravel, co	od one ald d	buider partic	cies (rescale	d from Platt	s, weganar	i, and			
		Rating	Rating Des										
		5					buried by fir			<)			
		4					l, or buried b						
		3					ed, or buried ed, or buried						
		1					r buried by f	-		al surface)			
	List the rati	ngs at each			0010100,00					ar ourradd)			
1	1	3	4	1	3	2							
	1	1	2	3	2	2							
	1	1	2	2	1	3							
	1	1	2	1	2	1							
	3	4	3	2	2	2							
3		Median stre					t no fewer t	nan 30 roug	hlv eauidist	ant points			
	OODOTTATE						ed in V _{EMBED}		<i>,</i> ,		0.75 in		
	Enter partic	cle size in in	chas to the i	noarost () 1 i	inch at each	noint helow	/hedrock e	hould be co	untad as 90) in asnhalt			
		as 0.0 in, s								ni, aspirat			
	0.03	0.40	0.90	0.40	0.80	0.50							
	0.50	0.60	0.90	2.50	0.30	7.80							
	0.01	0.00	1.30	0.90	0.50	5.50							
	1.00	1.20	1.00	0.60	0.20	7.50							
	0.70	1.20	4.10	0.80	12.80	0.45							
4	V _{BERO}						tal number (of feet of er	oded bank o	on each			
'	- REKO	•					iks are eroc				0 %		
		may be up	•	J -							5 /5		
			Left Bank:	0	ft		Right Bank:	0	ft				

Sampl	e Variable	s 5-9 within the	e entire ri	parian/buffer zone a	djacent to th	ne stream ch	nannel (25 f	feet from ea	ach bank).	
5	V _{LWD}	stream reach	n. Enter th	y stems (at least 4 inc le number from the en will be calculated.						2.0
					of downed w	voody stems:		2		
6	V_{TDBH}			measure only if V _{CCANO} eter. Enter tree DBHs		ing cover is a	at least 20%). Trees are	e at least 4	9.3
			,	ents of individual tree		in) within the	buffer on ea	ach side of		
		the stream be			- (,				
			Left Side				Right Side)		
	12				11					
	4				11					
	13				10					
	5 12				8					
	9.5									
	9									
	7									
7	V _{SNAG}			ast 4" dbh and 36" tal I the amount per 100 f			Enter num	ber of snags	on each	4.0
			Left Side:	3		Right Side:	:	1		
8	V_{SSD}			d shrubs (woody stem						
				Enter number of sapli Il be calculated.	ngs and shru	ubs on each :	side of the s	stream, and	the amount	Not Used
				Right Side:	:	26				
9	V _{SRICH}	Group 1 in th	e tallest s	ecies richness per 100 tratum. Check all exo and the subindex will b	tic and invas	ive species p	present in al			0.90
		-	1 = 1.0		e calculated					
	Acer rubr		<u> </u>	Magnolia tripetala		Ailanthus a		2 (-1.0)	Lonicera ja	nonica
	Acer sace			Nyssa sylvatica		Albizia julik			Lonicera ta	•
	Aesculus			Oxydendrum arboreum					Lotus corni	
				-		Alliaria pet				
	Asimina t			Prunus serotina		Alternanthe philoxeroid			Lythrum sa	
		eghaniensis		Quercus alba					Microstegiur	
	Betula lei			Quercus coccinea		Aster tatar			Paulownia	
	Carya alb			Quercus imbricaria		Cerastium			Polygonum o	
	Carya gla			Quercus prinus		Coronilla v			Pueraria m	
	Carya ov			Quercus rubra		Elaeagnus ι			Rosa multi	
1	Carya ov			Quercus velutina		Lespedeza			Sorghum h	
	Cornus fl			Sassafras albidum		Lespedeza	a cuneata		Verbena bi	rasiliensis
	Fagus gra	andifolia		Tilia americana		Ligustrum o	btusifolium			
	Fraxinus	americana		Tsuga canadensis		Ligustrum	sinense			
	Liriodendro	on tulipifera		Ulmus americana						
	Magnolia	acuminata								
	2 Species in Group 1						1	Species in	Group 2	
		- 0	p = 3.00 m					0000000	5.00p L	

	ample Variables 10-11 within at least 8 subplots (40" x 40", or 1m x 1m) in the riparian/buffer zone within 25 feet from each ank. The four subplots should be placed roughly equidistantly along each side of the stream. 10 V _{DETRITUS} Average percent cover of leaves, sticks, or other organic material. Woody debris <4" diameter and <36"											
10		Average pe	rcent cover	of leaves, s		er organic n	naterial. Wo	ody debris	<4" diamete	er and <36"	86.88 %	
			Left	Side			Righ	t Side]		
		95	75			95	50					
11	V _{HERB}	100 Average pe	80 ercentage co	over of herba	aceous vege	100 etation (mea	100 asure only if	tree cover is	s <20%). Do	o not		
			percentages		h and 36" ta 1 200% are a						Not Used	
			Left	Side			Righ	t Side] '		
Sample	e Variable 1	2 within the	entire cat	chment of t	the stream							
12	V _{WLUSE}				e for watersh	ied:					1.00	
	Land Use (Choose From Drop List) Runoff % in Catc Score ment										Running Percent (not >100)	
	Forest and n	ative range (>	•	1	100	100						
			•									
								•				
								•				
								•				
								•				
								•				
		2a-2					No	tes:				
Va	ariable	Value	VSI									
Vc	CANOPY	64 %	0.68									
V _{EI}	MBED	2.0	0.45									
Vs	UBSTRATE	0.75 in	0.38									
VB	ERO	0 %	1.00									
VL	WD	2.0	0.25									
V _{TI}	DBH	9.3	1.00									
	NAG	4.0	0.90									
Vs		Not Used	Not Used									
	RICH	0.90	0.43									
	ETRITUS	86.9 %	1.00									
	ERB	Not Used	Not Used									
Vw	LUSE	1	1.00									

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: AEP Mitchell Landfill Project Location: Stream 2a3. Cresap, Marshall Co., WV Sampling Date: 27 Sept 2011

Project Site Befor

Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 2a-3

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.74
Biogeochemical Cycling	0.84
Habitat	0.81

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	85.00	0.96
V _{EMBED}	Average embeddedness of channel.	3.00	0.82
V _{SUBSTRATE}	Median stream channel substrate particle size.	3.20	1.00
V _{BERO}	Total percent of eroded stream channel bank.	26.00	0.94
V _{LWD}	Number of down woody stems per 100 feet of stream.	1.00	0.13
V _{TDBH}	Average dbh of trees.	9.64	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	3.00	1.00
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	0.90	0.43
VDETRITUS	Average percent cover of leaves, sticks, etc.	87.50	1.00
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

Version 1											ion 1-25-11
	High-G	aradient	Headwat	er Strea	ms in ea	stern Ke	entucky a	and west	ern Wes	t Virgini	а
	-			Field [Data She	et and C	alculato	r		-	
	Team:	Dawn York	and Mary G	ilmore				Latitude/UT	M Northing:	39.827892	
Pro	ject Name:	AEP Mitche	ell Landfill Pi	oject			Longitude/UTM Easting: -80.774219				
	Location:	Stream 2a3	. Cresap, M	arshall Co.,	WV			Sam	pling Date:	27 Sept 20 ⁻	11
SA	R Number:	2a-3	Reach	Length (ft):	100	Stream Ty	/pe: Ephe	meral Stream			•
	Top Strata:	Tre	e/Sapling St	rata	(determined	d from perce	ent calculate	d in V _{CCANOF}	у)		
Site a	and Timina:	Project Site				•	Before Proje	ct			•
	-	1-4 in strea					Derore Proje				
1				over channe	el bv tree ar	nd sapling ca	anopy. Mea	sure at no f	ewer than 1	0 roughly	
	COANOFT	equidistant	points along	g the stream	. Measure	only if tree/s	apling cove Top Strata c	r is at least a			85.0 %
_	List the per	cent cover r	neasuremer	nts at each p	oint below:						_
	100	100	50	85	85	100	100	75	95	60	
2	V_{EMBED}						at no fewer				3.0
							noving it, de				0.0
							by fine sedim composed of				
			bed is comp						51110, use a i	ating score	
							cles (rescale	d from Platt	s Menahan	and	
		Minshall 19		or graver, et					s, meganan	, and	
		Rating	Rating Des	cription							
		5			overed, suri	rounded, or	buried by fir	ne sediment	(or bedrock	.)	
		4					d, or buried b				
		3					ed, or buried				
		2					ed, or buried			1	
	List the reti				coverea, su	rrounded, o	r buried by f	ine seaimer	it (or artificia	al surface)	
		ngs at each			4	0					
	2	4	4	4	4	2					
	3	3	2	2	4	2					
	4	3	1	3	2	2					
	4	3	4	4	1	2					
	3	2	3	4	4	5					
3	V _{SUBSTRATE}						t no fewer tl ed in V _{EMBED}		hly equidista	ant points	3.20 in
		-			-						
						point belov	v (bedrock s	hould be co	unted as 99	in, asphalt	
		as 0.0 in, s		-							
	5.20	3.80	0.90	3.20	3.80	4.20					
	8.10	1.20	8.10	2.50	3.90	3.10					
	3.50	6.20	2.10	3.00	2.00	4.60					
	4.10	2.50	3.20	1.50	3.10	2.50					
	3.50	0.40	6.20	1.50	2.90	9.40					
4	V _{BERO}	•					tal number				
				entage will b	e calculated	I If both bar	nks are eroo	ded, total ero	osion for the	stream	26 %
		may be up									
			Left Bank:	6	ft		Right Bank:	20) ft		

Sampl	e Variable	s 5-9 within th	e entire r	iparian/buffer zone	adjacent to t	he stream ch	nannel (25 f	eet from ea	ach bank).			
5	V _{LWD}	stream reach	n. Enter th	ly stems (at least 4 in ne number from the e will be calculated.						1.0		
		po: 100.000	0.00.000		er of downed v	woody stems:		1				
6	V_{TDBH}			measure only if V_{CCA}	_{NOPY} tree/sapl). Trees are	e at least 4	9.6		
		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 b	Left Side				Right Side			1		
	7	9	Leit Side		10							
	5	12.5			7							
	11.5				13							
	10				14							
	4				4.5							
	15				8							
	4				20							
	15											
7	4 V _{SNAG}	Number of s	nage (at le	ast 4" dbh and 36" ta	all) per 100 fe	et of stream	Enter numh	per of snags	on each			
1	♥ SNAG			the amount per 100				Jer of shage	oneach	3.0		
			Left Side			Right Side:		2				
8	V_{SSD}			d shrubs (woody ste Enter number of sar						Not Used		
				Il be calculated.	nings and shi	ubs on eachs		anu anu	the amount	NUL USEU		
			Left Side			Right Side:		22				
9	V _{SRICH}			ecies richness per 10 tratum. Check all ex								
				and the subindex will				i siraia. Sp	ecies	0.90		
		Group	1 = 1.0			Group 2 (-1.0)						
	Acer rubr	um		Magnolia tripetala		Ailanthus a	altissima		Lonicera ja	ponica		
	Acer sace	charum		Nyssa sylvatica		Albizia julit	orissin		Lonicera ta	tarica		
	Aesculus	flava		Oxydendrum arboreu	m	Alliaria pet	iolata		Lotus corni	iculatus		
	Asimina t			Prunus serotina		Alternanthe			Lythrum sa			
		eghaniensis		Quercus alba		philoxeroia			Microstegiur			
	Betula ler	-		Quercus coccinea		Aster tatar	icus		Paulownia			
	Carya alb			Quercus imbricaria		Cerastium			Polygonum			
	Carya gla			Quercus prinus		Coronilla v			Pueraria m			
	Carya ova			Quercus rubra		Elaeagnus ı			Rosa multi			
~	Carya ova			Quercus velutina		Lespedeza			Sorghum h	-		
	Cornus fle			Sassafras albidum		Lespedeza			Verbena bi	rasiliensis		
	Fagus gra			Tilia americana		Ligustrum o						
\checkmark	Fraxinus	americana		Tsuga canadensis	Ligustrum sinense							
	Liriodendro	on tulipifera		Ulmus americana								
	Magnolia	acuminata										
		2 5	Species in	Group 1			1	Species in	Group 2			
				a.oup '			I	opecies III				

	ample Variables 10-11 within at least 8 subplots (40" x 40", or 1m x 1m) in the riparian/buffer zone within 25 feet from each ank. The four subplots should be placed roughly equidistantly along each side of the stream. 10 V _{DETRITUS} Average percent cover of leaves, sticks, or other organic material. Woody debris <4" diameter and <36"										
10	V _{DETRITUS}			of leaves, s the percent					<4" diamete	er and <36"	87.50 %
			Left	Side			Righ	t Side]	
		100	75			75	100				
11	V _{HERB}	60 Average pe	100 ercentage co	over of herba	aceous vege	90 etation (mea	100 asure only if	tree cover is	; <20%). Do	o not	
		include woo	ody stems a percentages	t least 4" db s up through	h and 36" ta	II. Because	there may b	be several la	yers of grou	und cover	Not Used
			Left	Side			Righ	t Side]	
			100				100				
Sample	e Variable 1	2 within the		chment of t	he stream.		100				
12 Vwullse Weighted Average of Runoff Score for watershed:											1.00
	Land Use (Choose From Drop List)									Running Percent (not >100)	
	Forest and n	ative range (>	>75% ground	cover)				-	1	100	100
								•			
								-			
								-			
								-			
								-			
								-			
								-			
	:	2a-3					No	tes:			
Va	ariable	Value	VSI								
Vc	CANOPY	85 %	0.96								
V _{EI}	MBED	3.0	0.82								
Vs	UBSTRATE	3.20 in	1.00								
VB	ERO	26 %	0.94								
VL	WD	1.0	0.13								
V _{TI}	DBH	9.6	1.00								
Vsi	NAG	3.0	1.00								
Vs	SD	Not Used	Not Used								
Vs	RICH	0.90	0.43								
	ETRITUS	87.5 %	1.00								
	ERB	Not Used	Not Used								
Vw	LUSE	1	1.00								

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: AEP Mitchell Landfill Project Location: Stream 2b. Cresap, Marshall Co., WV Sampling Date: 27 Sept 2011

Project Site Befo

Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR:

Functional Results Summary:

Tree/Sapling Strata

SAR number: 2b

rice, caping chata

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.94
Biogeochemical Cycling	0.85
Habitat	0.75

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	45.42	0.44
V _{EMBED}	Average embeddedness of channel.	2.80	0.75
V _{SUBSTRATE}	Median stream channel substrate particle size.	6.50	0.97
V _{BERO}	Total percent of eroded stream channel bank.	18.00	0.98
V _{LWD}	Number of down woody stems per 100 feet of stream.	13.00	1.00
V _{TDBH}	Average dbh of trees.	9.73	1.00
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.	4.50	1.00
VDETRITUS	Average percent cover of leaves, sticks, etc.	65.63	0.80
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

										Vers	ion 1-25-11
	High-G	Gradient	Headwat	er Strea	ms in ea	stern Ke	entucky a	and west	ern Wes	st Virgini	a
				Field [Data She	et and C	alculato	r			
	Team:	Dawn York	and Mary G	ilmore							
Pro	ject Name:	AEP Mitche	ell Landfill Pi	roject			L	ongitude/U	TM Easting:	-80.774362	
	Location:	Stream 2b.	Cresap, Ma	rshall Co., V	NV					27 Sept 20	
SA	R Number:	2b	Reach	Length (ft):	100	Stream Ty	/pe: Ephe	meral Stream			•
	Top Strata:	Tre	e/Sapling St	rata	(determined	d from perce	ent calculate	d in V _{CCANOF}	эγ)		
Site :	and Timina.	Project Site				•	Before Proje	ct			-
		1-4 in strea				·	Delore Hoje				
1	V _{CCANOPY}			over channe	el by tree ar	nd sapling ca	anopy. Mea	sure at no fe	ewer than 1	0 roughly	
•	• CCANOPY	equidistant	points along	g the stream	. Measure	only if tree/s	apling cover Top Strata c	r is at least a			45.4 %
	List the per	cent cover r	neasuremer	nts at each p	oint below:						
	0	0	20	50	100	60	20	70	50	40	
	45	90									
2	V_{EMBED}	•					at no fewer t				0.0
							noving it, de				2.8
							y fine sedim				-
			bed is comp				composed of	Time searme	ents, use a	rating score	
								d from Dlott	. Magabar	and	Ì
		Minshall 19		or gravel, co		buider partic	cles (rescale	u ironi Piall	s, weganar	i, and	
		Rating	Rating Des								
		5					buried by fir			<)	
		4					l, or buried b				
		3					ed, or buried ed, or buried				
		1				-	r buried by f			al surface)	
	l ist the rati	nas at each	point below		0010100,00	noundou, o				ai canacoj	_
	2	1	4	3	3	4					
	4	1	4	3	2	3					
	1	3	4	3	4	4					
	1	4	2	2	2	1					
	3	3	5	4	3	1					
3							it no fewer th	nan 30 roug	hlv equidist	ant points	
-	SUBSTRATE						ed in V _{EMBED}		,		6.50 in
	Entor portio	la aiza in in	ahaa ta tha i		inch at aach	naint halow	/hodrook al	hould be on	unted on OC) in conholt	
			and or finer			point below	/ (bedrock sl		unieu as 95	ni, aspirait	
	5.80	8.00	13.60	3.50	2.80	1.00					
	17.20	0.30	99.00	4.70	1.50	0.50					
	99.00	2.20	14.90	13.50	14.00	4.50					
	14.50	1.30	4.50	9.90	2.60	99.00					
1	8.50	6.50	7.00	6.50	3.20	99.00	tal number o	of foot of an	adad baals	n ooob	
4	V _{BERO}						nks are eroc				18 %
		may be up	•			. a both bal				Juoun	10 %
			Left Bank:	12	2 ft		Right Bank:	6	ft		

Sampl	e Variable	s 5-9 within th	e entire r	iparian/buffer zone ad	jacent to th	ie stream ch	annel (25 f	eet from ea	ich bank).	
5	V_{LWD}	stream reach	h. Enter th	y stems (at least 4 inch ne number from the ent						13.0
		per 100 leet	of stream	will be calculated. Number of	of downed w	oody stems:	-	13		
6	V_{TDBH}	Average dbh	n of trees (measure only if V _{CCANO}					at least 4	0.7
		inches (10 c	m) in diam	eter. Enter tree DBHs	in inches.					9.7
				nents of individual trees	(at least 4 i	n) within the	buffer on ea	ach side of		
		the stream b			-		Right Side			1
	8	12	Left Side		4					
	8	12			14					
	7.5				10					
	7.5				10					
	17				8					
	10									
	6									
	12									
7	12 V _{SNAG}	Number of s	nags (at le	east 4" dbh and 36" tall)	per 100 fee	et of stream	Enter numb	per of snags	on each	
,	• SNAG			the amount per 100 fe				or or onago	on out	4.0
			Left Side:			Right Side:		2		
8	V_{SSD}			d shrubs (woody stems						Netlleed
				Enter number of saplir Il be calculated.	igs and shru	los on each s	side of the s	stream, and	the amount	Not Used
		•	Left Side:	52		Right Side:		64		
9	V _{SRICH}			ecies richness per 100 tratum. Check all exoti						4 50
				and the subindex will be					000	4.50
		Group	0 1 = 1.0							
	Acer rubr	rum		Magnolia tripetala		Ailanthus a	ltissima		Lonicera ja	ponica
7	Acer sace	charum		Nyssa sylvatica		Albizia julik	orissin		Lonicera ta	ntarica
	Aesculus	flava		Oxydendrum arboreum		Alliaria peti	iolata		Lotus corn	iculatus
	Asimina t	riloba		Prunus serotina		Alternanthe			Lythrum sa	licaria
		eghaniensis		Quercus alba		philoxeroid			Microstegiur	
	Betula lei	nta		Quercus coccinea		Aster tatari	cus		Paulownia	tomentosa
	Carya alb	Da		Quercus imbricaria		Cerastium	fontanum		Polygonum	cuspidatum
	Carya gla	abra		Quercus prinus		Coronilla v	aria		Pueraria m	ontana
	Carya ov	alis		Quercus rubra		Elaeagnus u	ımbellata		Rosa multi	flora
1	Carya ov	ata		Quercus velutina		Lespedeza	bicolor		Sorghum h	alepense
	Cornus fl	orida		Sassafras albidum		Lespedeza	cuneata		Verbena bi	rasiliensis
	Fagus gra			Tilia americana		Ligustrum ol				
		americana		Tsuga canadensis		Ligustrum :				
~		on tulipifera		Ulmus americana		5				
		acuminata								
	Magnolia	asanniata								
		6 5	Species in	Group 1			1	Species in	Group 2	

	ample Variables 10-11 within at least 8 subplots (40" x 40", or 1m x 1m) in the riparian/buffer zone within 25 feet from each ank. The four subplots should be placed roughly equidistantly along each side of the stream.									
10		Average pe	rcent cover	of leaves, sticks, or oth r the percent cover of th	er organic r	naterial. Wo	ody debris	<4" diamete	er and <36"	65.63 %
			Left	Side		Righ	t Side]	
		20	90		20	60				
11	V _{HERB}	80 Average pe	90 ercentage co	over of herbaceous veg	75 etation (mea	90 asure only if	tree cover is	s <20%). D	o not	
		include woo	ody stems a percentages	It least 4" dbh and 36" ta s up through 200% are	all. Because	there may b	be several la	iyers of grou	und cover	Not Used
				Side			t Side			
		10 50	60 10		75 75	20 10			-	
Comple	Variable 1			abmont of the atream		10				
				chment of the stream.						
12	V _{wluse}	weighted A	verage of F	Runoff Score for watersh	160:					1.00
	Land Use (Choose From Drop List) Runoff Score ment									
	Forest and n	ative range (>	>75% ground	l cover)			•	1	100	100
							-			
							•			
							-			
							•			
							•			
							•			
							•			
		2b				No	tes:			
V	ariable	Value	VSI							
	CANOPY	45 %	0.44							
	MBED	2.8	0.75							
	UBSTRATE	6.50 in	0.97							
	ERO	18 %	0.98							
VL	WD	13.0	1.00							
V _{TI}	DBH	9.7	1.00							
Vs	NAG	4.0	0.90							
Vs	SD	Not Used	Not Used							
Vs	RICH	4.50	1.00							
	ETRITUS	65.6 %	0.80							
V _H	ERB	Not Used	Not Used							
Vw	LUSE	1	1.00							

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: AEP Mitchell Landfill Project

 Location: Stream 3 Ephemeral Portion, Cresap, Marshall Co., WV

 Sampling Date: 28 Sept 2011
 Project Site

 Before Project

 Subclass for this SAR:

 Ephemeral Stream

 Uppermost stratum present at this SAR:

 Sampling Date: 3 Eph

Tree/Sapling Strata

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.94
Biogeochemical Cycling	0.85
Habitat	0.84

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	70.00	0.76
V _{EMBED}	Average embeddedness of channel.	2.80	0.75
V _{SUBSTRATE}	Median stream channel substrate particle size.	2.23	1.00
V _{BERO}	Total percent of eroded stream channel bank.	23.00	0.95
V _{LWD}	Number of down woody stems per 100 feet of stream.	9.00	1.00
V _{TDBH}	Average dbh of trees.	11.67	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	1.00	1.00
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	1.80	0.86
VDETRITUS			0.80
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

										Vers	ion 1-25-11	
	High-G	aradient	Headwat	er Strea	ms in ea	stern Ke	entucky a	and west	ern Wes	st Virginia	a	
	-			Field D	Data She	et and C	alculato	r		-		
	Team:	Dawn York	and Mary G	ilmore				Latitude/UT	M Northing:	39.82696		
Pro			ell Landfill Pr						-	-80.777663		
			phemeral P		an Marshal	I Co WV	-			28 Sept 20		
										20 000120	••	
SP	R Number:	3 Eph	Reach	Length (ft):	100	Stream Ty	/pe: Ephe	meral Stream)			
	Top Strata:	Tre	e/Sapling St	rata	(determined	d from perce	ent calculate	d in V _{CCANOF}	_{эү})			
Site	and Timing:	Project Site				•	Before Proje	ct				
Sample Variables 1-4 in stream channel												
1	V _{CCANOPY}			over channe	el by tree ar	nd sapling ca	anopy. Mea	sure at no f	ewer than 1	0 roughly		
	00/110/1						apling cover				70.0 %	
20%, enter at least one value between 0 and 19 to trigger Top Strata choice.)												
	List the per	cent cover r	neasuremer	nts at each p	oint below:							
	60	80	75	90	70	50	60	65	75	75		
2	V _{EMBED}	Average en	nbeddednes	s of the stre	am channe	l. Measure	at no fewer t	than 30 roud	ahlv equidis	tant points		
							noving it, de				2.8	
		surface and	d area surroi	unding the p	article that i	is covered b	y fine sedim	ent, and en	ter the ratin	g according		
		to the follow	ving table. I	f the bed is	an artificial s	surface, or c	composed of	fine sedime	ents, use a	rating score		
	of 1. If the bed is composed of bedrock, use a rating score of 5.											
		Embedded	ness rating f	or gravel, co	obble and b	oulder partic	cles (rescale	d from Platt	s. Megahar	, and		
		Minshall 19		U /		•	,		, C	,		
		Rating	Rating Des	cription								
		5			overed, suri	rounded, or	buried by fir	e sediment	(or bedrock	()		
		4	5 to 25 perc	cent of surfa	ce covered,	surrounded	d, or buried b	by fine sedin	nent			
		3					ed, or buried					
		2					ed, or buried					
		1			covered, su	rrounded, o	r buried by f	ine sedimer	nt (or artificia	al surface)		
		-	point below									
	3	4	2	2	1	4						
	2	2	1	3	3	1						
	2	4	2	5	3	5						
	2	3	3	2	2	5						
	3	2	2	5	4	2						
3	V _{SUBSTRATE}						at no fewer th		hly equidist	ant points	2.23 in	
		along the s	tream; use t	he same po	ints and par	ticles as use	ed in V _{EMBED}	•			2.20 11	
	Enter partic	le size in in	ches to the r	nearest 0.1 i	inch at each	point below	v (bedrock sl	hould be co	unted as 99	in, asphalt		
	or concrete	as 0.0 in, s	and or finer	particles as	0.08 in):							
	99.00	14.00	0.70	2.00	7.50	6.25						
	1.00	22.50	9.50	1.50	2.00	2.20						
	2.25	13.00	1.50	1.20	1.25	4.75						
	0.60	7.00	1.50	1.50	8.75	3.10						
	26.75	0.60	1.00	0.50	2.50	22.00						
4	V _{BERO}						tal number o	of feet of err	ded bank o	n each		
·	- DERU	•					nks are eroc				23 %	
		may be up	•	J I							20 /0	
			Left Bank:	5	ft		Right Bank:	18	3 ft			

Sampl	e Variable:	s 5-9 within th	e entire ri	parian/buff	er zone adj	acent to th	e stream ch	annel (25 f	ieet from ea	ach bank).	
5	V _{LWD}	Number of d stream reach per 100 feet	n. Enter th	e number fr	om the entir						9.0
		•					oody stems:		9		
6	V_{TDBH}	Average dbh inches (10 cl					ng cover is a	t least 20%). Trees are	e at least 4	11.7
		List the dbh	measurem	ents of indiv	vidual trees	(at least 4 in	n) within the	buffer on ea	ach side of		
	-	the stream b				-					
			Left Side	. –				Right Side			
	16.5	10.5 7	7.5	15	5.5	19	15	12.5	6		
	5.5	/	20								
7	V	Number of s	nage (at lo	act 4" dbb c	nd 26" tall)	por 100 foo	t of stroom	Entor numb	oor of spage	on oach	
7	V _{SNAG}	side of the st							Der of shags	oneach	1.0
			Left Side:		1		Right Side:		0		
8	V_{SSD}	Number of s									
		if tree cover per 100 ft of				gs and shru	bs on each s	side of the s	stream, and	the amount	Not Used
			Left Side:		1		Right Side:	2	27		
9	V _{SRICH}	Riparian veg									
		Group 1 in th richness per							i strata. Spo	ecies	1.80
		•	1 = 1.0						2 (-1.0)		
	Acer rubr	-		Magnolia ti	ripetala		Ailanthus a			Lonicera ja	ponica
	Acer sace	charum		Nyssa sylv	atica		Albizia julik	orissin		Lonicera ta	itarica
	Aesculus	flava		Oxydendrun			Alliaria peti			Lotus corni	iculatus
	Asimina ti			Prunus ser			Alternanthe			Lythrum sa	
		ghaniensis		Quercus al			philoxeroid			Microstegiur	
	Betula ler	•		Quercus co			Aster tatari	cus		Paulownia	
	Carya alb			Quercus in			Cerastium			Polygonum	
	Carya gla			Quercus pi			Coronilla v	aria		Pueraria m	-
	Carya ova			Quercus ru			Elaeagnus u	ımbellata	~	Rosa multi	flora
1	- Carya ova			Quercus ve			Lespedeza			Sorghum h	
	Cornus flo			Sassafras			' Lespedeza			Verbena bi	-
	Fagus gra			Tilia amerio			Ligustrum ol				
		americana		Tsuga can			Ligustrum				
	Liriodendro			Ulmus ame			U				
		acuminata		and and							
	magnona	a commuta									
		3 3	Species in (Group 1				1	Species in	Group 2	

	Sample Variables 10-11 within at least 8 subplots (40" x 40", or 1m x 1m) in the riparian/buffer zone within 25 feet from each bank. The four subplots should be placed roughly equidistantly along each side of the stream.										
10	V _{DETRITUS}						naterial. Wo /er at each s		<4" diamete	er and <36"	65.63 %
			Left	Side			Right	t Side] '	
		90	100	75	30	50	80	40	60		
11	V _{HERB}	Average pe	ercentage co	over of herba	aceous vege	etation (mea	asure only if	tree cover is	s <20%). De	o not	
			percentages				there may b Enter the per				Not Used
		•		Side			Righ	t Side] '	
Sample	e Variable 1	2 within the	ontiro oct	abmont of t	ho stroom						
12	V _{WLUSE}				for watersh	ed.					
12	* WLUSE	Weighted	werage of t		ion wateron						1.00
	Land Use (Choose From Drop List)									% in Catch- ment	Running Percent (not >100)
	Forest and n	ative range (>	>75% ground	cover)				•	1	100	100
								•			
								-			
								•			
								•			
								•			
								-			
	3	B Eph					No	tes:			
Va	ariable	Value	VSI								
Vc	CANOPY	70 %	0.76								
V _{EI}	MBED	2.8	0.75								
V _{SI}	UBSTRATE	2.23 in	1.00								
VB	ERO	23 %	0.95								
VLV	WD	9.0	1.00								
V _{TI}	DBH	11.7	1.00								
Vsi	NAG	1.0	1.00								
Vs	SD	Not Used	Not Used								
Vs	RICH	1.80	0.86								
	ETRITUS	65.6 %	0.80								
V _H	ERB	Not Used	Not Used								
Vw	LUSE	1	1.00								

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: AEP Mitchell Landfill Project Location: Cresap, Marshall County, WV Sampling Date: 8/12/11

Project Site I

Before Project

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 3

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	1.00
Biogeochemical Cycling	0.94
Habitat	0.82

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	65.63	0.70
V _{EMBED}	Average embeddedness of channel.	4.00	1.00
V _{SUBSTRATE}	Median stream channel substrate particle size.	3.35	1.00
V _{BERO}	Total percent of eroded stream channel bank.	15.00	0.99
V _{LWD}	Number of down woody stems per 100 feet of stream.	12.00	1.00
V _{TDBH}	Average dbh of trees.	9.86	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	2.00	1.00
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	1.40	0.67
VDETRITUS			0.28
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

Version	1-25-11
VEISION	1-20-11

	High-G	aradient	Headwat		ms in ea Data She		-		tern Wes	st Virginia	a
	Toom	D. Godec,	C. Carka				aiculate		MNorthing	20.040124.00	אייר
Dr				roigot					-	39°49'34.80 80°46'34.80	
PI	-		ell Landfill Pi	-			•	0	npling Date:)
			arshall Coun					Sai	inpling Date.	0/12/11	
SA	AR Number:	3	Reach	Length (ft):	100	Stream Ty	vpe: Inte	ermittent Strea	ım		•
	Top Strata:	Tre	e/Sapling St	rata	(determined	d from perce	ent calculate	ed in V _{CCANO}	_{PY})		
Site	and Timing:	Project Site	1			•	Before Proj	ect			
Sample	e Variables	1-4 in strea	m channel								
20%, enter at least one value between 0 and 19 to trigger Top Strata choice.)											65.6 %
List the percent cover measurements at each point below:											
	0	20	80	100	80	90	80	100	10	10	
	80	90	80	60	80	90					
2	V _{EMBED}	Average embeddedness of the stream channel. Measure at no fewer than 30 roughly equidistant points along the stream. Select a particle from the bed. Before moving it, determine the percentage of the surface and area surrounding the particle that is covered by fine sediment, and enter the rating according									
							-				
		to the following table. If the bed is an artificial surface, or composed of fine sediments, use a rating score of 1. If the bed is composed of bedrock, use a rating score of 5.									
		Embedded Minshall 19		or gravel, co	obble and b	oulder partic	les (rescal	ed from Plat	ts, Megahar	n, and	
		Rating	Rating Des	cription							
		5						ine sediment		<)	
		4						by fine sedi			
		3						d by fine sec d by fine sec			
		1						fine sedime		al surface)	
	List the rati	ngs at each	point below		,	,	,		\\	,	
	4	4	4	4	4	4					
	4	5	3	4	3	4					
	4	5	4	4	4	4					
	4	4	4	4	4	4					
	4	4	4	4	4	4					
3	V _{SUBSTRATE}		eam channe tream; use t					than 30 roug _D .	hly equidist	ant points	3.35 in
						point below	/ (bedrock s	should be co	unted as 99	in, asphalt	
		-	and or finer		-	0.00					
	1.10	3.20	3.00	0.40	10.40	6.20					
	2.50	99.00	2.50	2.20	4.30	3.30					
	4.40 6.00	99.00 12.40	14.30 15.10	3.40 5.00	6.10 2.00	2.40 2.10					
		6.50	0.50			0.50					
4	2.20			12.10 stream cha	1.10		tal number	of feet of er	oded bank o	n each	
. 4	V _{BERO}	i otai perce		Sucan Uld	unior Dalin.		a number		oucu balin (n caon	
		side and th may be up	•	entage will b	e calculated	I If both bar	nks are ero	ded, total er	osion for the		15 %

Sampl	e Variable	s 5-9 within tl	he entire ri	parian/buffer zone	adjacent	t to the	e stream ch	annel (25 i	feet from ea	ich bank).	
5	V _{LWD}	stream read	ch. Enter th	y stems (at least 4 i le number from the will be calculated.							12.0
		•					ody stems:		12		
6	V_{TDBH}			measure only if V _{CC} , eter. Enter tree DB			g cover is a	t least 20%). Trees are	e at least 4	9.9
		List the dbh	measurem	ents of individual tre	ees (at lea	ast 4 in) within the	buffer on e	ach side of		
		the stream									•
			Left Side			Right Side					
	6	13	7		1	10	6	17	10		
					_						
											1
	M	Number of		act 41 dbb and 001 d	hall) mar 10	20 fe et	of other one	Enter numb		are a cale	
7	V_{SNAG}			ast 4" dbh and 36" i I the amount per 10				Enter numi	ber of snags	on each	2.0
			Left Side:	2			Right Side:		0		
8	V_{SSD}			d shrubs (woody ste							NI . II
				Enter number of sa I be calculated.	iplings and	a snrut	os on each s	side of the s	stream, and	the amount	Not Used
		•	Left Side:				Right Side:				
9	V _{SRICH}			ecies richness per 1							4.40
				tratum. Check all e and the subindex wil					ii strata. Spe	ecies	1.40
		-	p 1 = 1.0						0 2 (-1.0)		
	Acer rubr	um		Magnolia tripetala		1	Ailanthus a			Lonicera ja	ponica
~	Acer sace	charum		Nyssa sylvatica			Albizia julib	orissin		Lonicera ta	tarica
	Aesculus	flava		Oxydendrum arbore	um		Alliaria peti	olata		Lotus corn	iculatus
	Asimina t			Prunus serotina			Alternanthe			Lythrum sa	
		eghaniensis		Quercus alba			philoxeroid			Microstegiur	
	Betula ler	-		Quercus coccinea	Г		Aster tatari	cus		Paulownia	
	Carya alb	a		Quercus imbricaria	a		Cerastium			Polygonum	
	Carya gla			Quercus prinus			Coronilla va	aria		Pueraria m	ontana
	Carya ova			Quercus rubra			Elaeagnus u	mbellata	~	Rosa multi	flora
1	Carya ova	ata		Quercus velutina			Lespedeza	bicolor		Sorghum h	alepense
	Cornus flo			Sassafras albidum			Lespedeza			Verbena bi	-
	Fagus gra		~	Tilia americana			' Ligustrum ob				
~		americana		Tsuga canadensis			Ligustrum s	sinense			
~		on tulipifera		Ulmus americana			-				
		acuminata									
		5	Species in	Group 1				3	Species in	Group 2	

Sample Variables 10-11 within at least 8 subplots (40" x 40", or 1m x 1m) in the riparian/buffer zone within 25 feet from each bank. The four subplots should be placed roughly equidistantly along each side of the stream.											
10	V _{DETRITUS}						naterial. Wo /er at each s		<4" diamete	er and <36"	22.81 %
			Left	Side			Right	t Side] '	
		20	25	10	40	20	30	10	40	1	
11	V _{HERB}	10 Average pe	20 rcentage co	30 over of herba	25 aceous vege	25 etation (mea	20 asure only if	10 tree cover is	30 s <20%). Do	o not	
		include woo	ody stems a percentages	t least 4" db	h and 36" ta	II. Because	there may b Enter the per	e several la	yers of grou	und cover	Not Used
			Left	Side			Righ	t Side			
Sample	e Variable 1	2 within the	entire cat	chment of t	he stream						
12	V _{WLUSE}				for watersh	ed.					
12	* WLUSE	Weighted /	worago or r		nor wateren						1.00
				Runoff Score	% in Catch- ment	Running Percent (not >100)					
	Forest and n	ative range (>	>75% ground	cover)				•	1	100	100
								•			
								•			
								•			
								-			
								•			
								•			
								-			
	Summary:	SAA Numbe	er 3				No	tes:			
Va	ariable	Value	VSI								
Vc	CANOPY	66 %	0.70								
V _{EI}	MBED	4.0	1.00								
Vs	UBSTRATE	3.35 in	1.00								
VB	ERO	15 %	0.99								
VL	WD	12.0	1.00								
	DBH	9.9	1.00								
	NAG	2.0	1.00								
V _{st}		Not Used	Not Used								
	RICH	1.40	0.67								
	etritus	22.8 %	0.28								
	ERB	Not Used	Not Used								
	LUSE	1	1.00								

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: AEP Mitchell Landfill Project Location: Stream 3a. Cresap, Marshall Co., WV Sampling Date: 28 Sept 2011

Project Site Bef

Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 3A

1

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.89
Biogeochemical Cycling	0.85
Habitat	0.77

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	54.00	0.55
V _{EMBED}	Average embeddedness of channel.	2.83	0.76
V _{SUBSTRATE}	Median stream channel substrate particle size.	4.85	1.00
V _{BERO}	Total percent of eroded stream channel bank.	27.00	0.93
V _{LWD}	Number of down woody stems per 100 feet of stream.	35.00	0.81
V _{TDBH}	Average dbh of trees.	11.29	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	5.00	0.80
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
VDETRITUS	Average percent cover of leaves, sticks, etc.	78.13	0.95
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

										Vers	ion 1-25-11	
	High-G	iradient	Headwat	ter Strea	ms in ea	stern Ke	entucky a	and west	ern Wes	st Virgini	a	
		Field Data Sheet and Calculator										
	Team:	Dawn York	awn York and Mary Gilmore Latitude/UTM Northing: 39 48 26.52.6									
Pro	oject Name:	AEP Mitche	ell Landfill P	roject			Longitude/UTM Easting: 80 51 25.673W					
	Location:	Stream 3a.	Cresap, Ma	arshall Co., N	WV			-	-	28 Sept 20		
SA	AR Number:	ЗA		Length (ft):		Stream Ty	/De:				-	
0,		0/1	riodon	Reach Length (ft): 100 Stream Type: Ephemeral Stream								
	Top Strata:	Tre	Tree/Sapling Strata (determined from percent calculated in V _{CCANOPY})									
Site	and Timing: Project Site Before Project										•	
Comula	Verieblee	1 1 in atrea	m chonnel			_	-				_	
Sample 1	Variables		ercent cover	over chann	ol by trop or	nd capling or	anony Maa	euro at no f	ower than 1	0 roughly		
I		equidistant 20%, enter	points along at least one	g the stream value betw	n. Measure een 0 and 1	only if tree/s 9 to trigger	apling cove	r is at least :			54.0 %	
	List the per	cent cover r	neasuremer	nts at each p	point below:							
	40	40	60	75	40	35	60	90	60	40		
			nbeddednes									
		surface and to the follow of 1. If the	tream. Sele d area surror ving table. I bed is comp ness rating t 183)	unding the p If the bed is posed of bec	barticle that i an artificial s drock, use a	is covered b surface, or c rating score	y fine sedim composed o e of 5.	nent, and en f fine sedime	ter the rating ents, use a i	g according rating score		
		Rating	Rating Des	scription								
		5			overed, sur	rounded, or	buried by fir	ne sediment	(or bedrock	()		
		4				, surroundec						
		3				d, surrounde						
		2				d, surrounde						
		1			covered, su	irrounded, o	r buried by f	ine sedimer	nt (or artificia	al surface)		
			point below									
	2	2	3	4	3	3						
	3	3	3	3	3	3						
	3	5	2	2	3	4						
	1	3	3	2	4	2						
-	4	2	1	2	4	3						
3	Enter partic	along the s le size in in	eam channe tream; use t ches to the i	he same po nearest 0.1	ints and par inch at each	ticles as use	ed in V _{EMBED}				4.85 in	
			and or finer	-		-						
	9.20	99.00	20.00	5.80	0.80	5.00						

				-						
	9.20	99.00	20.00	5.80	0.80	5.00				
	4.50	2.90	4.30	8.50	0.60	12.25				
	7.00	6.30	3.20	5.50	3.20	12.20				
	10.10	2.50	1.10	10.10	4.20	2.80				
	1.70	4.70	14.70	0.75	1.20	99.00				
4	V _{BERO}		e total perce			Enter the to I If both bar				27 %
			Left Bank:	6	ft		Right Bank:	21	ft	

Sampl	e Variable:	s 5-9 within th	ne entire ri	parian/buff	er zone adj	acent to th	e stream ch	nannel (25 f	feet from ea	ich bank).	
5	V _{LWD}	Number of d stream reac per 100 feet	h. Enter th	e number fr	om the entir						35.0
		•					oody stems:		35		
6	V_{TDBH}	Average dbł inches (10 c					ng cover is a	t least 20%). Trees are	e at least 4	11.3
		List the dbh	measurem	ents of indiv	vidual trees	(at least 4 ii	n) within the	buffer on ea	ach side of		
		the stream b									
			Left Side					Right Side			
	6.5	15	8	16	14	17	9	8.5	5.5	4	
	15.5	10				7.5	13	12.5	12	18	
			(100 (,		
7	V _{SNAG}	Number of s side of the s						Enter num	per of snags	on each	5.0
			Left Side:		2		Right Side:		3		
8	V_{SSD}	Number of s									
		if tree cover per 100 ft of				gs and shru	ibs on each	side of the s	stream, and	the amount	Not Used
			Left Side:		19		Right Side:		41		
9	V _{SRICH}	Riparian veg									
		Group 1 in tl richness per							i sirala. Spe	ecles	1.60
		Group	0 1 = 1.0					Group	2 (-1.0)		
	Acer rubr	um		Magnolia ti	ripetala	~	Ailanthus a	altissima		Lonicera ja	ponica
~	Acer sace	charum		Nyssa sylv	atica		Albizia julit	orissin		Lonicera ta	tarica
	Aesculus	flava		Oxydendrun	n arboreum		Alliaria pet	iolata		Lotus corni	iculatus
	Asimina ti			Prunus sei			Alternanthe			Lythrum sa	
		ghaniensis		Quercus a			philoxeroia			Microstegiur	
	Betula ler	-		Quercus co			Aster tatan	icus		Paulownia	
	Carya alb	а		Quercus in			Cerastium			Polygonum	
	Carya gla	bra		Quercus p	rinus		Coronilla v	aria		Pueraria m	ontana
	Carya ova	alis		Quercus ru	ıbra		Elaeagnus ι	ımbellata		Rosa multi	flora
1	Carya ova	ata		Quercus ve	elutina		Lespedeza	bicolor		Sorghum h	alepense
	Cornus flo	orida		Sassafras	albidum		Lespedeza	a cuneata		Verbena bi	rasiliensis
	Fagus gra	andifolia		Tilia ameri	cana		Ligustrum o	btusifolium			
1	Fraxinus	americana		Tsuga can	adensis		Ligustrum	sinense			
~	Liriodendro	on tulipifera		Ulmus ame	ericana						
	Magnolia	acuminata									
		А	Species in	Group 1				0	Species in	Group 0	
		4 \$	Species in					2	Species in	Group 2	

	e Variables The four sub								one within	25 feet from	n each
10	V _{DETRITUS}				ticks, or othe ticks or othe ticks of the ti				<4" diamete	er and <36"	78.13 %
			Left	Side			Righ	t Side] '	
		75	50	90	100	50	100	100	60		
11	V _{HERB}				aceous vege						
			percentages		h and 36" ta 1 200% are a						Not Used
				Side			Righ	t Side] '	
Sample	e Variable 1	2 within the	entire cat	chment of t	he stream.						
12	V _{WLUSE}				e for watersh	ed:					
		-	-						T		1.00
			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	100	100
								•			
								•			
								•			
								•			
	-							•			
								•			
								-			
		3A					No	tes:			
Va	ariable	Value	VSI								
Vc	CANOPY	54 %	0.55								
V _{EI}	MBED	2.8	0.76								
Vs	UBSTRATE	4.85 in	1.00								
VB	ERO	27 %	0.93								
VL	WD	35.0	0.81								
V _{TI}	DBH	11.3	1.00								
Vsi	NAG	5.0	0.80								
Vs		Not Used	Not Used								
	RICH	1.60	0.76								
	ETRITUS	78.1 %	0.95								
V _H	ERB	Not Used	Not Used								
Vw	LUSE	1	1.00								

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: AEP Mitchell Landfill Project Location: Stream 3b. Cresap, Marshall Co., WV Sampling Date: 28 Sept 2011

Project Site Befo

Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 3B

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.93
Biogeochemical Cycling	0.81
Habitat	0.79

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	64.50	0.69
V _{EMBED}	Average embeddedness of channel.	2.77	0.74
V _{SUBSTRATE}	Median stream channel substrate particle size.	6.10	0.99
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.	13.00	1.00
V _{TDBH}	Average dbh of trees.	6.50	0.58
V _{SNAG}	Number of snags per 100 feet of stream.	3.00	1.00
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	1.60	0.76
VDETRITUS	Average percent cover of leaves, sticks, etc.	60.00	0.73
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

	Version 1-25-11
estern Wes	t Virginia
UTM Northing:	39 49 26.37.1461N
/I ITM Fasting	80 46 38 220W

	High-G	aradient	Headwat				ntucky a alculato		tern Wes	t Virgini	a
	Team.	Dawn York	and Mary G						M Northina.	39 49 26.37	7 1461N
Pro	oject Name:								-	80 46 38.22	
	•		Cresap, Ma	•	M/\/			-	-	28 Sept 20	
								Oan	ipiling Date.	20 0601 20	
SA	AR Number:	3B		Length (ft):	100	Stream Ty		meral Stream			
	Top Strata:	Tre	e/Sapling St	rata	(determined	d from perce	ent calculate	d in V _{CCANO}	_{эү})		
Site	and Timing:	Project Site				•	Before Proje	ct			•
Sample	e Variables	1-4 in strea	m channel								
1	V _{CCANOPY}	equidistant	points along	the stream	. Measure	only if tree/s	anopy. Meas apling cover Top Strata c	is at least			64.5 %
	List the per	cent cover r	neasuremer	nts at each p	point below:						
	100	100	95	95	80	75	60	30	5	5	
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	2.8
							y fine sedim omposed of				
		of 1. If the	bed is comp	osed of bec	lrock, use a	rating score	of 5.			_	
		Embeddedi Minshall 19		or gravel, co	obble and b	oulder partic	les (rescale	d from Platt	s, Megahan	, and	
		Rating	Rating Des								
		5					buried by fin			()	
		4					l, or buried b				
		3					d, or buried				
		1					r buried by fi			al surface)	
	List the rati	nas at each	point below		0010100,00		barroa by ri				
	5	2	3	3	3	2					
	3	2	4	2	3	2					
	3	2	4	1	3	2					
	4	4	3	2	3	3					
	2	3	2	2	3	3					
3	V _{SUBSTRATE}						t no fewer th ed in V _{EMBED} .		hly equidista	ant points	6.10 in
	Enter partic	le size in in	ches to the r	nearest 0 1	inch at each	point below	(bedrock sl	hould be co	unted as 99	in asphalt	
			and or finer							in, aophan	
	11.50	3.00	11.50	10.50	4.40	13.50					
	7.25	1.50	12.00	7.00	11.25	3.00					
	3.00	4.20	1.25	8.50	10.50	1.00					
	2.50	2.00	2.50	0.70	9.40	99.00					
	5.20	3.52	7.00	1.00	16.00	13.50					
4	V _{BERO}	Total perce side and the	nt of eroded e total perce	stream cha	nnel bank.	Enter the to	tal number o Iks are erod				0 %
		may be up			{+		Diabt Dealer	-	<i>t</i> +		
			Left Bank:	0	ft		Right Bank:	0	ft		

Sampl	e Variable	s 5-9 within th	ne entire ri	parian/buff	er zone adj	acent to th	e stream ch	annel (25 i	feet from ea	ach bank).	
5	V _{LWD}	Number of d stream reac per 100 feet	h. Enter th	e number fr	om the entir						13.0
							oody stems:		13		
6	V_{TDBH}	Average dbł inches (10 c					ng cover is a	t least 20%). Trees are	e at least 4	6.5
		List the dbh	measurem	ents of indiv	vidual trees	(at least 4 ii	n) within the	buffer on e	ach side of		
		the stream b									
			Left Side					Right Side			
	9	5.5	6	5.5		6	5	8	7		
											1
7	V	Number of s	naga (at la	aat 4" dhh a	nd 26" tall)	por 100 foo	t of otroom	Entor num	har of apage	on anah	
7	V _{SNAG}	side of the s							Der of shays	oneach	3.0
			Left Side:		3		Right Side:		0		
8	V_{SSD}	Number of s									Not Used
		if tree cover per 100 ft of				ys and shru	os on each s		stream, and	the amount	Not Used
		•	Left Side:	ç	8		Right Side:		76		
9	V _{SRICH}	Riparian veg Group 1 in tl									1.60
		richness per	^r 100 feet a	nd the subir	ndex will be	calculated t	from these d				
	_		0 1 = 1.0						0 2 (-1.0)		
	Acer rubr	um		Magnolia tr	ripetala	~	Ailanthus a	altissima		Lonicera ja	ponica
\checkmark	Acer sace	charum		Nyssa sylv	atica		Albizia julik	orissin		Lonicera ta	itarica
	Aesculus	flava		Oxydendrum	n arboreum		Alliaria peti	iolata		Lotus corni	iculatus
	Asimina t	riloba		Prunus ser	otina		Alternanthe	era		Lythrum sa	licaria
	Betula alle	ghaniensis		Quercus al	ba		philoxeroid	les		Microstegiur	n vimineum
	Betula ler	nta		Quercus co	occinea		Aster tatari	icus		Paulownia	tomentosa
	Carya alb	a		Quercus in	nbricaria		Cerastium	fontanum		Polygonum	cuspidatum
	Carya gla	bra		Quercus pr	rinus		Coronilla v	aria		Pueraria m	ontana
	Carya ova	alis		Quercus ru	bra		Elaeagnus u	ımbellata		Rosa multi	flora
1	Carya ova	ata		Quercus ve	elutina		Lespedeza	bicolor		Sorghum h	alepense
	Cornus fle	orida		Sassafras	albidum		Lespedeza			Verbena bi	-
	Fagus gra			Tilia amerio			Ligustrum ol				
		americana		Tsuga cana	adensis		Ligustrum				
~		on tulipifera		Ulmus ame			-				
		acuminata									
		4	Species in	Group 1				2	Species in	Group 2	

	e Variables The four sub								one within	25 feet from	n each
10	V _{DETRITUS}				ticks, or othe t cover of the				<4" diamete	er and <36"	60.00 %
			Left	Side			Righ	t Side	-] '	
		20	20	90	95	40	40	100	75		
11	V _{HERB}	Average pe	rcentage co	over of herba	aceous vege	etation (mea	asure only if	tree cover is	s <20%). De	o not	
			percentages		h and 36" ta 1 200% are a						Not Used
				Side			Righ	t Side] '	
Sample	e Variable 1	2 within the	entire cat	chment of t	he stream						
12	V _{WLUSE}				e for watersh	ed:					
	* WLUSE	Troightea /	tronage of t								1.00
			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	100	100
								•			
								•			
								•			
								•			
	-							•			
								•			
								-			
		3B					No	tes:			
Va	ariable	Value	VSI								
Vc	CANOPY	65 %	0.69								
V _{EI}	MBED	2.8	0.74								
Vs	UBSTRATE	6.10 in	0.99								
VB	ERO	0 %	1.00								
VL	WD	13.0	1.00								
V _{TI}	DBH	6.5	0.58								
Vsi	NAG	3.0	1.00								
Vs	SD	Not Used	Not Used								
Vs	RICH	1.60	0.76								
	ETRITUS	60.0 %	0.73								
V _H	ERB	Not Used	Not Used								
Vw	LUSE	1	1.00								

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

Project Name: AEP Mitchell Landfill Project Location: Stream 4. Cresap, Marshall Co., WV Sampling Date: 27 Sept 2011

Project Site

Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR:

Functional Results Summary:

Tree/Sapling Strata

4 SAR number:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.91
Biogeochemical Cycling	0.78
Habitat	0.85

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	83.50	0.94
V _{EMBED}	Average embeddedness of channel.	2.50	0.64
V _{SUBSTRATE}	Median stream channel substrate particle size.	8.90	0.81
V _{BERO}	Total percent of eroded stream channel bank.	22.00	0.96
V _{LWD}	Number of down woody stems per 100 feet of stream.	9.00	1.00
V _{TDBH}	Average dbh of trees.	9.09	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	2.00	1.00
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	1.80	0.86
VDETRITUS	Average percent cover of leaves, sticks, etc.	61.25	0.75
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

	High-G	aradient	Headwat				entucky a alculato		ern Wes	t Virgini	a
	Team:	Dawn York	and Mary G					Latitude/UTI	M Northina:	39.825074	
Pr	oject Name:									-80.774334	
	-		Cresap, Mar		٧			-	-	27 Sept 20	
SA	AR Number:	4		Length (ft):		Stream Ty	/pe: Ephe	meral Stream			-
	Top Strata:	Tre	e/Sapling St	rata	(determine	d from perce	ent calculate	d in V _{CCANOF}	у _ү)		
Site	and Timing:	Project Site	1				Before Proje	ct			
Sample	e Variables										-
1	V _{CCANOPY}	equidistant	points along	g the stream	. Measure	only if tree/s	anopy. Mea apling cover Top Strata c	r is at least 2			83.5 %
	List the per	cent cover r	neasuremer	nts at each p	oint below:						
	80	70	100	50	70	100	95	90	90	90	
2	V _{EMBED}	along the s	tream. Sele	ct a particle	from the be	ed. Before n	at no fewer t noving it, de by fine sedim	termine the	percentage	of the	2.5
				• •			composed of			•	
		of 1. If the	bed is comp	osed of bec	lrock, use a	rating score	e of 5.				
		Embedded Minshall 19		or gravel, co	obble and b	oulder partic	cles (rescale	d from Platt	s, Megahan	, and	
		Rating	Rating Des								
		5					buried by fir			()	
		4					l, or buried b ed, or buried				
		2					ed, or buried				
		1					r buried by f			al surface)	
	List the rati	ngs at each	point below	:							
	2	1	2	2	2	4					
	2	1	2	2	3	4					
	3	1	3	2	2	3					
	1	3	3	3	3	4					
0	2	2 Madian atre	3	4	2	4	t no fower th		hly oquidiat	ant pointo	
3	V _{SUBSTRATE}						lt no fewer th ed in V _{EMBED}		niy equidista	ant points	8.90 in
			ches to the r and or finer			ı point belov	/ (bedrock s	hould be co	unted as 99	in, asphalt	
	99.00	0.05	4.70	17.00	23.30	15.50					
	19.50	1.30	7.30	9.80	1.50	16.00					
	1.10	17.10	10.80	0.50	0.50	9.30					
	2.20	9.90	3.50	4.90	11.40	8.50					
	99.00	99.00	8.10	7.10	10.00	3.50					
4	V _{BERO}	•	e total perce				tal number o nks are eroc				22 %
			Left Bank:	8	ft		Right Bank:	14	l ft		

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Sampl	e Variable	s 5-9 within th	ne entire r	iparian/buffer zone adj	jacent to the	e stream ch	annel (25 fe	eet from ea	ich bank).	
5	V_{LWD}	stream reacl	h. Enter th	y stems (at least 4 inch ne number from the enti will be calculated.						9.0
		per 100 leet	UI SILEAIII		of downed wo	ody stems:	(9		
6	V_{TDBH}	Average dbł	n of trees (measure only if V _{CCANOF}				. Trees are	e at least 4	0.4
		inches (10 c	m) in diam	eter. Enter tree DBHs	in inches.					9.1
				nents of individual trees	(at least 4 in) within the	buffer on ea	ch side of		
		the stream b			1		D: 1 - 0: 1			
	0	0	Left Side		15	7	Right Side			
	6 14	6 5			15 11	7 4.5				
	8	6			4	4.5 7				
	8.5	9			10	11.5				
	13	9			11	5				
	6	8			10.5	17				
	6	11			6					
	14	10			9					
7	10	10 Number of a	naga (at k	east 4" dbh and 36" tall)	12	of atroom	Entor numb	or of opega	on oach	
7	V_{SNAG}			the amount per 100 fe				er or snags	oneach	2.0
			Left Side:			Right Side:		1		
8	V_{SSD}			d shrubs (woody stems						NetHered
				Enter number of saplin Il be calculated.	igs and shrut	os on each s	side of the si	tream, and	the amount	Not Used
		•	Left Side:	13		Right Side:		4		
9	V_{SRICH}			ecies richness per 100						
				tratum. Check all exotion the subindex will be				strata. Sp	ecies	1.80
		Group	01 = 1.0				Group	2 (-1.0)		
	Acer rubr	rum		Magnolia tripetala		Ailanthus a			Lonicera ja	ponica
~	Acer sace	charum		Nyssa sylvatica		Albizia julib	orissin		Lonicera ta	tarica
	Aesculus	flava		Oxydendrum arboreum		Alliaria peti			Lotus corni	culatus
	Asimina t			Prunus serotina					Lythrum sa	
		eghaniensis		Quercus alba		Alternanthe			Microstegiur	
	Betula lei	-		Quercus coccinea		' Aster tatari			Paulownia	
	Carya alb			Quercus imbricaria		Cerastium			Polygonum d	
	-					Coronilla va			Pueraria m	
	Carya gla			Quercus prinus						
	Carya ov			Quercus rubra		Elaeagnus u			Rosa multi	
	Carya ov			Quercus velutina		Lespedeza			Sorghum h	-
	Cornus fl			Sassafras albidum		Lespedeza			Verbena bi	asilierisis
<i>✓</i>	Fagus gra			Tilia americana		Ligustrum ol				
		americana		Tsuga canadensis		Ligustrum s	sinense			
		on tulipifera	\checkmark	Ulmus americana						
	Magnolia	acuminata								
		3 5	Species in	Group 1			1	Species in	Group 2	

	e Variables The four sub								one within	25 feet fror	n each
10	V _{DETRITUS}				ticks, or oth t cover of th			oody debris - subplot.	<4" diamete	er and <36"	61.25 %
			Left	Side			Righ	t Side]	
		60	50			60	90				
11	V _{HERB}	90 Average pe	70 rcentage co	over of herba	aceous vege	50 etation (mea	20 asure only if	tree cover is	s <20%). Do	o <i>not</i>	
			percentages					be several la cent cover c			Not Used
			Left	Side			Righ	t Side] '	
Sample	e Variable 1	2 within the	entire cate	chment of t	he stream.						
12	V _{WLUSE}				e for watersh	ied:					1.00
	Land Use (Choose From Drop List) Runoff Score									% in Catch ment	Running Percent (not >100)
	Forest and n	ative range (>	>75% ground	cover)				•	1	100	100
								•			
								•			
								•			
								-			
								-			
								•			
								•			
	Summary:	SAA Numbe	er 4				No	tes:			
Va	ariable	Value	VSI								
Vc	CANOPY	84 %	0.94								
V _{EI}	MBED	2.5	0.64								
Vs	UBSTRATE	8.90 in	0.81								
VB	ERO	22 %	0.96								
VL		9.0	1.00								
	DBH	9.1	1.00								
	NAG	2.0	1.00								
V _{SS}		Not Used	Not Used								
	RICH	1.80	0.86								
	etritus	61.3 %	0.75								
	ERB	Not Used	Not Used								
	LUSE	1	1.00								

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: AEP Mitchell Landfill Project Location: Stream 5. Cresap, Marshall Co., WV Sampling Date: 28 Sept 2011

Project Site Be

Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR:

Functional Results Summary:

Tree/Sapling Strata

SAR number: 5

Tree/Saping Strata

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.87
Biogeochemical Cycling	0.89
Habitat	0.78

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	91.00	1.00
V _{EMBED}	Average embeddedness of channel.	3.37	0.95
V _{SUBSTRATE}	Median stream channel substrate particle size.	9.25	0.79
V _{BERO}	Total percent of eroded stream channel bank.	85.00	0.62
V _{LWD}	Number of down woody stems per 100 feet of stream.	7.00	0.88
V _{TDBH}	Average dbh of trees.	11.38	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	6.00	0.70
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	0.90	0.43
VDETRITUS	Average percent cover of leaves, sticks, etc.	8.13	0.10
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

	High-G	Gradient	Headwat			stern Ke et and C	-		tern Wes	st Virgini	а
	Team:	Dawn York	and Mary G	ailmore				Latitude/UT	M Northina:	39 49 26.35	51N
Pr	roject Name:									80 46 32.10	
	-	Stream 5. 0			'V		. –	•	•	28 Sept 20	
S	AR Number:			Length (ft):		Stream Ty	pe: Ephe	meral Stream			•
	Top Strata:	Tre	e/Sapling St	rata	(determine	d from perce	ent calculate	d in V _{CCANO}	Рү)		
Site	and Timing:	Project Site				-	Before Proje				-
	e Variables	-				•	belore Proje				•
1 V _{CCANOPY} Average percent cover over channel by tree and sapling canopy. Measure at no fewer than 10 roughly									91.0 %		
	List the per	cent cover r	neasuremer	nts at each p	oint below:						_
	90	90	90	100	90	80	90	100	90	90	
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 3.4									3.4		
surface and area surrounding the particle that is covered by fine sediment, and enter the rating according to the following table. If the bed is an artificial surface, or composed of fine sediments, use a rating score											
		of 1. If the	bed is comp	osed of bec	Irock, use a	rating score	e of 5.		-	5	1
		Embedded Minshall 19		for gravel, co	obble and b	oulder partic	les (rescale	d from Platt	s, Megahan	, and	
		Rating	Rating Des	•							
		5 <5 percent of surface covered, surrounded, or buried by fine sediment (or bedrock)									
4 5 to 25 percent of surface covered, surrounded, or buried by fine sediment										()	
		4	5 to 25 perc	cent of surfa	ce covered,	surrounded	l, or buried l	by fine sedir	ment	()	
		4 3	5 to 25 per 26 to 50 pe	cent of surfa rcent of surf	ce covered, ace covered	surrounded d, surrounde	l, or buried l d, or buried	by fine sedir by fine sed	nent iment	()	
		4	5 to 25 per 26 to 50 pe 51 to 75 pe	cent of surfa rcent of surf rcent of surf	ce covered, ace covered ace covered	surrounded d, surrounde d, surrounde	l, or buried l ed, or buried ed, or buried	by fine sedir by fine sed by fine sed	nent iment iment		
	List the rati	4 3 2 1	5 to 25 pero 26 to 50 pe 51 to 75 pe >75 percen	cent of surfa rcent of surf rcent of surf t of surface	ce covered, ace covered ace covered	surrounded d, surrounde d, surrounde	l, or buried l ed, or buried ed, or buried	by fine sedir by fine sed by fine sed	nent iment iment		
	List the rati	4 3	5 to 25 pero 26 to 50 pe 51 to 75 pe >75 percen	cent of surfa rcent of surf rcent of surf t of surface :	ce covered, ace covered ace covered	surrounded d, surrounde d, surrounde rrounded, o	l, or buried l ed, or buried ed, or buried	by fine sedir by fine sed by fine sed	nent iment iment		
	4	4 3 2 1 ngs at each	5 to 25 pero 26 to 50 pe 51 to 75 pe >75 percen point below 3	cent of surfa rcent of surf rcent of surf t of surface	ce covered, ace covered ace covered covered, su	surrounded d, surrounde d, surrounde rrounded, o 2	l, or buried l ed, or buried ed, or buried	by fine sedir by fine sed by fine sed	nent iment iment		
	4	4 3 2 1 ngs at each 2 4	5 to 25 pero 26 to 50 pe 51 to 75 pe >75 percen point below 3 2	cent of surfa rcent of surf rcent of surf t of surface : 3 5	ce covered, ace covered ace covered covered, su 3	surrounded d, surrounde d, surrounde rrounded, o 2 4	l, or buried l ed, or buried ed, or buried	by fine sedir by fine sed by fine sed	nent iment iment		
	4	4 3 2 1 ngs at each 2	5 to 25 pero 26 to 50 pe 51 to 75 pe >75 percen point below 3	cent of surfa rcent of surf rcent of surf t of surface : 3	ce covered, ace covered ace covered covered, su 3 3	surrounded d, surrounde d, surrounde rrounded, o 2	l, or buried l ed, or buried ed, or buried	by fine sedir by fine sed by fine sed	nent iment iment		
	4 2 3	4 3 2 1 ngs at each 2 4 2	5 to 25 pero 26 to 50 pe 51 to 75 pe >75 percen point below 3 2 3	cent of surfa rcent of surf rcent of surf t of surface : 3 5 2	ce covered, ace covered covered, su 3 3 2	surrounded d, surrounde d, surrounde rrounded, o 2 4 5	l, or buried l ed, or buried ed, or buried	by fine sedir by fine sed by fine sed	nent iment iment		
3	4 2 3 4 4	4 3 2 1 ngs at each 2 4 2 4 3 Median stree	5 to 25 perc 26 to 50 pe 51 to 75 pe >75 percen point below 3 2 3 5 5 5 5 5 5 5 5	cent of surfa rcent of surf rcent of surf t of surface : 3 5 2 4 5	ce covered, ace covered covered, su 3 3 2 3 3 3 oarticle size.	surrounded, d, surrounded d, surrounded, o 2 4 5 3 4 Measure a	I, or buried I ed, or buried ed, or buried r buried by f	by fine sedir by fine sed by fine sed ine sedimer an 30 roug	nent iment iment nt (or artificia	al surface)	9.25 in
3	4 2 3 4 V _{SUBSTRATE}	4 3 2 1 ngs at each 2 4 2 4 3 Median stre along the s	5 to 25 pero 26 to 50 pe 51 to 75 pe >75 percen point below 3 2 3 5 5 5 5 5 6 6 75 percent 1 1 2 3 5 5 6 6 7 5 6 7 5 6 7 5 8 7 5 8 7 5 8 7 5 8 7 7 7 7 7 7 7 7 7 7 7 7 7	cent of surfa rcent of surf rcent of surf t of surface : 3 5 2 4 5 I substrate p he same po nearest 0.1 i	ce covered, ace covered covered, su 3 3 2 3 3 article size. ints and par	surrounded, d, surrounded, d, surrounded, o 2 4 5 3 4 Measure a ticles as use	I, or buried I ed, or buried d, or buried r buried by f buried by f t no fewer tl ed in V _{EMBED}	by fine sedir by fine sed by fine sed ine sedimer nan 30 roug	nent iment iment nt (or artificia hly equidista	al surface)	9.25 in
3	4 2 3 4 V _{SUBSTRATE} Enter partic or concrete	4 3 2 1 ngs at each 2 4 2 4 2 4 3 Median stress along the s cle size in in-	5 to 25 perc 26 to 50 pe 51 to 75 pe >75 percen point below 3 2 3 5 5 5 eam channe tream; use t ches to the i and or finer	cent of surfa rcent of surf rcent of surf t of surface : 3 5 2 4 5 I substrate p he same po nearest 0.1 i particles as	ce covered, ace covered covered, su 3 3 2 3 article size. ints and par inch at each 0.08 in):	surrounded d, surrounded d, surrounded, o 2 4 5 3 4 Measure a ticles as use	I, or buried I ed, or buried d, or buried r buried by f buried by f t no fewer tl ed in V _{EMBED}	by fine sedir by fine sed by fine sed ine sedimer nan 30 roug	nent iment iment nt (or artificia hly equidista	al surface)	9.25 in
3	4 2 3 4 V _{SUBSTRATE} Enter partic or concrete 19.10	4 3 2 1 ngs at each 2 4 2 4 3 Median stre along the s cle size in in- as 0.0 in, s 5.50	5 to 25 perc 26 to 50 pe 51 to 75 pe >75 percen point below 3 2 3 5 5 5 5 5 5 5 5 5 5 5 5 5	cent of surfa rcent of surf rcent of surf t of surface : 3 5 2 4 5 I substrate p he same po nearest 0.1 i particles as 4.30	ce covered, ace covered covered, su 3 3 2 3 3 article size. ints and par inch at each 0.08 in): 4.80	surrounded, d, surrounded, d, surrounded, o 2 4 5 3 4 Measure a ticles as use point below 99.00	I, or buried I ed, or buried d, or buried r buried by f buried by f t no fewer tl ed in V _{EMBED}	by fine sedir by fine sed by fine sed ine sedimer nan 30 roug	nent iment iment nt (or artificia hly equidista	al surface)	9.25 in
3	4 2 3 4 V _{SUBSTRATE} Enter partic or concrete 19.10 11.00	4 3 2 1 ngs at each 2 4 2 4 3 Median stre along the s cle size in in- a s 0.0 in, s 5.50 10.00	5 to 25 perc 26 to 50 pe 51 to 75 pe >75 percen point below 3 2 3 5 5 5 eam channe tream; use t ches to the r and or finer 5.25 5.50	cent of surfa rcent of surf rcent of surf t of surface : 3 5 2 4 5 I substrate p he same po hearest 0.1 i particles as 4.30 7.50	ce covered, ace covered covered, su 3 3 2 3 3 0 article size. ints and par inch at each 0.08 in): 4.80 4.50	surrounded, d, surrounded d, surrounded, o 2 4 5 3 4 Measure a ticles as use point below 99.00 34.25	I, or buried I ed, or buried d, or buried r buried by f buried by f t no fewer tl ed in V _{EMBED}	by fine sedir by fine sed by fine sed ine sedimer nan 30 roug	nent iment iment nt (or artificia hly equidista	al surface)	9.25 in
3	4 2 3 4 V _{SUBSTRATE} Enter partic or concrete 19.10 11.00 13.75	4 3 2 1 ngs at each 2 4 2 4 3 Median stress along the s cle size in in- a s 0.0 in, s 5.50 10.00 18.00	5 to 25 percent 26 to 50 percent 51 to 75 percent point below 3 2 3 5 5 5 5 5 5 5 5 5 5 5 5 5	cent of surfa rcent of surf rcent of surf t of surface : 3 5 2 4 5 I substrate p he same po nearest 0.1 i particles as 4.30 7.50 5.25	ce covered, ace covered covered, su 3 3 2 3 3 article size. ints and par inch at each 0.08 in): 4.80 4.50 20.20	surrounded d, surrounded d, surrounded rrounded, o 2 4 5 3 4 Measure a ticles as use point below 99.00 34.25 99.00	I, or buried I ed, or buried d, or buried r buried by f buried by f t no fewer tl ed in V _{EMBED}	by fine sedir by fine sed by fine sed ine sedimer nan 30 roug	nent iment iment nt (or artificia hly equidista	al surface)	9.25 in
3	4 2 3 4 4 V _{SUBSTRATE} Enter partic or concrete 19.10 11.00 13.75 2.00	4 3 2 1 ngs at each 2 4 2 4 3 Median stre along the s cle size in in- as 0.0 in, s 5.50 10.00 18.00 5.50	5 to 25 percent 26 to 50 percent 51 to 75 percent point below 3 2 3 5 5 5 5 5 5 5 5 5 5 5 5 5	cent of surfa rcent of surf rcent of surf t of surface : 3 5 2 4 5 I substrate p he same po nearest 0.1 particles as 4.30 7.50 5.25 12.00	ce covered, ace covered covered, su 3 3 3 2 3 3 3 article size. ints and par inch at each 0.08 in): 4.80 4.50 20.20 8.50	surrounded d, surrounded rrounded, o 2 4 5 3 4 Measure a ticles as use point below 99.00 34.25 99.00 8.00	I, or buried I ed, or buried d, or buried r buried by f buried by f t no fewer tl ed in V _{EMBED}	by fine sedir by fine sed by fine sed ine sedimer nan 30 roug	nent iment iment nt (or artificia hly equidista	al surface)	9.25 in
	4 2 3 4 V _{SUBSTRATE} Enter partic or concrete 19.10 11.00 13.75 2.00 26.50	4 3 2 1 ngs at each 2 4 2 4 3 Median stre along the s cle size in in- a s 0.0 in, s 5.50 10.00 18.00 5.50 2.25	5 to 25 percent 26 to 50 percent 51 to 75 percent point below 3 2 3 5 5 5 5 5 5 5 5 5 5 5 5 5	cent of surfa rcent of surf rcent of surf t of surface : 3 5 2 4 5 I substrate p he same po nearest 0.1 i particles as 4.30 7.50 5.25 12.00 21.00	ce covered, ace covered covered, su 3 3 2 3 3 2 3 3 3 3 3 article size. ints and par inch at each 0.08 in): 4.80 4.50 20.20 8.50 6.50	surrounded d, surrounded d, surrounded rrounded, o 2 4 5 3 4 Measure a ticles as use point below 99.00 34.25 99.00 8.00 2.20	I, or buried I ed, or buried r buried by f r buried by f t no fewer tl ed in V _{EMBED} v (bedrock s	by fine sedir by fine sed ine sedimer han 30 roug hould be co	nent iment iment nt (or artificia hly equidista unted as 99	al surface)	9.25 in
3	4 2 3 4 4 V _{SUBSTRATE} Enter partic or concrete 19.10 11.00 13.75 2.00	4 3 2 1 ngs at each 2 4 2 4 3 Median stre along the s cle size in in- a s 0.0 in, s 5.50 10.00 18.00 5.50 2.25 Total perce	5 to 25 perc 26 to 50 perc 51 to 75 percen point below 3 2 3 5 5 5 5 5 5 5 5	cent of surfa rcent of surf rcent of surf t of surface : 3 5 2 4 5 I substrate p he same po nearest 0.1 particles as 4.30 7.50 5.25 12.00	ce covered, ace covered covered, su 3 3 2 3 3 2 3 3 article size. ints and par inch at each 0.08 in): 4.80 4.50 20.20 8.50 6.50 unnel bank.	surrounded d, surrounded rrounded, o 2 4 5 3 4 Measure a ticles as use point below 99.00 34.25 99.00 8.00 2.20 Enter the to	I, or buried I ad, or buried r buried by f t no fewer th ad in V _{EMBED} v (bedrock s	by fine sedir by fine sed ine sedimer han 30 roug hould be co	nent iment iment nt (or artificia hly equidista unted as 99	al surface)	9.25 in 85 %

Sampl	e Variable	s 5-9 within th	ne entire rij	parian/buff	er zone adj	acent to th	e stream ch	annel (25 f	eet from ea	ich bank).	
5	V _{LWD}	Number of d stream reac per 100 feet	h. Enter th	e number fr	om the entir						7.0
		·			Number of		oody stems:		7		
6	V_{TDBH}	Average dbł inches (10 c					ng cover is a	t least 20%)). Trees are	e at least 4	11.4
		List the dbh	,				n) within the	buffer on ea	ach side of		
		the stream b				,	,				-
			Left Side					Right Side			
	8	8	19.5	5	7.5	8.5	5.5	9.5	8	6.5	
	33	9.5	10	11.5	22	15	7	7.5	5	16.5	
						9.5 20	20	8.5	5	10	
						20					
										_	
7	V_{SNAG}	Number of s side of the s						Enter numb	er of snags	on each	6.0
			Left Side:		4		Right Side:		2		
8	V_{SSD}	Number of s									
		if tree cover per 100 ft of				gs and shru	bs on each s	side of the s	tream, and	the amount	Not Used
			Left Side:		8		Right Side:	1	16		
9	V _{SRICH}	Riparian veg Group 1 in tl	he tallest st	ratum. Che	eck all exotic	and invasiv	ve species p	resent in all			0.90
		richness per		nd the subir	ndex will be	calculated f	rom these d		0 (1 0)		
_	Acorruba		<u>01 = 1.0</u>	Magnolia tr	rinatala		Ailanthua		2 (-1.0)	Lonicoro io	nonico
	Acer rubr						Ailanthus a			Lonicera ja	-
~	Acer sace			Nyssa sylv			Albizia julib			Lonicera ta	
	Aesculus			Oxydendrum			Alliaria peti	olata		Lotus corni	
	Asimina t	riloba		Prunus ser	otina		Alternanthe			Lythrum sa	
		eghaniensis		Quercus al	ba		philoxeroid	es		Microstegiun	n vimineum
	Betula ler	nta		Quercus co	occinea		Aster tatari	cus		Paulownia	tomentosa
	Carya alb	oa		Quercus in	nbricaria		Cerastium	fontanum		Polygonum d	cuspidatum
	Carya gla	abra		Quercus pr	rinus		Coronilla va	aria		Pueraria m	ontana
	Carya ova	alis		Quercus ru	bra		Elaeagnus u	mbellata		Rosa multi	flora
	Carya ova	ata		Quercus ve	elutina		Lespedeza	bicolor		Sorghum h	alepense
	Cornus fle	orida		Sassafras a	albidum		Lespedeza	cuneata		Verbena br	rasiliensis
	Fagus gra	andifolia		Tilia amerio	cana		Ligustrum ot	otusifolium			
	Fraxinus	americana		Tsuga cana	adensis		Ligustrum s	sinense			
	Liriodendro	on tulipifera		Ulmus ame	ericana						
	Magnolia	acuminata									
	-										
		2	Species in (Group 1				1	Species in	Group 2	

	ample Variables 10-11 within at least 8 subplots (40" x 40", or 1m x 1m) in the riparian/buffer zone within 25 feet from each ank. The four subplots should be placed roughly equidistantly along each side of the stream.											
10	V _{DETRITUS}				sticks, or oth t cover of th				<4" diamete	r and <36"	8.13 %	
			Left	Side			Righ	t Side]		
		5	15	5	10	10	5	5	10			
11	V _{HERB}	Average pe	ercentage co	over of herba	aceous vege	etation (mea	sure only if	tree cover is	; <20%). Do	o not		
			percentages		h and 36" ta 1 200% are a						Not Used	
				Side			Righ	t Side] '		
Sample	e Variable 1	2 within the	entire cat	chment of t	he stream							
12	V _{WLUSE}				e for watersh	ed.						
	* WLUSE	Troightea /	a charage of t								1.00	
	Land Lise (Choose From Drop List)								Runoff Score	% in Catch- ment	Running Percent (not >100)	
	Forest and native range (>75% ground cover)								1	100	100	
								•				
								•				
								•				
								•				
	-							•				
								•				
	Summary:	SAA Numbe	er 5				No	tes:				
Va	ariable	Value	VSI									
Vc	CANOPY	91 %	1.00									
V _{EI}	MBED	3.4	0.95									
Vs	UBSTRATE	9.25 in	0.79									
VB	ERO	85 %	0.62									
VL	WD	7.0	0.88									
V _{TI}	DBH	11.4	1.00									
Vsi	NAG	6.0	0.70									
Vs	SD	Not Used	Not Used									
Vs	RICH	0.90	0.43									
	ETRITUS	8.1 %	0.10									
V _H	ERB	Not Used	Not Used									
Vw	LUSE	1	1.00									

Before Project

6 EPH

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: AEP Mitchell Landfill Project

 Location: Stream 6 Ephemeral Portion, Cresap, Marshall Co., WV

 Sampling Date: 28 Sept 2011

 Project Site

Subclass for this SAR:

Functional Results Summary:

Ephemeral Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

Enter Results in Section A of the Mitigation Sufficiency Calculator

SAR number:

Function	Functional Capacity Index
Hydrology	0.79
Biogeochemical Cycling	0.89
Habitat	0.92

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	84.50	0.95
V _{EMBED}	Average embeddedness of channel.	3.03	0.83
V _{SUBSTRATE}	Median stream channel substrate particle size.	6.63	0.96
V _{BERO}	Total percent of eroded stream channel bank.	145.00	0.30
V _{LWD}	Number of down woody stems per 100 feet of stream.	7.00	0.88
V _{TDBH}	Average dbh of trees.	10.24	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	1.00	1.00
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	2.70	1.00
VDETRITUS	Average percent cover of leaves, sticks, etc.	71.88	0.88
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

										Vers	ion 1-25-11
	High-G	Gradient	Headwat	er Strea	ms in ea	stern Ke	entucky a	and west	tern Wes	st Virgini	а
	U						alculato			U	
	Team.	Dawn York	and Mary G	limore				atitude/UT	M Northina [.]	39 49 22.12	N
Pro			ell Landfill P						-	80 46 27. 5	
110	-		phemeral P		an Marshal					28 Sept 20	
								San	iping Date.	20 0601 20	
SA	R Number:	6 EPH	Reach	Length (ft):	100	Stream Ty	/pe: Ephe	meral Stream	ı		•
	Top Strata:	Tre	e/Sapling St	rata	(determined	d from perce	ent calculate	d in V _{CCANOF}	>Y)		
Site	and Timing:	Project Site	2			•	Before Proje	ct			
Sample	Variables	1-4 in strea	m channel								
1	V _{CCANOPY}	equidistant	points along	g the stream	. Measure	only if tree/s	anopy. Mea apling cove Top Strata c	r is at least a			84.5 %
	List the per	cent cover r	neasuremer	nts at each p	oint below:						
	90	95	60	95	100	95	90	90	70	60	
2	V _{EMBED}	along the s	tream. Sele	ct a particle	from the be	d. Before n	at no fewer t noving it, de	termine the	percentage	of the	3.0
							y fine sedim				
			ving table. I bed is comp				composed of	fine sedime	ents, use a	rating score	
			-			-					1
		Embedded Minshall 19		or gravel, co	obble and b	oulder partic	cles (rescale	d from Platt	s, Megahar	n, and	
		Rating	Rating Des								
		5					buried by fir			<)	
		4					l, or buried b				
		3					ed, or buried				
		2					ed, or buried r buried by f			al surfaco)	
	l ist the rati		point below			nounded, o	i bulled by i	ine sedimer		ai sunace)	
	2	3	2	. 5	5	2					
	5	4	3	5	2	3					
	1	4	2	5	3	1					
	2	4	3	2	2	2					
	5	2	3	4	3						
3						3 Moosuro a	it no fewer th	20 20 roug	hly oquidict	ant points	
5	V _{SUBSTRATE}						ed in V _{EMBED}			an points	6.63 in
		-			-						
						point below	/ (bedrock s	nould be co	unted as 99) in, asphalt	
1			and or finer		,						1
	4.20	8.50	42.00	5.75	4.20	6.75					
	8.50	3.00	6.00	12.50	5.10	4.25					
	12.75	6.23	15.50	14.50	3.50	23.75					
	36.50	19.50	3.52	99.00	9.50	2.51					
	99.00	13.00	4.75	5.25	6.50	3.00					
4	V _{BERO}	•					tal number o				
			•	entage will b	e calculated	I If both bar	nks are eroc	ied, total ero	osion for the	e stream	145 %
		may be up									
			Left Bank:	70) ft		Right Bank:	75	5 ft		

Sampl	e Variable:	s 5-9 within th	ne entire ri	parian/buff	ier zone adj	acent to th	e stream ch	annel (25 f	eet from ea	ch bank).	
5	V _{LWD}	Number of c stream reac per 100 feet	h. Enter th	ne number fi	rom the entir						7.0
		I				f downed w	oody stems:		7		
6	V_{TDBH}	Average dbl inches (10 c					ng cover is a	t least 20%)). Trees are	at least 4	10.2
		List the dbh	measurem	ents of indiv	vidual trees	(at least 4 ir	n) within the	buffer on ea	ach side of		
	_	the stream b	pelow:								-
		-	Left Side		Ī			Right Side		-	
	17.5	10	7.5	15	10	14	6	4.5	6	5.5	
	7	9				5.5 10	5 6.5	6 20.5	19 12.5	18	
						10	0.0	20.5	12.0		
7	V _{SNAG}	Number of s side of the s						Enter numb	er of snags	on each	1.0
			Left Side:				Right Side:		1		
8	V_{SSD}	Number of s									
		if tree cover per 100 ft of				gs and shru	bs on each s	side of the s	tream, and	the amount	Not Used
			Left Side:		14		Right Side:	2	20		
9	V _{SRICH}	Riparian veç					m reach. Cl	neck all spe			
		Group 1 in t richness per							strata. Spe	ecies	2.70
			0.1 = 1.0				ioni these u		2 (-1.0)		
	Acer rubr		<u> </u>	Magnolia t	rinetala		Ailanthus a		2(1.0)	Lonicera ja	nonica
~	Acer saco			Nyssa sylv	•		Albizia julik			Lonicera ta	
	Aesculus				n arboreum		Alliaria peti			Lotus corni	
				-							
	Asimina ti			Prunus sei			Alternanthe philoxeroid			Lythrum sa	
		eghaniensis		Quercus a						Microstegiur	
	Betula ler			Quercus c			Aster tatari			Paulownia	tomentosa
	Carya alb	a		Quercus in	nbricaria		Cerastium	fontanum		Polygonum	cuspidatum
	Carya gla	bra		Quercus p	rinus		Coronilla v	aria		Pueraria m	ontana
	Carya ova	alis		Quercus ru	ıbra		Elaeagnus u	ımbellata		Rosa multi	flora
	Carya ova	ata		Quercus v	elutina		Lespedeza	bicolor		Sorghum h	alepense
	Cornus flo	orida		Sassafras	albidum		Lespedeza	cuneata		Verbena bi	rasiliensis
~	Fagus gra	andifolia		Tilia ameri	cana		Ligustrum ol	btusifolium			
1	Fraxinus	americana		Tsuga can	adensis		Ligustrum :	sinense			
	Liriodendro	on tulipifera	~	Ulmus ame	ericana						
		acuminata									
		4	Species in	Group 1				1	Species in	Group 2	

	e Variables The four sub								one within	25 feet from	n each
10	V _{DETRITUS}				t cover of the				<4" diamete	er and <36"	71.88 %
			Left	Side			Righ	t Side] '	
		80	90	95	60	60	70	90	30		
11	V _{HERB}	Average pe	rcentage co	over of herba	aceous vege	etation (mea	asure only if	tree cover is	s <20%). De	o not	
			percentages		h and 36" ta 1 200% are a						Not Used
		·		Side			Righ	t Side	-] '	
Sample	e Variable 1	2 within the	entire cat	chment of t	he stream						
12	V _{WLUSE}				e for watersh	ed.					
	* WLUSE	Troightea /	tronage of th								1.00
			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	100	100
								•			
								•			
								•			
								•			
	-							•			
								-			
	6	EPH					No	tes:			
Va	ariable	Value	VSI								
Vc	CANOPY	85 %	0.95								
V _{EI}	MBED	3.0	0.83								
V _{SI}	UBSTRATE	6.63 in	0.96								
VB	ERO	145 %	0.30								
VL	WD	7.0	0.88								
V _{TI}	DBH	10.2	1.00								
Vsi	NAG	1.0	1.00								
Vs	SD	Not Used	Not Used								
Vs	RICH	2.70	1.00								
	ETRITUS	71.9 %	0.88								
V _H	ERB	Not Used	Not Used								
Vw	LUSE	1	1.00								

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: AEP Mitchell Landfill Project Location: Cresap, Marshall County, WV Sampling Date: 8/13/2011

Project Site

Before Project

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 6

1 0

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.92
Biogeochemical Cycling	0.90
Habitat	0.87

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	89.50	1.00
V _{EMBED}	Average embeddedness of channel.	4.20	0.90
V _{SUBSTRATE}	Median stream channel substrate particle size.	5.65	1.00
V _{BERO}	Total percent of eroded stream channel bank.	50.00	0.81
V _{LWD}	Number of down woody stems per 100 feet of stream.	7.00	0.88
V _{TDBH}	Average dbh of trees.	8.08	0.88
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.	4.00	1.00
VDETRITUS	Average percent cover of leaves, sticks, etc.	51.88	0.63
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

	High-G	Gradient	Headwat			stern Ke et and C	-	and west or	tern Wes	t Virginia	a
	Team:	D. Godec,	G. Gerke						M Northing:	39°49'22.02	2"N
Pro	oject Name:			roject				Longitude/U ⁻	-		
	-		arshall Coun	•					npling Date:		
SA	AR Number:	6		Length (ft):	100	Stream Ty	vpe: Int	ermittent Strea			-
	Top Strata:	Tre	e/Sapling St	rata	(determined	d from perce	ent calcula	ted in V _{CCANO}	_{PY})		
Site	and Timing:	Project Site	1			•	Before Pro	oject			•
Sample	e Variables										
1	V _{CCANOPY}	equidistant		g the stream	. Measure	only if tree/s	apling cov	easure at no f /er is at least : a choice.)			89.5 %
	List the per	cent cover r	neasuremer	nts at each p	point below:	-					
	100	90	90	80	100	100	90	80	75	90	
2	V _{EMBED}							er than 30 roug			4.2
								iment, and en			
								of fine sedim			
		of 1. If the	bed is comp	osed of bed	lrock, use a	rating score	e of 5.				_
		Embedded Minshall 19		or gravel, co	obble and b	oulder partic	les (resca	lled from Platt	s, Megahan	, and	
		Rating	Rating Des								
		5						fine sediment)	
		4						d by fine sedir ed by fine sed			
		2						ed by fine sed			
		1						y fine sedimer		I surface)	
	List the rati	ngs at each	point below	:							
	5	4	4	5	5	3					
	5	4	5	4	4	4					
	4	4	4	5	4	4					
	4	3	4	5	4	4					
	4	4	4	4	4	5					
3		along the s	tream; use t	he same po	ints and par	ticles as use	ed in V _{EMB}				5.65 in
	or concrete	as 0.0 in, s	and or finer	particles as		-	/ (bedrock	should be co	unted as 99	in, asphalt	
	99.00	8.40	6.20	2.20	3.10	1.20					
	99.00	9.50	6.00	5.50	5.90	2.40					
	3.40	1.00	4.10	8.30	12.20	0.50					
	1.50	1.50	3.00	10.00	10.90	1.50					
	5.80	8.20	1.10	3.20	8.90	<u>99.00</u>	tal as 1		a da al la sub		
4	V _{BERO}	•	e total perce					er of feet of ero oded, total ero			50 %
			Left Bank:	25	5 ft		Right Ban	k: 25	5 ft		

Sampl	e Variable	s 5-9 within th	ne entire ri	parian/buff	ier zone adj	acent to th	e stream ch	annel (25 f	eet from ea	ich bank).	
5	V_{LWD}	Number of d stream reac per 100 feet	h. Enter th	e number fi	rom the entir						7.0
			or stream			f downed w	oody stems:		7		
6	V_{TDBH}	Average dbh			ly if V _{CCANOP}	_Y tree/saplir). Trees are	e at least 4	8.1
		inches (10 c	,								0.1
		List the dbh		ents of indi	vidual trees	(at least 4 ir	n) within the	buffer on ea	ach side of		
		the stream b	Left Side					Right Side			1
	7	4	10	4	15	6	7	4	6	4	
	13	12	14	9	12	9	11	5	12	6	
	10	6				5	5	9	5		
7	V _{SNAG}	Number of s	nags (at le	ast 4" dbh a	and 36" tall)	per 100 fee	t of stream.	Enter numb	per of snags	on each	
	UNAG	side of the s							5		0.0
			Left Side:		0		Right Side:		0		
8	V _{SSD}	Number of s				up to 4 inch				asure onlv	
	330	if tree cover	is <20%).	Enter numb	per of sapling						Not Used
		per 100 ft of	stream wil Left Side:	l be calcula	ted.		Discht Oider				
9	V _{SRICH}	Riparian veg		ecies richne	ess per 100 f	eet of strea	Right Side:		cies present	t from	
Ĵ	• 3hich	Group 1 in th	he tallest s	tratum. Che	eck all exotic	and invasi	ve species p	resent in al			4.00
		richness per		ind the subi	ndex will be	calculated f	from these d				
_		-	0 1 = 1.0						2 (-1.0)		
	Acer rubr			Magnolia t	-		Ailanthus a			Lonicera ja	
\checkmark	Acer sace	charum		Nyssa sylv	ratica		Albizia julib			Lonicera ta	itarica
	Aesculus			Oxydendrur	n arboreum	~	Alliaria peti	olata		Lotus corni	iculatus
	Asimina t	riloba		Prunus sei	rotina		Alternanthe			Lythrum sa	licaria
	Betula alle	eghaniensis		Quercus a	lba		philoxeroid	es		Microstegiur	n vimineum
	Betula lei	nta		Quercus c	occinea		Aster tatari	cus		Paulownia	tomentosa
	Carya alb	ba		Quercus in	nbricaria		Cerastium	fontanum		Polygonum d	cuspidatum
	Carya gla	abra	\checkmark	Quercus p	rinus		Coronilla va	aria		Pueraria m	ontana
	Carya ov	alis		Quercus ru	ıbra		Elaeagnus u	mbellata		Rosa multi	flora
1	Carya ov	ata		Quercus v	elutina		Lespedeza	bicolor		Sorghum h	alepense
	Cornus fl	orida		Sassafras	albidum		Lespedeza	cuneata		Verbena br	rasiliensis
<i>✓</i>	Fagus gra		~	Tilia ameri			Ligustrum ol				
~		americana		Tsuga can		~	Ligustrum s				
		on tulipifera		Ulmus am			0	-			
		acuminata									
	Magnolla	asanniata									
		7 9	Species in	Group 1				2	Species in	Group 2	

	e Variables The four sub								one within	25 feet fror	n each
10		Average pe	rcent cover	of leaves, s	ticks, or othe t cover of the	er organic n	naterial. Wo	ody debris	<4" diamete	er and <36"	51.88 %
			Left	Side			Righ	t Side]	
		75	80	75	100	20	15	20	20		
11	V _{HERB}	80 Average pe	70 ercentage co	80 over of herba	90 aceous vege	30 etation (mea	30 asure only if	25 tree cover is	20 s <20%). Do	o not	
		include woo	ody stems a percentages	t least 4" db	h and 36" ta 1 200% are a	II. Because	there may b	be several la	ivers of grou	und cover	Not Used
			Left	Side			Righ	t Side			
Sample	e Variable 1	2 within the	entire cat	chment of t	he stream						
12	V _{WLUSE}				e for watersh	ed:					1.00
										1	
			Land	Use (Choos	e From Dro	p List)			Runoff Score	% in Catch ment	Running Percent (not >100)
	Forest and n	ative range (>	>75% ground	cover)				•	1	100	100
								•			
								•			
								-			
								•			
								-			
								•			
								•			
	Summary:	SAA Numbe	er 6				No	tes:			
V	ariable	Value	VSI								
Vc	CANOPY	90 %	1.00								
VE	MBED	4.2	0.90								
Vs	UBSTRATE	5.65 in	1.00								
VB	ERO	50 %	0.81								
VL	WD	7.0	0.88								
VT	DBH	8.1	0.88								
	NAG	0.0	0.10								
Vs		Not Used	Not Used								
	RICH	4.00	1.00								
	ETRITUS	51.9 %	0.63								
	ERB	Not Used	Not Used								
Vw	LUSE	1	1.00								

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: AEP Mitchell Landfill Project Location: Stream 7. Cresap, Marshall Co., WV Sampling Date: 28 Sept 2011

Project Site B

Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 7

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.94
Biogeochemical Cycling	0.84
Habitat	0.72

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	41.50	0.38
V _{EMBED}	Average embeddedness of channel.	2.80	0.75
V _{SUBSTRATE}	Median stream channel substrate particle size.	6.98	0.94
V _{BERO}	Total percent of eroded stream channel bank.	10.00	1.00
V _{LWD}	Number of down woody stems per 100 feet of stream.	17.00	1.00
V _{TDBH}	Average dbh of trees.	9.45	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	2.00	1.00
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	3.60	1.00
VDETRITUS	Average percent cover of leaves, sticks, etc.	56.88	0.69
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

Version 1-25-11	Version 1-	25-11	
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	High-G	Gradient	Headwat		ms in ea Data She		-		tern Wes	st Virgini	а
	Team:	Dawn York	and Mary G	ilmore				Latitude/UT	M Northing:	39 49 26.32	2.8871N
Pr	oject Name:									80 46 33.35	
	-		Cresap, Mar	-	/V			•	•	28 Sept 20	
S	AR Number:			Length (ft):		Stream Ty	vpe: Ephe	emeral Strean		I	•
	Top Strata:	Tre	e/Sapling St	rata	(determined	d from perce	ent calculate	ed in V _{CCANO}	_{PY})		
Site	and Timing:	Project Site	1			•	Before Proje	ect			•
Sampl	e Variables	1-4 in strea	m channel								
1	V _{CCANOPY}	equidistant	ercent cover points alonç at least one	g the stream	. Measure	only if tree/s	apling cove	r is at least			41.5 %
	List the per	cent cover r	neasuremer	nts at each p	point below:						_
	5	0	0	5	5	50	80	90	90	90	
2	V _{EMBED}	along the s	nbeddednes tream. Sele	ct a particle	from the be	d. Before n	noving it, de	termine the	percentage	of the	2.8
			d area surro ving table. I								
		of 1. If the	bed is comp	osed of bec	drock, use a	rating score	e of 5.				1
		Embedded Minshall 19	ness rating f 183)	or gravel, co	obble and b	oulder partic	les (rescale	ed from Plati	s, Megahan	, and	
		Rating	Rating Des								
		5			overed, sur		-			K)	
		4 3			ice covered, face covered						
		2			face covered						
		1			covered, su					al surface)	
	List the rati	ngs at each	point below	:					·	·	
	3	1	5	2	3	3					
	5	5	4	2	3	2					
	1	1	3	2	4	2					
	3	1	2	2	3	3					
	4	4	3	3	2	3					
3	V _{SUBSTRATE}		eam channe tream; use t						hly equidist	ant points	6.98 in
			ches to the i and or finer			point below	/ (bedrock s	hould be co	unted as 99	in, asphalt	
	9.75	0.80	10.50	1.00	7.20	2.40					
	5.00	3.50	27.50	16.00	7.80	7.50					
	99.00	0.50	7.50	8.00	1.10	1.20					
	6.75	1.00	8.00	1.75	8.50	99.00					
	2.70	11.00	12.50	5.00	6.00	5.75					
4	V _{BERO}	Total perce	nt of erodec e total perce	stream cha	annel bank.	Enter the to					10 %
		,,,	Left Bank:	0	ft		Right Bank:	1() ft		

Sample Variables 5-9 within the entire riparian/buffer zone adjacent to the stream channel (25 feet from each bank).												
5	V _{LWD}	Number of down woody stems (at least 4 inches in diameter and 36 inches in length) per 100 feet of stream reach. Enter the number from the entire 50'-wide buffer and within the channel, and the amount per 100 feet of stream will be calculated.									17.0	
	Number of downed woody stems: 17											
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.									9.5	
		List the dbh	the dbh measurements of individual trees (at least 4 in) within the buffer on each side of									
	-	the stream b					1					
		Left Side					Right Side					
	7	9.5	11	4	12	13.5 7	15	5	15	5		
						/						
		Niumala au a f		+ 411 - II- I				Eastern market				
7	V _{SNAG}	side of the s					t of stream. Iculated.	Enter num	per of snags	on each	2.0	
			Left Side:		1		Right Side:		1			
8	V _{SSD} Number of saplings and shrubs (woody stems up to 4 inches dbh) per 100 feet of stream (measure or if tree cover is <20%). Enter number of saplings and shrubs on each side of the stream, and the amount of saplings and shrubs on each side of the stream.											
		per 100 ft of				gs and shru	bs on each s	side of the s	stream, and	the amount	Not Used	
		p	Left Side:		77		Right Side:	9	97			
9	V _{SRICH}						0.00					
		Group 1 in the tallest stratum. Check all exotic and invasive species present in all strata. Species richness per 100 feet and the subindex will be calculated from these data.						ecies	3.60			
	Group 1 = 1.0											
	Acer rubr	Acer rubrum		Magnolia tripetala			Ailanthus a	ltissima		Lonicera ja	icera japonica	
~	Acer sace	Acer saccharum		Nyssa sylvatica			Albizia julibrissin			Lonicera tatarica		
	Aesculus	Aesculus flava		Oxydendrum arboreum			Alliaria peti	iolata		Lotus corniculatus		
	Asimina ti			Prunus serotina			Alternanthera			Lythrum salicaria		
		Betula alleghaniensis		Quercus alba		philoxeroides				Microstegium vimineum		
		Betula lenta		Quercus coccinea		Aster tataricus				Paulownia tomentosa		
		Carya alba		Quercus imbricaria			Cerastium fontanum			Polygonum cuspidatum		
	Carya glabra			Quercus prinus		Coronilla varia				Pueraria montana		
	Carya ovalis			Quercus rubra		Elaeagnus umbellata				Rosa multiflora		
1	Carya ovata			Quercus velutina			Lespedeza bicolor			Sorghum halepense		
	Cornus flo	Cornus florida		Sassafras albidum		Lespedeza cuneata			Verbena bi	rasiliensis		
	Fagus gra	Fagus grandifolia		Tilia americana			Ligustrum ol	btusifolium				
1	Fraxinus a	Fraxinus americana		Tsuga can	adensis	Ligustrum sinense						
~	Liriodendro	Liriodendron tulipifera		Ulmus americana								
		acuminata										
5 Species in Group 1								1	Species in	Group 2		

Sample Variables 10-11 within at least 8 subplots (40" x 40", or 1m x 1m) in the riparian/buffer zone within 25 feet from each bank. The four subplots should be placed roughly equidistantly along each side of the stream.											
10										56.88 %	
	Left Side			Side	Right Side] '		
		60	90	25	60	80	100	20	20		
11	V _{HERB}	Average pe	ercentage co	over of herba	aceous vege	etation (mea	sure only if	tree cover is	s <20%). D	o <i>not</i>	
	include woody stems at least 4" dbh and 36" tall. Because there may be several layers of gr vegetation percentages up through 200% are accepted. Enter the percent cover of ground each subplot.										Not Used
	Left Side Right Side] '			
Sample	e Variable 1	2 within the	entire cat	chment of t	he stream.						
Sample Variable 12 within the entire catchment of the stream. 12 V _{wLUSE} Weighted Average of Runoff Score for watershed: 1											1.00
											Running
	Land Use (Choose From Drop List)							Runoff Score	% in Catch ment	Percent (not >100)	
	Forest and native range (>75% ground cover) Image: Contract of the second sec							•	1	100	100
						•					
	▼										
Summary: SAA Number 7			er 7	Notes: Approx 70% of the stream reach was covered with downed trees.							
Variable		Value	VSI	Approx 70	% of the s	tream reac	h was cove	ered with d	owned tree	es.	
V _{CCANOPY}		42 %	0.38								
V _{EMBED}		2.8	0.75								
V _{SUBSTRATE}		6.98 in	0.94								
V _{BERO}		10 %	1.00								
V _{LWD}		17.0	1.00								
V _{TDBH}		9.5	1.00								
V _{SNAG}		2.0	1.00								
V _{SSD}		Not Used	Not Used								
V _{SRICH}		3.60	1.00								
VD	ETRITUS	56.9 %	0.69								
V _H	ERB	Not Used	Not Used								
V _{WLUSE}		1	1.00								

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: AEP Mitchell Landfill

Location: Stream 8 Lower Sample Reach, Cresap, Marshall Co, WV

Sampling Date: 8/14/2011

Functional Results Summary:

Project Site Bef

Before Project

8

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

Enter Results in Section A of the Mitigation Sufficiency Calculator

SAR number:

Function	Functional Capacity Index
Hydrology	0.91
Biogeochemical Cycling	0.75
Habitat	0.79

Variable	Name	Average Measure	Subindex
VCCANOPY	Percent canpoy over channel.	82.50	0.93
V _{EMBED}	Average embeddedness of channel.	4.70	0.65
V _{SUBSTRATE}	Median stream channel substrate particle size.	2.50	1.00
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.	20.00	1.00
V _{TDBH}	Average dbh of trees.	12.00	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	2.00	1.00
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	6.00	1.00
VDETRITUS	Average percent cover of leaves, sticks, etc.	13.13	0.16
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

										Vers	ion 1-25-11
	High-G	Gradient	Headwat	er Strea	ms in ea	stern Ke	entucky a	and wes	tern Wes	st Virgini	a
				Field [Data She	et and C	alculato	r			
	Team:	D. Godec,	G. Gerke					Latitude/UT	M Northing:	39°49'36.74	4"N
Pro	oject Name:	AEP Mitche	ell Landfill				L	.ongitude/U ⁻	TM Easting:	80°46'0.51'	'W
	Location:	Stream 8 L	ower Sampl	e Reach, Cr	esap,Marsh	nall Co,WV		San	npling Date:	8/14/2011	
SA	AR Number:	8	Reach	Length (ft):	100	Stream Ty	/pe: Inter	mittent Strea	m		•
	Top Strata:	Tre	e/Sapling St	rata	(determine	d from perce	ent calculate	d in V _{CCANO}	_{PY})		
Site	and Timing:	Project Site				•	Before Proje	ct			•
Sample	e Variables	1-4 in strea	m channel			_	-				
1	V _{CCANOPY}	equidistant	points along	g the stream	. Measure	nd sapling ca only if tree/s 9 to trigger	apling cove	r is at least			82.5 %
	List the per	cent cover r	neasuremer	nts at each p	oint below:					I	
	80	90	70	90	80	80	90	75	90	80	
2	V _{EMBED}					I. Measure ed. Before n					4.7
		surface and	d area surro	unding the p	article that i	is covered b	y fine sedim	ent, and en	ter the ratin	g according	
						surface, or o rating score		f fine sedim	ents, use a	rating score	
				or gravel, co	obble and b	oulder partic	cles (rescale	d from Plat	s, Megahar	n, and	
		Minshall 19 Rating	Rating Des	orintion							
		5			overed, sur	rounded, or	buried by fir	ne sediment	(or bedrocl	<)	
		4				surrounded					
		3				d, surrounde					
		2				d, surrounde	,	,			
	List the rati	1			covered, su	irrounded, o	r buried by f	ine sedimei	nt (or artifici	al surface)	
		ngs at each			4	<i>_</i>					1
	5	5	5	4	4	5					
	5 4	5 4	5 5	5 5	5 4	5 5					
	4	4	5	5 5	4 5	5					
		5	4	5	5	4					
3	-	Median stre					t no fewer t	nan 30 rouo	hlv equidist	ant points	
Ũ	SUBSTRATE					ticles as use			iny oquiaiot	an pointo	2.50 in
	Enter porti	-							unted as OC) in conholt	
		cle size in in as 0.0 in, s				i point below	(Dedrock s	noula be co	unied as 99	n, asphalt	
	18.10	1.30	6.20	1.10	10.10	0.50					1
	5.30	24.90	8.30	36.30	1.30	1.20					
	0.90	1.80	1.20	30.10	1.80	9.30					
	0.90	0.50	0.90	6.10	4.90	6.10					
	1.30	0.50	3.20	8.30	4.90 5.30	0.90					
4	V _{BERO}	•				Enter the to					
			•	entage will b	e calculated	If both bar	nks are eroo	ded, total er	osion for the	e stream	20 %
		may be up									
			Left Bank:	5	ft		Right Bank:	1:	5 ft		

Sampl	e Variable	s 5-9 within th	ne entire ri	parian/buff	er zone adj	acent to th	e stream ch	annel (25 f	feet from ea	ich bank).	
5	V _{LWD}	Number of c stream reac per 100 feet	h. Enter th	e number fr	om the entir						20.0
		I			Number of	f downed w	oody stems:		20		
6	V _{TDBH}	Average dbł inches (10 c					ng cover is a	t least 20%). Trees are	e at least 4	12.0
		List the dbh	measurem	ents of indiv	vidual trees	(at least 4 ii	n) within the	buffer on ea	ach side of		
		the stream b									-
			Left Side	1	-			Right Side		1	
	5	20	26	10	30	9	6	6	15	12	
	6					5	6				
7	V	Number of s	naga (at la	oot 4" dbb c	and 26" toll)	por 100 foo	t of stream	Entor numb	oor of opega	an aaah	
7	V _{SNAG}	side of the s							ber of snags	on each	2.0
			Left Side:		0		Right Side:		2		
8	V_{SSD}	Number of s									Not Used
			if tree cover is <20%). Enter number of saplings and shrubs on each side of the stream, and the amount per 100 ft of stream will be calculated.						Not Used		
			Left Side:				Right Side:				
9	V_{SRICH}	Riparian veç Group 1 in ti									0.00
		richness per							i sirala. Ope	50165	6.00
		Group	o 1 = 1.0			Group 2 (-1.0)					
	Acer rubr	um		Magnolia ti	ripetala		Ailanthus a	ltissima		Lonicera ja	ponica
1	Acer sace	charum		Nyssa sylv	atica		Albizia julik	orissin		Lonicera ta	ntarica
	Aesculus	flava		Oxydendrun	n arboreum		Alliaria peti	iolata		Lotus corni	iculatus
	Asimina t	riloba		Prunus sei	rotina		Alternanthe			Lythrum sa	licaria
		eghaniensis		Quercus a			philoxeroia			Microstegiur	
	Betula lei	nta		Quercus co	occinea		Aster tatari	icus		Paulownia	tomentosa
	Carya alb)a		Quercus in	nbricaria		Cerastium	fontanum		Polygonum	cuspidatum
	Carya gla	abra		Quercus p	rinus		Coronilla v	aria		Pueraria m	ontana
	Carya ov	alis		Quercus ru	ıbra		Elaeagnus u	ımbellata		Rosa multi	flora
	Carya ov	ata		Quercus ve	elutina		Lespedeza	bicolor		Sorghum h	alepense
	Cornus fl	orida		Sassafras	albidum		Lespedeza	cuneata		Verbena bi	rasiliensis
1	Fagus gra	andifolia	1	Tilia ameri	cana		Ligustrum ol	btusifolium			
	Fraxinus	americana		Tsuga can	adensis		Ligustrum	sinense			
~	Liriodendro	on tulipifera		Ulmus ame	ericana						
		acuminata									
	÷										
		6	Species in	Group 1				0	Species in	Group 2	

	e Variables The four sul								one within	25 feet from	n each
10	V _{DETRITUS}				ticks, or oth t cover of th				<4" diamete	er and <36"	13.13 %
			Left	Side	-		Righ	t Side] '	
		5	20	10	10	15	25	10	10		
11	V _{HERB}	15 Average pe	10 rcentage co	5 over of herba	15 aceous vege	20 etation (mea	5 sure only if	15 tree cover is	20 s <20%). D	o <i>not</i>	
	- TILITO	include woo	ody stems a percentages	t least 4" db	h and 36" ta 1 200% are a	II. Because	there may b	be several la	yers of grou	und cover	Not Used
		•	Left	Side			Righ	t Side] '	
										-	
	e Variable 1										
12	V _{wluse}	Weighted A	verage of F	Runoff Score	e for watersh	ed:					1.00
			Land	Use (Choos	e From Dro	p List)			Runoff Score	% in Catch- ment	Running Percent (not >100)
	Forest and n	ative range (>	>75% ground	cover)				•	1	100	100
	•										
	•							-			
								-	-		
								•	-		
								•			
								•			
								•			
	Summary:	SAA Numbe	er 8				No	tes:			
V	ariable	Value	VSI								
Vc	CANOPY	83 %	0.93								
VE	MBED	4.7	0.65								
Vs	UBSTRATE	2.50 in	1.00								
VB	ERO	20 %	0.97								
VL	WD	20.0	1.00								
	рвн	12.0	1.00								
	NAG	2.0	1.00								
Vs		Not Used	Not Used								
	RICH	6.00	1.00								
	ETRITUS	13.1 %	0.16								
	ERB	Not Used	Not Used								
	LUSE	1	1.00								

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: AEP Mitchell Landfill Project

Location: Stream 8 Upper Sample Reach, Cresap, Marshall Co, WV

Sampling Date: 8/14/2011

Project Site Be

Before Project

8

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number:

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.97
Biogeochemical Cycling	0.94
Habitat	0.96

Variable	Name	Average Measure	Subindex
VCCANOPY	Percent canpoy over channel.	86.50	0.98
V _{EMBED}	Average embeddedness of channel.	4.20	0.90
V _{SUBSTRATE}	Median stream channel substrate particle size.	3.65	1.00
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.	13.00	1.00
V _{TDBH}	Average dbh of trees.	9.50	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	2.00	1.00
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	6.00	1.00
VDETRITUS	Average percent cover of leaves, sticks, etc.	77.19	0.94
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

Version 1-25										ion 1-25-11	
	High-C	aradient	Headwat	er Strea	ms in ea	stern Ke	entucky a	and wes	tern Wes	st Virginia	a
				Field [Data She	et and C	alculato	r			
	Team:	D. Godec, (G. Gerke					Latitude/UT	M Northing:	39°49'47.75	5"N
Pr	oject Name:	AEP Mitche	ell Landfill Pi	roject			L	.ongitude/U ⁻	TM Easting:	80°46'12.75	5"W
	Location:	Stream 8 U	pper Sampl	e Reach, Cr	esap,Marsh	nall Co,WV		San	npling Date:	8/14/2011	
S/	AR Number:	8	Reach	Length (ft):	100	Stream Ty	/pe: Inter	mittent Strea	m		•
	Top Strata:	Tre	e/Sapling St	rata	(determine	d from perce	ent calculate	d in V _{CCANO}	PY)		
Site	and Timing:	Project Site				•	Before Proje	ct			•
Sample	e Variables	1-4 in strea	m channel								
1	V _{CCANOPY}	equidistant	points along	g the stream	. Measure	only if tree/s	anopy. Mea apling cove Top Strata c	r is at least			86.5 %
	List the per	cent cover r	neasuremer	nts at each p	oint below:						
	80	90	90	80	100	80	80	75	100	90	
2	V _{EMBED}						at no fewer noving it, de				4.2
		surface and	area surro	unding the p	article that i	is covered b	y fine sedim	ent, and en	ter the ratin	g according	
to the following table. If the bed is an artificial surface, or composed of fine sediments, use a rating score of 1. If the bed is composed of bedrock, use a rating score of 5.											
	Embeddedness rating for gravel, cobble and boulder particles (rescaled from Platts, Megahan, and										
		Minshall 19	•	orintion							
		Rating 5	<pre>Rating Des <5 percent</pre>		overed, sur	rounded, or	buried by fir	ne sediment	(or bedrock	()	
		4					l, or buried b			/	
		3					ed, or buried				
		2				,	ed, or buried	2			
	List the reti	1 ngs at each			covered, su	irrounded, o	r buried by f	ine sedimer	nt (or artificia	al surface)	
		1	5	4	5	5					
	4	4	5 4	3	4	5					
	4	4	4	3 4	4	4					
	5	4	5	4	4	4					
	4	4	5	4	4	4					
3		Median stre					t no fewer t	han 30 roug	hlv equidista	ant points	
Ŭ	· SUBSTRATE						ed in V _{EMBED}		ing oquidion	ant pointo	3.65 in
	Entor partic	cle size in in	abor to the	Dooroct 0 1 i	inch at aach	noint holow	/hodrock.c	hauld ha aa	unted as 00	in acphalt	
		e as 0.0 in, s					I (DEUIOCK S		unieu as 99	in, asphait	
	21.50	0.50	1.30	0.50	12.30	1.20					
	10.40	4.20	3.40	0.90	18.10	3.40					
	8.20	3.10	0.80	1.50	5.30	3.90					
	0.90	4.40	7.10	8.40	1.50	40.10					
	1.50	1.20	4.30	6.20	0.60	6.30					
4	V _{BERO}	•					tal number				
			•	entage will b	e calculated	I If both bar	nks are eroo	ded, total er	osion for the	e stream	40 %
		may be up									
			Left Bank:	20) ft		Right Bank:	20) ft		

Sampl	e Variable	s 5-9 within th	ne entire ri	parian/buff	er zone adj	acent to th	e stream ch	nannel (25	feet from ea	ach bank).	
5	V _{LWD}	Number of c stream reac per 100 feet	h. Enter th	e number fr	om the entir						13.0
		po: 100 1001				f downed w	oody stems:		13		
6	V _{TDBH}	Average dbł inches (10 c					ng cover is a	t least 20%	b). Trees are	e at least 4	9.5
		List the dbh	measurem	ents of indiv	vidual trees	(at least 4 i	n) within the	buffer on e	ach side of		
		the stream b	pelow:				•				-
			Left Side		-			Right Side	9		
	6	14	15	7	7	13	4	9	4	6	
	6	7	11	8		12	9	25	8		
7	V _{SNAG}	Number of s side of the s						Enter num	ber of snags	on each	2.0
			Left Side:		1		Right Side:		1		
8	V_{SSD}	Number of s					nes dbh) per	100 feet of			
		if tree cover is <20%). Enter number of saplings and shrubs on each side of the stream, and the amount per 100 ft of stream will be calculated.							Not Used		
			Left Side: Right Side:								
9	V _{SRICH}	Riparian veç					m reach. C	heck all spe			
		Group 1 in the richness per							ll strata. Sp	ecies	6.00
		-	5 1 = 1.0			Calculated	nom mese o		0 2 (-1.0)		
	Acer rubr		<u>- 1.0</u>	Magnolia ti	ripetala		Ailanthus a		, 2 (1.0)	Lonicera ja	nonica
~	Acer sace			Nyssa sylv	-		Albizia julik			Lonicera ta	-
	Aesculus			Oxydendrun			Alliaria pet			Lotus corn	
	Asimina t			-						Lythrum sa	
				Prunus sei			Alternanthe philoxeroid			-	
		eghaniensis		Quercus a						Microstegiur	
	Betula lei			Quercus co			Aster tatan			Paulownia	
	Carya alb			Quercus in			Cerastium			Polygonum	
	Carya gla	abra		Quercus p	rinus		Coronilla v	aria		Pueraria m	ontana
	Carya ov	alis		Quercus ru	ıbra		Elaeagnus ι	ımbellata		Rosa multi	flora
	Carya ov	ata		Quercus ve	elutina		Lespedeza	a bicolor		Sorghum h	alepense
	Cornus fl	orida		Sassafras	albidum		Lespedeza	n cuneata		Verbena bi	rasiliensis
1	Fagus gra	andifolia	~	Tilia ameri	cana		Ligustrum o	btusifolium			
	Fraxinus	americana		Tsuga can	adensis		Ligustrum	sinense			
~	Liriodendro	on tulipifera		Ulmus ame	ericana						
	Magnolia	acuminata									
			<u> </u>	. .					_	_	
		6	Species in	Group 1				0	Species in	Group 2	

Sample Variables 10-11 within at least 8 subplots (40" x 40", or 1m x 1m) in the riparian/buffer zone within 25 feet from each bank. The four subplots should be placed roughly equidistantly along each side of the stream.											n each
10	V _{DETRITUS}						naterial. Wo /er at each s		<4" diamete	er and <36"	77.19 %
			Left	Side	_		Righ	t Side	-] '	
		80	100	90	100	60	80	75	50		
11	V _{HERB}	90 Average pe	100 rcentage cc	90 over of herba	90 aceous vege	70 etation (mea	60 sure only if	60 tree cover is	40 s <20%). Do	o not	
		include woo	ody stems a percentages	t least 4" db	h and 36" ta	II. Because	there may t Enter the per	be several la	yers of grou	und cover	Not Used
			Left	Side			Righ	t Side	1		
Sample	e Variable 1	2 within the	entire cat	chment of t	he stream						
12	V _{WLUSE}				e for watersh	ed.					
12	* WLUSE	Weighted A	werage of f			eu.					1.00
			Land	Use (Choos	e From Dro	p List)			Runoff Score	% in Catch- ment	Running Percent (not >100)
	Forest and native range (>75% ground cover)									100	100
	-										
								•			
								-			
								•			
								•			
								•			
								•			
	Summary:	SAA Numbe	er 8				No	tes:			
Va	ariable	Value	VSI								
Vc	CANOPY	87 %	0.98								
V _{EI}	MBED	4.2	0.90								
Vs	UBSTRATE	3.65 in	1.00								
VB	ERO	40 %	0.86								
VL	WD	13.0	1.00								
	DBH	9.5	1.00								
	NAG	2.0	1.00								
Vs		Not Used	Not Used								
	RICH	6.00	1.00								
	ETRITUS	77.2 %	0.94								
	ERB	Not Used	Not Used								
	LUSE	1	1.00								

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

Project Name: AEP Mitchell Landfill Project Location: Cresap, Marshall County, WV Sampling Date: 8/13/2011

Project Site

Before Project

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR:

Functional Results Summary:

Tree/Sapling Strata

8A SAR number:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.65
Biogeochemical Cycling	0.58
Habitat	0.62

Variable	Name	Average Measure	Subindex
VCCANOPY	Percent canpoy over channel.	66.50	0.72
V _{EMBED}	Average embeddedness of channel.	4.93	0.53
V _{SUBSTRATE}	Median stream channel substrate particle size.	13.25	0.53
V _{BERO}	Total percent of eroded stream channel bank.	10.00	1.00
V _{LWD}	Number of down woody stems per 100 feet of stream.	12.00	1.00
V _{TDBH}	Average dbh of trees.	10.50	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.	3.60	1.00
VDETRITUS	Average percent cover of leaves, sticks, etc.	17.81	0.22
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	0.50	0.53

	High-G	iradient	Headwat		ms in ea Data She			-		ern Wes	t Virgini	а
	Team:	D. Godec, 0	G. Gerke						Latitude/UTI	M Northing:	39°49'53.42	2"N
Pro	ject Name:	AEP Mitche	ell Landfill Pr	roject			•		.ongitude/U1	-		
	-		arshall Coun	-			•		-	pling Date:		
SA	R Number:	8A		Length (ft):	100	Stream Ty	vpe:	Inter	mittent Stream			-
	Top Strata:	Tre	e/Sapling St	rata	(determined	d from perce	ent calc	culate	d in V _{CCANOF}	_{YY})		
Site a	and Timing:	Project Site					Before	Proje	ct			•
-		1-4 in strea										
1	V _{CCANOPY}	equidistant	ercent cover points along at least one	g the stream	. Measure	only if tree/s	apling	cove	r is at least 2			66.5 %
_	List the per	cent cover r	neasuremer	nts at each p	oint below:							_
	25	25	50	100	25	90	90	C	90	90	80	
2	V _{EMBED}		nbeddednes tream. Sele									4.9
			d area surroi									
		to the follow	ving table. I bed is comp	f the bed is	an artificial s	surface, or c	compos			-		
			ness rating f			÷		scale	d from Platt	s. Megahan	and	1
		Minshall 19		or gratol, o				eeu.e		, moganan	,	
		Rating	Rating Des	cription								
		5		-	overed, surr	ounded, or	buried	by fir	ne sediment	(or bedrock)	
		4							by fine sedin			
		3							by fine sedi			
		2							by fine sedi			
	List the roti	1			covered, su	rrounded, o	r burie	a by f	ine sedimen	t (or artificia	al surface)	
			point below		F	E						
	5	5	5	5	5	5						
	5	5	5	5	4	5						
	5	5	5	5	5	5						
	5	5	5	5	5	4						
3	5	5 Modian stre	5 eam channe	5 cubetrato r	5	5 Moasuro a	t no fo	wor t	aan 20 roug	alv oquidiete	ant points	
3	♥ SUBSTRATE		tream; use t								ani points	13.25 in
			ches to the r and or finer			point below	/ (bear	OCK S	nould be col	unted as 99	in, asphalt	
				-		14 50						
	12.10	10.10	99.00	99.00	99.00	14.50						
	4.20	1.50	99.00	99.00	12.20	8.20						
	99.00	0.50	99.00	99.00	14.30	9.10						
	5.60	1.10	99.00	99.00	4.10	4.30						
	5.60	99.00	99.00	99.00	1.20	5.20	tol	nhar	of foot of a	dod berek -	n aaab	
4	V _{BERO}	i utai perce	nt of eroded									

V _{BERO}	side and the total percert of eroded side and the total percer may be up to 200%.				10 %
	Left Bank:	5 ft	Right Bank:	5 ft	

Sampl	e Variable	s 5-9 within th	ne entire ri	iparian/buffe	er zone adj	acent to th	e stream ch	nannel (25 t	feet from ea	ach bank).	
5	V _{LWD}		h. Enter th	ly stems (at le ne number fro will be calcu	om the entir						12.0
							oody stems:		12		
6	V_{TDBH}			measure only leter. Enter t			ng cover is a	t least 20%). Trees are	e at least 4	10.5
		List the dbh	measurem	nents of indiv	idual trees	(at least 4 i	n) within the	buffer on e	ach side of		
		the stream b									
			Left Side					Right Side	9		
	10	12	14			12	10	5			
7	V _{SNAG}	Number of s	mans (at le	east 4" dbh a	nd 36" tall)	per 100 fee	t of stream	Enter num	per of snags	on each	
,	* SNAG			the amount					of of onlage		0.0
			Left Side:	()		Right Side:		0		
8	V_{SSD}			d shrubs (wo							NetHerd
				Enter numb Il be calculat		gs and shru	los on each s	side of the s	stream, and	the amount	Not Used
		•	Left Side:	11	7		Right Side:		87		
9	V _{SRICH}			ecies richnes tratum. Che							0.00
				and the subin					i strata. Op	ecies	3.60
		Group	0 1 = 1.0					Group	2 (-1.0)		
	Acer rubr	um		Magnolia tri	ipetala		Ailanthus a	altissima		Lonicera ja	ponica
1	Acer sace	charum		Nyssa sylva	atica		Albizia julik	orissin		Lonicera ta	tarica
	Aesculus	flava		Oxydendrum	arboreum		Alliaria peti	iolata		Lotus corni	iculatus
	Asimina t	riloba		Prunus sero	otina		Alternanthe	era		Lythrum sa	licaria
	Betula alle	eghaniensis		Quercus all	ba		philoxeroia			Microstegiur	n vimineum
	Betula ler	nta		Quercus co	ccinea		Aster tatari	icus		Paulownia	tomentosa
	Carya alb	a		Quercus im	bricaria		Cerastium	fontanum		Polygonum d	cuspidatum
	Carya gla	bra		Quercus pri	inus		Coronilla v	aria		Pueraria m	ontana
~	Carya ova	alis		Quercus ru	bra		Elaeagnus u	ımbellata		Rosa multi	flora
	Carya ova	ata		Quercus ve	lutina		Lespedeza	bicolor		Sorghum h	alepense
	Cornus flo	orida		Sassafras a	albidum		Lespedeza	a cuneata		Verbena bi	rasiliensis
	Fagus gra	andifolia		Tilia americ	ana		Ligustrum ol	btusifolium			
	Fraxinus	americana		Tsuga cana	densis		Ligustrum	sinense			
~	Liriodendro	on tulipifera		Ulmus ame	ricana						
	Magnolia	acuminata									
	-		<u> </u>	-		 			_	_	
		5 5	Species in	Group 1				1	Species in	Group 2	

10	V _{DETRITUS}				sticks, or oth nt cover of th				<4" diamete	er and <36"	17.81 %
			Left	Side			Righ	t Side] '	
		20	10	20	10	10	20	30	10		
11	V _{HERB}	25 Average pe	10 Proentage co	40 ver of herb	20 Daceous vege	10 etation (me	25 asure only if	10 tree cover is	15 <20%) D	o not	
	▼ HERB	include woo	ody stems at	least 4" d	bh and 36" ta	all. Because	there may b	be several la	yers of gro	und cover	Not Use
		vegetation each subple		up throug	h 200% are a	accepted.	Enter the per	cent cover c	of ground ve	egetation at	1101 036
			Left	Side			Righ	t Side		1	
		80	90	60	90	10	25	90	40		
		60	75	50	90	25	10	60	60		
ample	e Variable 1	2 within the	e entire cato	hment of	the stream.						
12	V _{WLUSE}	Weighted A	verage of R	unoff Scor	e for watersh	ned:					0.50
											0.50
			Land	lse (Choo	se From Dro	n List)			Runoff	% in Catch	Running Percen
			Land			p Li3t)			Score	ment	(not >100
	Forest and r	native range («	<50% ground	cover)				•	0.5	100	100
								•			
	-							•			
	e							•			
								-			
								•			
		8A					No	tes:			
Va	ariable	Value	VSI								
۷ _c	CANOPY	67 %	0.72								
	MBED	4.9	0.53								
	UBSTRATE	13.25 in	0.53								
V _{BI}	ERO	10 %	1.00								
۷ _{L\}	ND	12.0	1.00								
VT	ОВН	10.5	1.00								
Vsi	NAG	0.0	0.10								
Vs		Not Used	Not Used								
	RICH	3.60	1.00								
	RICH ETRITUS	17.8 %	0.22								
	ETRITUS ERB	Not Used	Not Used								
	LUSE	0.5	0.53								

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: AEP Mitchell Landfill Project Location: Cresap, Marshall County, WV Sampling Date: 8/14/2011

Project Site I

Before Project

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR:

Functional Results Summary:

Tree/Sapling Strata

SAR number: 9

rice/eaping enate

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.96
Biogeochemical Cycling	0.88
Habitat	0.86

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	75.50	0.83
V _{EMBED}	Average embeddedness of channel.	4.30	0.85
V _{SUBSTRATE}	Median stream channel substrate particle size.	6.95	0.94
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.	8.00	1.00
V _{TDBH}	Average dbh of trees.	11.69	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	3.00	1.00
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	3.60	1.00
VDETRITUS	Average percent cover of leaves, sticks, etc.	39.38	0.48
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

	High-G	aradient	Headwat		ms in ea Data She		-	and west r	ern Wes	t Virginia	а
	Team:	D.Godec, C	G. Gerke					- Latitude/UTI	M Northing:	39°49'50.07	7"N
Pro		AEP Mitche		roject				ongitude/U1	-		
		Cresap, Ma							pling Date:		
SA	R Number:	9	Reach	Length (ft):	100	Stream Ty	vpe: Inter	mittent Stream			-
	Top Strata:	Tre	e/Sapling St	rata	(determined	d from perce	ent calculate	ed in V _{CCANOF}	_{YY})		
Site a	and Timing:	Project Site	1				Before Proje	ect			•
Sample	Variables	1-4 in strea	m channel								
1	V _{CCANOPY}	equidistant		g the stream	. Measure	only if tree/s	apling cove	sure at no fe r is at least 2 choice.)			75.5 %
	List the per	cent cover r	neasuremer	nts at each p	point below:						
	70	80	60	80	90	80	75	60	80	80	
2	V _{EMBED}	•						than 30 roug			4.3
								termine the nent, and ent			
								f fine sedime			
			bed is comp							c .	
		Embedded	ness rating f	or gravel, co	obble and bo	oulder partic	les (rescale	d from Platt	s, Megahan	, and	
		Minshall 19	83)								
		Rating	Rating Des	cription							
		5						ne sediment)	
		4						oy fine sedin			
		3						by fine sedi			
		2						l by fine sedi ine sedimen		l surface)	
	List the rati	ngs at each			0010100,00		i banoa by i			a banabo)	l
	4	4	5	5	5	4					
	4	4	5	5	4	4					
	4	4	5	5	4	4					
	4	4	5	4	4	4					
	4	4	5	4	4	4					
3	V _{SUBSTRATE}	Median stre	eam channe	l substrate p	particle size.	Measure a	t no fewer t	han 30 rougl	nly equidista	ant points	
		along the s	tream; use t	he same po	ints and par	ticles as use	ed in V _{EMBED})-			6.95 in
	Enter partic	cle size in in	ches to the r	nearest 0.1 i	inch at each	point below	/ (bedrock s	hould be cou	unted as 99	in, asphalt	
		as 0.0 in, s					Υ.			· •	
	8.20	6.90	99.00	99.00	99.00	6.50					
	6.30	8.10	99.00	99.00	4.50	1.50					
	0.50	7.00	99.00	99.00	6.80	2.30					
	1.20	2.50	99.00	2.50	8.10	1.10					
	4.80	1.30	99.00	3.10	7.50	8.20					
4	V _{BERO}	Total perce	nt of eroded	stream cha	nnel bank.			of feet of erc			
		side and th	e total perce	entage will b	e calculated	If both bar	iks are eroo	ded, total ero	sion for the	stream	40 %

BENU	side and the total percentage will be calcu		
	may be up to 200%.		, stream 2

Sampl	e Variable	s 5-9 within th	ne entire ri	parian/buff	er zone adj	acent to th	e stream ch	annel (25	feet from ea	ich bank).	
5	V _{LWD}	Number of d stream reac per 100 feet	h. Enter th	e number fr	om the entir						8.0
		P				f downed w	oody stems:		8		
6	V_{TDBH}	Average dbł inches (10 c					ng cover is a	t least 20%	b). Trees are	e at least 4	11.7
		List the dbh	,				n) within the	buffer on e	ach side of		
		the stream b	pelow:			·	•				-
			Left Side		-			Right Side	e		
	18	16	14	8	11	5	9	11	7	11	
	10	11	18	16	12	10					
7	V _{SNAG}	Number of s side of the s						Enter num	ber of snags	on each	3.0
			Left Side:		1		Right Side:		2		
8	V_{SSD}	Number of s					nes dbh) per	100 feet of			
		if tree cover per 100 ft of				gs and shru	bs on each s	side of the s	stream, and	the amount	Not Used
			Left Side:		ieu.		Right Side:				
9	V _{SRICH}	Riparian veg									
		Group 1 in th richness per							ll strata. Spe	ecies	3.60
		-	0.1 = 1.0			calculated			0 2 (-1.0)		
	Acer rubr	-		Magnolia ti	ripetala		Ailanthus a			Lonicera ja	ponica
	Acer sace			Nyssa sylv	-		Albizia julik			Lonicera ta	•
	Aesculus			Oxydendrun			Alliaria peti			Lotus corni	
	Asimina t			Prunus sei						Lythrum sa	
							Alternanthe philoxeroid			-	
		eghaniensis		Quercus a						Microstegiur	
	Betula lei			Quercus co			Aster tatari			Paulownia	
	Carya alb			Quercus in			Cerastium			Polygonum	-
	Carya gla		~	Quercus p			Coronilla v			Pueraria m	
	Carya ov	alis		Quercus ru	ıbra		Elaeagnus u	ımbellata		Rosa multi	flora
	Carya ov	ata		Quercus ve	elutina		Lespedeza	bicolor		Sorghum h	alepense
	Cornus fl	orida		Sassafras	albidum		Lespedeza	cuneata		Verbena bi	rasiliensis
<i>✓</i>	Fagus gra	andifolia		Tilia ameri	cana		Ligustrum ol	btusifolium			
<i></i>	Fraxinus	americana		Tsuga can	adensis		Ligustrum :	sinense			
	Liriodendro	on tulipifera		Ulmus ame	ericana						
	Magnolia	acuminata									
			- · ·	a					_	_	
		5 8	Species in	Group 1				1	Species in	Group 2	

	e Variables The four sub								one within	25 feet from	n each
10	V _{DETRITUS}				sticks, or oth t cover of th				<4" diamete	er and <36"	39.38 %
			Left	Side			Righ	t Side] '	
		30	60	50	60	30	40	30	10		
11	V _{HERB}	20 Average pe	50 ercentage co	40 over of herba	60 aceous vege	20 etation (mea	40 sure only if	50 tree cover is	40 s <20%). Do	o not	
		include woo	ody stems a percentages	t least 4" db	h and 36" ta 1 200% are a	II. Because	there may b	be several la	iyers of grou	und cover	Not Used
			Left	Side			Righ	t Side]	
Sample	e Variable 1	2 within the	entire cat	chment of t	he stream						
12	V _{WLUSE}				e for watersh	ed:					1.00
										_	1.00
			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	100	100
								-			
								•			
								-			
								-			
								•			
								•			
								•			
	Summary:	SAA Numbe	er 9				No	tes:			
Va	ariable	Value	VSI								
Vc	CANOPY	76 %	0.83								
V _{EI}	MBED	4.3	0.85								
Vs	UBSTRATE	6.95 in	0.94								
VB	ERO	40 %	0.86								
VL	WD	8.0	1.00								
V _{TI}	DBH	11.7	1.00								
Vsi	NAG	3.0	1.00								
Vs		Not Used	Not Used								
Vs	RICH	3.60	1.00								
	ETRITUS	39.4 %	0.48								
	ERB	Not Used	Not Used								
Vw	LUSE	1	1.00								

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: AEP Mitchell Landfill Project Location: Cresap, Marshall County, WV Sampling Date: 8/14/2011

Project Site

Before Project

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 10

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.96
Biogeochemical Cycling	0.92
Habitat	0.86

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	82.50	0.93
V _{EMBED}	Average embeddedness of channel.	3.73	1.00
V _{SUBSTRATE}	Median stream channel substrate particle size.	3.30	1.00
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.	7.00	0.88
V _{TDBH}	Average dbh of trees.	10.80	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	3.00	1.00
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	6.00	1.00
VDETRITUS	Average percent cover of leaves, sticks, etc.	18.13	0.22
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

	High-G	aradient	Headwat			stern Ke		-		ern Wes	t Virgini	a
	Team:	D. Godec,	G. Gerke							M Northing:	39°49'48.34	4"N
Pro			ell Landfill Pi	roiect						M Easting:		
	-		arshall Coun	•			i		-	pling Date:		<u>, , , , , , , , , , , , , , , , , , , </u>
						o. T					0/11/2011	
SA	AR Number:	10	Reach	Length (ft):	100	Stream Ty	pe:	Intern	nittent Strea	m		
	Top Strata:	Tre	e/Sapling St	rata	(determine	d from perce	ent calcu	lated	I in V _{CCANOF}	_{УY})		
Site	and Timing:	Project Site	2				Before I	Projec	t			
Sample	e Variables	1-4 in strea	m channel									
1	V _{CCANOPY}	equidistant	points along	g the stream	. Measure	nd sapling ca only if tree/s 9 to trigger	apling c	over	is at least 2			82.5 %
	List the per	cent cover r	measuremer	nts at each p	point below:							
	70	80	75	90	100	90	80		90	70	80	
2	V_{EMBED}					I. Measure						3.7
						ed. Before n						5.7
						is covered b surface, or c						
						rating score		u ui		enis, use a i	aling score	
			-			oulder partic			from Diott	Magaban	and	
		Minshall 19		or graver, co		oulder partic	ies (ies	caleu	i ironi Fialli	s, meganan	, and	
		Rating	Rating Des	scription								
		5				rounded, or)	
		4				, surrounded						
		3				d, surrounde						
		2				d, surrounde irrounded, o					l ourfage)	
	Lict the rati		point below		covered, su		Duneu	by III	le seuimen	it (or artificia	a sunace)	
					1	4						l
	4	4	4	4	4	4						
	3	4	3	4	4	3						
	4	4	3	4	3	4						
	4	5	3	3	4	4						
	3	3	4	5	4	3						
3	V _{SUBSTRATE}					Measure a ticles as use			an 30 rougi	hly equidista	ant points	3.30 in
			ches to the r and or finer			n point below	/ (bedro	ck sh	ould be co	unted as 99	in, asphalt	
	3.10	5.10	0.80	8.00	4.00	1.20						
	3.50	0.30	4.90	6.20	2.80	8.50						
	0.50	1.20	1.20	10.10	3.90	1.10						
	0.90	99.00	2.30	1.30	4.10	0.80						
	1.30	10.10	8.10	99.00	6.40	0.90						
4	V _{BERO}					Enter the to	tal num	ber o	f feet of erc	ded bank o	n each	
	- DERU					If both ban						20 %
		may be up	•	-								_0 /0

Left Bank:	10 ft	Right Bank:	10 ft

Sampl	e Variable	s 5-9 within tl	he entire ri	parian/buff	ier zone adj	acent to th	e stream ch	nannel (25	feet from ea	ach bank).			
5	V_{LWD}		ch. Enter th	e number fi	least 4 inche rom the entir ulated.						7.0		
		I				f downed w	oody stems:		7				
6	V_{TDBH}				ly if V _{CCANOP} tree DBHs i		ng cover is a	t least 20%	b). Trees are	e at least 4	10.8		
		List the dbh	measurem	ents of indi	vidual trees	(at least 4 ii	n) within the	buffer on e	ach side of				
		the stream l											
			Left Side			Right Side 10 21 11 5							
	7	8	7	11	17	10							
	18 5	15	11	8	8								
	5												
7	7 V _{SNAG} Number of snags (at least 4" dbh and 36" tall) per 100 feet of stream. Enter number of snags on each side of the stream, and the amount per 100 feet will be calculated.										3.0		
			Left Side:		2		Right Side:		1				
8	V_{SSD}				oody stems								
		if tree cover per 100 ft o			per of sapling	gs and shru	bs on each	side of the s	stream, and	the amount	Not Used		
			Left Side:		lou.		Right Side:						
9	V_{SRICH}				ess per 100 f								
					eck all exotic ndex will be				ll strata. Spo	ecies	6.00		
		-	p 1 = 1.0			Group 2 (-1.0)							
	Acer rubi			Magnolia t	ripetala		ponica						
~	Acer sace			- Nyssa sylv	-		Ailanthus a Albizia julit			, Lonicera ta			
	Aesculus			-	n arboreum		Alliaria pet			Lotus corn			
	Asimina			Prunus sei						Lythrum sa			
		eghaniensis		Quercus a			Alternanthe philoxeroid			Microstegiur			
	Betula lei	-								Paulownia			
	Carya alt			Quercus c Quercus in			Aster tatar Cerastium						
	-						Cerasilum Coronilla v			Polygonum Pueraria m	-		
	Carya gla			Quercus p									
	Carya ovalis Quercus rubra						Elaeagnus ι			Rosa multi			
	Carya ovata Quercus velutina						Lespedeza			Sorghum h	-		
	Cornus fl			Sassafras			Lespedeza			Verbena bi	rasiliensis		
	Fagus grandifolia Tilia americana						Ligustrum o						
		americana		Tsuga can			Ligustrum	sinense					
1	Liriodendr	on tulipifera	\checkmark	Ulmus am	ericana								
	Magnolia	acuminata											
	6 Species in Group 1							0	Species in	Group 2			
		-	•	•				-	,	- 1- =			

	e Variables The four sub								one within	25 feet fror	n each
10	V _{DETRITUS}	Average pe long are inc			ticks, or oth t cover of th				<4" diamete	er and <36"	18.13 %
			Left	Side			Righ	t Side] '	
		10	10	40	30	10	5	10	20		
11	V _{HERB}	25 Average pe	30 rcentage.cc	20	30 aceous vege	10 station (mos	20 Sure only if	10 tree cover is	10	o not	
	V HERB	include woo	ody stems a percentages	t least 4" db	h and 36" ta 1 200% are a	II. Because	there may b	be several la	ivers of grou	und cover	Not Used
			Left	Side	-		Righ	t Side] '	
Comple	Variable 1	Quuithin the	ontino oot	hmont of t	ha atraam						
12	e Variable 1 V _{WLUSE}				for watersh	od:					
12	V WLUSE	weighted A	verage of n		TOT WATERST	leu.					1.00
			Land	Use (Choos	e From Dro	p List)			Runoff Score	% in Catch ment	Running Percent (not >100)
	Forest and n	ative range (>	>75% ground	cover)				-	1	100	100
								-			
								-			
								-			
								•			
								-			
								-			
								-			
	Summary: S	SAA Numbe	r 10				No	tes:	-	-	
V	ariable	Value	VSI								
Vc	CANOPY	83 %	0.93								
VE	MBED	3.7	1.00								
Vs	UBSTRATE	3.30 in	1.00								
VB	ERO	20 %	0.97								
VL	WD	7.0	0.88								
	DBH	10.8	1.00								
	NAG	3.0	1.00								
Vs		Not Used	Not Used								
	RICH	6.00	1.00								
	ETRITUS	18.1 %	0.22								
	ERB	Not Used	Not Used								
	LUSE	1	1.00								

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: AEP Mitchell Landfill Project Location: Cresap, Marshall County, WV Sampling Date: 8/14/2011

Project Site

Before Project

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 13

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.94
Biogeochemical Cycling	0.82
Habitat	0.79

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	81.50	0.91
V _{EMBED}	Average embeddedness of channel.	4.47	0.77
V _{SUBSTRATE}	Median stream channel substrate particle size.	3.10	1.00
V _{BERO}	Total percent of eroded stream channel bank.	25.00	0.94
V _{LWD}	Number of down woody stems per 100 feet of stream.	11.00	1.00
V _{TDBH}	Average dbh of trees.	9.06	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.	3.60	1.00
VDETRITUS	Average percent cover of leaves, sticks, etc.	20.31	0.25
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

	High-G	aradient	Headwat			stern Ke et and C		and west or	tern Wes	t Virginia	a
	Team:	D. Godec,	G. Gerke					Latitude/UT	M Northing:	39°49'38.81	I"N
Pro			ell Landfill Pi	roject				Longitude/U			
	-		arshall Coun	-				-	npling Date:		
SA	AR Number:	13		Length (ft):	100	Stream Ty	vpe: Int	ermittent Strea	m		-
	Top Strata:	Tre	e/Sapling St	rata	(determined	d from perce	ent calcula	ted in V _{CCANO}	_{PY})		
Site	and Timing:	Project Site	!				Before Pro	oject			•
Sample	e Variables										
1	V _{CCANOPY}	equidistant		g the stream	. Measure	only if tree/s	apling cov	easure at no f ver is at least t choice.)			81.5 %
	List the per	cent cover r	neasuremer	nts at each p	point below:						1
	80	75	90	90	100	70	80	80	80	70	
2	V _{EMBED}	along the s	tream. Sele	ct a particle	from the be	d. Before n	noving it, c	r than 30 rou determine the iment, and en	percentage	of the	4.5
		to the follow of 1. If the	ving table. I bed is comp	f the bed is bosed of bec	an artificial s Irock, use a	surface, or o rating score	omposed of 5.	of fine sedim	ents, use a r	ating score	
There	should be	Embedded Minshall 19		or gravel, co	obble and bo	oulder partic	les (resca	led from Plat	s, Megahan	, and	
	me number	Rating	Rating Des								
of er	ntries for	5						fine sediment)	
	edness and	4						d by fine sedir ed by fine sed			
Subs	trate Size	2						ed by fine sed			
		1						/ fine sedimer		l surface)	
	List the rati	ngs at each	point below	:			-		•		
	4	5	5	3	4	5					
	4	5	3	3	5	5					
	4	5	5	5	5	5					
	5	4	4	5	5	4					
	4	5	5	5	4	4					
3		along the s	tream; use t	he same po	ints and par	ticles as use	ed in V _{EMBI}				3.10 in
	or concrete	as 0.0 in, s	and or finer	particles as	0.08 in):	point below	/ (bedrock	should be co	unted as 99	in, asphait	1
	6.10	0.50	0.90	12.20	0.90						
	4.90	1.50	3.10	5.60	4.30						
	3.20	5.20	2.20	8.10	3.10						
	99.00	3.90	3.90	1.20	1.30						
	1.00	1.20	0.90	0.80	6.40						
4	V _{BERO}	•	e total perce					r of feet of er oded, total er			25 %
			Left Bank:	15	5 ft		Right Banl	k: 10	D ft		

Sampl	e Variable	s 5-9 within th	ne entire ri	parian/buff	er zone adj	acent to th	e stream ch	annel (25 f	feet from ea	ch bank).			
5	V_{LWD}	Number of c stream reac per 100 feet	h. Enter th	e number fi	rom the entir						11.0		
		•					oody stems:		11				
6	V_{TDBH}	Average dbl inches (10 c					ng cover is a	t least 20%). Trees are	at least 4	9.1		
		List the dbh	measurem	ents of indiv	vidual trees	(at least 4 ir	n) within the	buffer on ea	ach side of				
		the stream b	pelow:										
			Left Side		-	Right Side							
	9	5	6	5	8	5	20	4	4	15			
	16 18	5	18	6	5	5							
	10												
7	7 V _{SNAG} Number of snags (at least 4" dbh and 36" tall) per 100 feet of stream. Enter number of snags on each side of the stream, and the amount per 100 feet will be calculated.										0.0		
			Left Side:		0		Right Side:		0				
8	V_{SSD}	Number of s					nes dbh) per	100 feet of					
		if tree cover per 100 ft of				gs and shru	bs on each :	side of the s	stream, and	the amount	Not Used		
			Left Side:	be calcula	ieu.		Right Side:						
9	V _{SRICH}	Riparian veç					m reach. Cl	neck all spe					
		Group 1 in t richness per							l strata. Spe	ecies	3.60		
		-	0.1 = 1.0										
	Acer rubr			Magnolia t	rinetala		ponica						
	Acer sace			Nyssa sylv	•		Ailanthus a Albizia julik			Lonicera ta	-		
				-			-						
	Aesculus			Oxydendrun			Alliaria peti	ioiala		Lotus corni			
	Asimina t			Prunus sei			Alternanthe			Lythrum sa			
	Betula alle	eghaniensis		Quercus a	lba		philoxeroia	es		Microstegiur			
	Betula lei	nta		Quercus c	occinea		Aster tatari	icus		Paulownia	tomentosa		
	Carya alb	oa		Quercus in	nbricaria		Cerastium	fontanum		Polygonum d	cuspidatum		
	Carya gla	abra		Quercus p	rinus		Coronilla v	aria		Pueraria m	ontana		
	Carya ov	alis		Quercus ru	ıbra		Elaeagnus u	ımbellata		Rosa multi	flora		
	Carya ov	ata		Quercus v	elutina		Lespedeza	bicolor		Sorghum h	alepense		
	Cornus fl	orida		Sassafras	albidum		Lespedeza	cuneata		Verbena br	rasiliensis		
	Fagus gra	andifolia		Tilia ameri	cana		Ligustrum ol	btusifolium					
1	Fraxinus americana Tsuga canadensis						Ligustrum	sinense					
~	Liriodendro	on tulipifera	~	Ulmus ame									
		acuminata											
	Magnolia acuminata												
		5	Species in	Group 1				1	Species in	Group 2			

	e Variables The four sub								one within	25 feet fror	n each
10		Average pe	rcent cover	of leaves, s		er organic n	naterial. Wo	ody debris	<4" diamete	er and <36"	20.31 %
			Left	Side			Righ	t Side] '	
		20	10	20	25	25	20	40	10		
11	V _{HERB}	30 Average pe	25 rcentage co	10 over of herba	20 aceous vege	10 etation (mea	25 sure only if	15 tree cover is	20 s <20%). De	o <i>not</i>	
	TILIID	include woo	ody stems a percentages	t least 4" db	h and 36" ta 1 200% are a	II. Because	there may b	be several la	ivers of grou	und cover	Not Used
			Left	Side			Righ	t Side] '	
Sample	e Variable 1	2 within the	ontiro cat	chment of t	he stream						
12	V _{WLUSE}				e for watersh	ed.					
12	* WLUSE	Weighted /	worago or r								1.00
			Land	Use (Choos	e From Dro	p List)			Runoff Score	% in Catch- ment	Running Percent (not >100)
	Forest and n	ative range (>	>75% ground	cover)				•	1	100	100
								-			
								-			
								-			
								•			
								•			
								•			
								•			
	Summary: S	SAA Numbe	r 13				No	tes:	-	-	
Va	ariable	Value	VSI								
Vc	CANOPY	82 %	0.91								
V _{EI}	MBED	4.5	0.77								
Vs	UBSTRATE	3.10 in	1.00								
VB	ERO	25 %	0.94								
VL	WD	11.0	1.00								
V _{TI}		9.1	1.00								
Vsi		0.0	0.10								
Vs		Not Used	Not Used								
	RICH	3.60	1.00								
	ETRITUS	20.3 %	0.25								
	ERB	Not Used	Not Used								
	LUSE	1	1.00								

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: AEP Mitchell Landfill Project Location: Cresap, Marshall County, WV Sampling Date: 8/14/2011

Project Site

Before Project

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 14

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.78
Biogeochemical Cycling	0.76
Habitat	0.62

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	83.50	0.94
V _{EMBED}	Average embeddedness of channel.	4.67	0.67
V _{SUBSTRATE}	Median stream channel substrate particle size.	99.00	0.10
V _{BERO}	Total percent of eroded stream channel bank.	15.00	0.99
V _{LWD}	Number of down woody stems per 100 feet of stream.	8.00	1.00
V _{TDBH}	Average dbh of trees.	8.82	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.	3.00	1.00
VDETRITUS	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.	1.00	1.00

	High-G	aradient	Headwat				entucky a alculato		tern Wes	t Virgini	а
	Team:	D. Godec,	G. Gerke						M Northing:	39°49'37.74	4"N
Pro			ell Landfill Pi	roject					-	80°46'4.47"	
	Location:	Cresap, Ma	arshall Coun	ty, WV			Sampling Date: 8/14/2011				
SA	AR Number:	14	Reach	Length (ft):	100	Stream Ty	/pe: Inter	mittent Strea	m		-
	Top Strata:	Tre	e/Sapling St	rata	(determine	d from perce	ent calculate	d in V _{CCANOF}	⊳ү)		
Site a	Site and Timing: Project Site Before Project										
Sample	e Variables										
1	CCANOPY										83.5 %
			ī								1
	100	90	80	80	90	70	75	80	90	80	
2	V _{EMBED}	along the s	nbeddednes tream. Sele d area surroi	ct a particle	from the be	ed. Before r	noving it, de	termine the	percentage	of the	4.7
		to the follow of 1. If the	wing table. I bed is comp	f the bed is posed of bec	an artificial : drock, use a	surface, or o rating score	composed o e of 5.	f fine sedime	ents, use a i	rating score	
		Embedded Minshall 19	-		obble and b	oulder partic	cles (rescale	d from Platt	s, Megahan	, and	
		Rating	Rating Des						<u> </u>	、 、	
		5					buried by fir d, or buried l			()	
		3					ed, or buried				
		2					ed, or buried				
		1			covered, su	irrounded, o	r buried by f	ine sedimer	nt (or artificia	al surface)	
	List the rati	ngs at each	point below		R	1		R	R	1	
	4	4	5	5	5	5					
	4	4	5	5	5	5					
	4	4	5	5	5	5					
	4	4	5	5	5	5					
3	4 V _{SUBSTRATE}		5 eam channe tream; use t						hly equidista	ant points	99.00 in
	•		ches to the r and or finer			n point belov	v (bedrock s	hould be co	unted as 99	in, asphalt	
	4.40 6.20 99.00 99.00 99.00 99.00										
	6.30	5.50	99.00	99.00	99.00	99.00					
	4.30	6.70	99.00	99.00	99.00	99.00					
	8.20	6.30	99.00	99.00	99.00	99.00					
	7.10	4.90	99.00	99.00	99.00	99.00					
4	V _{BERO}	•	ent of eroded e total perce to 200%.								15 %
			Left Bank:	5	ft		Right Bank:	10) ft		

Version 1-25-11

Sampl	e Variable	s 5-9 within th	ne entire ri	parian/buff	er zone adj	acent to th	e stream ch	annel (25	feet from ea	ich bank).	
5	V _{LWD}	Number of d stream reac per 100 feet	h. Enter th	e number fr	om the entir						8.0
		P				f downed w	oody stems:		8		
6	V _{TDBH}	Average dbł inches (10 c					ng cover is a	t least 20%	b). Trees are	e at least 4	8.8
		List the dbh	,				n) within the	buffer on e	ach side of		
		the stream b	pelow:				•				-
			Left Side		-			Right Side	9		
	4	4	8	4	12	18	4	20	4		
	4	15									
									_		
7	V _{SNAG}	Number of s side of the s						Enter num	ber of snags	on each	0.0
			Left Side:		0		Right Side:		0		
8	V_{SSD}	Number of s									
		if tree cover per 100 ft of				gs and shru	bs on each :	side of the s	stream, and	the amount	Not Used
			Left Side:	De calcula	ieu.		Right Side:				
9	V _{SRICH}	Riparian veg					m reach. Cl	neck all spe			
		Group 1 in tl richness per							Il strata. Spe	ecies	3.00
		-	0.1 = 1.0			Calculated	ioni nese u		0 2 (-1.0)		
	Acer rubr			Magnolia ti	rinetala		ponica				
	Acer sace			Nyssa sylv	-		Ailanthus a Albizia julik			Lonicera ta	•
	Aesculus			Oxydendrun			Alliaria peti			Lotus corni	
	Asimina t			-						Lythrum sa	
				Prunus sei			Alternanthe philoxeroio			-	
		eghaniensis		Quercus a						Microstegiur	
	Betula ler			Quercus co			Aster tatari			Paulownia	
	Carya alb			Quercus in			Cerastium			Polygonum	-
	Carya gla	abra		Quercus p	rinus		Coronilla v	aria		Pueraria m	ontana
	Carya ova	alis		Quercus ru	ıbra		Elaeagnus u	ımbellata		Rosa multi	flora
	Carya ova	ata		Quercus ve	elutina		Lespedeza	bicolor		Sorghum h	alepense
	Cornus fle	orida		Sassafras	albidum		Lespedeza	cuneata		Verbena bi	rasiliensis
1	Fagus gra	andifolia	\checkmark	Tilia ameri	cana		Ligustrum ol	btusifolium			
	Fraxinus	americana		Tsuga can	adensis		Ligustrum	sinense			
	Liriodendro	on tulipifera		Ulmus ame	ericana						
	Magnolia	acuminata									
			o · ·						<u> </u>	• •	
		3 3	Species in	Group 1				0	Species in	Group 2	

									one within	25 feet from	n each
10	V _{DETRITUS}								<4" diamete	er and <36"	19.38 %
19.3 Index include. Enter the percent cover of the detrital layer at each subplot. Image: Left Side Right Side 25 20 30 10 20 20 10 10 10 25 25 20 10 30 20 25 25 11 V _{HERB} Average percentage cover of herbaceous vegetation (measure only if tree cover is <20%). Do not include woody stems at least 4" dbh and 36" tall. Because there may be several layers of ground cover vegetation percentages up through 200% are accepted. Enter the percent cover of ground vegetation at each subplot.											
		-									
11	V _{HEBB}	. •								o not	
		include woo vegetation	ody stems a percentages	t least 4" db	h and 36" ta	II. Because	there may b	be several la	yers of grou	und cover	Not Used
			Left	Side			Righ	t Side	1		
Sample	a Variable 1	2 within the	entire cat	chment of t	he stream						
						ed.					
	* WLUSE	Troightea /	tronage of th		for material						1.00
	Land Lise (Choose From Drop List)										Running Percent (not >100)
	Forest and n	ative range (>	•	1	100	100					
								•			
								•			
								-			
								•			
								•			
								•			
	Summary: S	SAA Numbe	r 14				No	tes:			
Va	ariable	Value	VSI								
Vc	CANOPY	84 %	0.94								
V _{EI}	MBED	4.7	0.67								
Vs	UBSTRATE	99.00 in	0.10								
VB	ERO	15 %	0.99								
VL	WD	8.0	1.00								
		8.8	1.00								
			0.10								
	RICH	3.00	1.00								
	etritus	19.4 %	0.24								
	ERB	Not Used	Not Used								
	LUSE	1	1.00								

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: AEP Mitchell Landfill Project Location: Cresap, Marshall County, WV Sampling Date: 8/15/2011

Project Site

Before Project

Subclass for this SAR:

Intermittent Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 16

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.59
Biogeochemical Cycling	0.72
Habitat	0.55

Variable	Name	Average Measure	Subindex
VCCANOPY	Percent canpoy over channel.	44.50	0.42
V _{EMBED}	Average embeddedness of channel.	3.60	1.00
V _{SUBSTRATE}	Median stream channel substrate particle size.	4.30	1.00
V _{BERO}	Total percent of eroded stream channel bank.	80.00	0.65
V _{LWD}	Number of down woody stems per 100 feet of stream.	4.00	0.50
V _{TDBH}	Average dbh of trees.	6.09	0.50
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.	0.80	0.38
VDETRITUS	Average percent cover of leaves, sticks, etc.	20.00	0.24
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	0.58	0.61

	High-G	radient	Headwat				entucky a alculato		ern Wes	t Virgini	а				
	Team:	D. Godec							M Northing:	39°49'24.84	4"N				
Pro	oject Name:		ell Landfill P	roject					TM Easting:						
	-		arshall Coun	-					pling Date:						
SA	AR Number:	16	Reach	Length (ft):	100	Stream Ty	pe: Inter	mittent Stream			•				
	Top Strata:	Tre	e/Sapling St	rata	(determined	d from perce	ent calculate	d in V _{CCANOF}	y)						
Site	and Timing:	Project Site				•	Before Proje	ct			•				
Sample	e Variables														
1		equidistant	points along		. Measure	only if tree/s	apling cove	r is at least 2	ewer than 10 20%. (If less		44.5 %				
	List the percent cover measurements at each point below:														
	85	90	0	0	0	0	0	80	90	100					
2	V _{EMBED}	along the s	tream. Sele	ct a particle	from the be	d. Before n	noving it, de	termine the	ghly equidist percentage	of the	3.6				
	surface and area surrounding the particle that is covered by fine sediment, and enter the rating according to the following table. If the bed is an artificial surface, or composed of fine sediments, use a rating score														
	of 1. If the bed is composed of bedrock, use a rating score of 5.														
		Embeddedness rating for gravel, cobble and boulder particles (rescaled from Platts, Megahan, and Minshall 1983)													
		Rating	Rating Des												
		5			overed, suri	rounded, or	buried by fir	ne sediment	(or bedrock)					
		5 4	<5 percent 5 to 25 perc	of surface c cent of surfa	ce covered,	surrounded	l, or buried b	by fine sedin	nent)					
		5 4 3	<5 percent 5 to 25 perc 26 to 50 pe	of surface c cent of surfa rcent of surf	ce covered, ace covered	surrounded d, surrounde	l, or buried b d, or buried	by fine sedin by fine sedi	nent iment)					
		5 4 3 2	<5 percent 5 to 25 perc 26 to 50 pe 51 to 75 pe	of surface c cent of surfa rcent of surf rcent of surf	ce covered, ace covered ace covered	surrounded d, surrounde d, surrounde	l, or buried k ed, or buried ed, or buried	by fine sedin by fine sedi by fine sedi	nent iment iment						
	List the ratio	5 4 3 2 1	<5 percent 5 to 25 perc 26 to 50 pe 51 to 75 pe >75 percen	of surface c cent of surfa rcent of surf rcent of surf t of surface	ce covered, ace covered ace covered	surrounded d, surrounde d, surrounde	l, or buried k ed, or buried ed, or buried	by fine sedin by fine sedi by fine sedi	nent iment						
	List the rati	5 4 3 2 1	<5 percent 5 to 25 perc 26 to 50 pe 51 to 75 pe >75 percen	of surface c cent of surfa rcent of surf rcent of surf t of surface	ce covered, ace covered ace covered	surrounded d, surrounde d, surrounde	l, or buried k ed, or buried ed, or buried	by fine sedin by fine sedi by fine sedi	nent iment iment						
		5 4 3 2 1 ngs at each	<5 percent 5 to 25 perc 26 to 50 pe 51 to 75 pe >75 percen point below	of surface c cent of surfa rcent of surf rcent of surf t of surface :	ce covered, ace covered ace covered covered, su	surrounded d, surrounde d, surrounde rrounded, o	l, or buried k ed, or buried ed, or buried	by fine sedin by fine sedi by fine sedi	nent iment iment						
	3	5 4 3 2 1 ngs at each 4	<5 percent 5 to 25 perc 26 to 50 pe 51 to 75 pe >75 percen point below 4	of surface c cent of surfa rcent of surf rcent of surf t of surface : 3	ce covered, face covered face covered covered, su	surrounded d, surrounde d, surrounde rrounded, o 3	l, or buried k ed, or buried ed, or buried	by fine sedin by fine sedi by fine sedi	nent iment iment						
	3 3	5 4 3 2 1 ngs at each 4 4	<5 percent 5 to 25 perc 26 to 50 pe 51 to 75 pe >75 percen point below 4 3	of surface c cent of surfa rcent of surf rcent of surf t of surface : 3 4	ce covered, face covered face covered covered, su 4 4	surrounded d, surrounde d, surrounde rrounded, o 3 3	l, or buried k ed, or buried ed, or buried	by fine sedin by fine sedi by fine sedi	nent iment iment						
	3 3 4 3 4	5 4 3 2 1 ngs at each 4 4 4 4 3	<5 percent 5 to 25 perc 26 to 50 pe 51 to 75 pe >75 percen point below 4 3 3 3 4	of surface c cent of surfa rcent of surf rcent of surf t of surface : 3 4 4 4 3 3 3	ce covered, face covered covered, su 4 4 4 4 4 4 4 4	surrounded d, surrounded d, surrounded, o 3 3 4 4 4 4	I, or buried t d, or buried d, or buried r buried by f	by fine sedin by fine sedi by fine sedi ine sedimen	nent iment it (or artificia	I surface)					
3	3 3 4 3 4	5 4 3 2 1 ngs at each 4 4 4 4 3 Median stree	<5 percent 5 to 25 perc 26 to 50 pe 51 to 75 pe >75 percen point below 4 3 3 3 4 eam channe	of surface c cent of surfa rcent of surf rcent of surf t of surface : 3 4 4 4 3 3 3	ce covered, face covered face covered covered, su 4 4 4 4 4 4 4 5 article size.	surrounded d, surrounded rrounded, o 3 3 4 4 4 4 Measure a	I, or buried t ed, or buried r buried by f	by fine sedin by fine sedine ine sedimen	nent iment iment	I surface)	4.30 in				
3	3 3 4 3 4 V _{SUBSTRATE}	5 4 3 2 1 ngs at each 4 4 4 4 4 3 Median stree along the s	<5 percent 5 to 25 perc 26 to 50 pe 51 to 75 pe >75 percen point below 4 3 3 3 4 eam channe tream; use t	of surface c cent of surfa rcent of surf rcent of surface : 3 4 4 3 3 I substrate p he same po	ce covered, face covered covered, su 4 4 4 4 4 4 5 article size. ints and par	surrounded, d, surrounded, d, surrounded, o 3 3 4 4 4 4 Measure a ticles as use	I, or buried t ed, or buried r buried by f buried by f t no fewer th ed in V _{EMBED}	by fine sedin by fine sedi ine sedimen	nent iment it (or artificia	al surface)	4.30 in				
3	3 3 4 3 4 V _{SUBSTRATE}	5 4 3 2 1 ngs at each 4 4 4 4 3 Median stre along the s	<5 percent 5 to 25 perc 26 to 50 pe 51 to 75 pe >75 percen point below 4 3 3 3 4 eam channe tream; use t ches to the i	of surface c cent of surfa rcent of surf rcent of surface : 3 4 4 3 3 I substrate p he same po	ce covered, face covered covered, su 4 4 4 4 4 4 5 article size. ints and par inch at each	surrounded, d, surrounded, d, surrounded, o 3 3 4 4 4 4 Measure a ticles as use	I, or buried t ed, or buried r buried by f buried by f t no fewer th ed in V _{EMBED}	by fine sedin by fine sedi ine sedimen	nent iment it (or artificia	al surface)	4.30 in				
3	3 4 3 4 V _{SUBSTRATE} Enter partic or concrete 1.20	5 4 3 2 1 ngs at each 4 4 4 4 3 Median stre along the s ele size in inc as 0.0 in, s 3.80	<5 percent 5 to 25 perc 26 to 50 pe 51 to 75 pe >75 percen point below 4 3 3 3 4 2 4 2 am channe tream; use t ches to the and or finer 9.80	of surface c cent of surfa rcent of surf rcent of surf t of surface : 3 4 4 3 1 substrate p he same po nearest 0.1 particles as 5.90	ce covered, face covered covered, su 4 4 4 4 4 4 5 article size. ints and par inch at each	surrounded d, surrounded d, surrounded rrounded, o 3 3 4 4 4 4 Measure a ticles as use point below 6.30	I, or buried t ed, or buried r buried by f buried by f t no fewer th ed in V _{EMBED}	by fine sedin by fine sedi ine sedimen	nent iment it (or artificia	al surface)	4.30 in				
3	3 4 3 4 V _{SUBSTRATE} Enter partic or concrete 1.20 2.30	5 4 3 2 1 ngs at each 4 4 4 4 3 Median stre along the s along the s along the s along the s 3.80 1.10	<5 percent 5 to 25 perc 26 to 50 pe 51 to 75 pe >75 percen point below 4 3 3 3 4 eam channe tream; use t ches to the p and or finer 9.80 5.30	of surface c cent of surfa rcent of surfa rcent of surface : 3 4 4 3 3 I substrate p he same po hearest 0.1 particles as 5.90 6.30	ce covered, face covered face covered covered, su 4 4 4 4 4 a article size. ints and par inch at each 0.08 in): 12.50 6.10	surrounded d, surrounded d, surrounded rrounded, o 3 3 4 4 4 4 Measure a ticles as use point below 6.30 7.50	I, or buried t ed, or buried r buried by f buried by f t no fewer th ed in V _{EMBED}	by fine sedin by fine sedi ine sedimen	nent iment it (or artificia	al surface)	4.30 in				
3	3 3 4 3 4 V _{SUBSTRATE} Enter partice or concrete 1.20 2.30 6.40	5 4 3 2 1 ngs at each 4 4 4 4 4 4 3 Median stre along the s cle size in inc as 0.0 in, s 3.80 1.10 0.60	<pre><5 percent 5 to 25 perc 26 to 50 pe 51 to 75 pe >75 percen point below 4 3 3 3 4 eam channe tream; use t ches to the n and or finer 9.80 5.30 1.20</pre>	of surface c cent of surfa rcent of surfa rcent of surface : 3 4 3 3 I substrate p he same po nearest 0.1 particles as 5.90 6.30 4.80	ce covered, face covered covered, su 4 4 4 4 4 a 4 barticle size. ints and par inch at each 0.08 in): 12.50 6.10 1.20	surrounded d, surrounded d, surrounded rrounded, o 3 3 4 4 4 4 Measure a ticles as use point below 6.30 7.50 8.10	I, or buried t ed, or buried r buried by f buried by f t no fewer th ed in V _{EMBED}	by fine sedin by fine sedi ine sedimen	nent iment it (or artificia	al surface)	4.30 in				
3	3 3 4 3 4 V _{SUBSTRATE} Enter partic or concrete 1.20 2.30 6.40 5.90	5 4 3 2 1 ngs at each 4 4 4 4 4 3 Median stre along the s cle size in inc as 0.0 in, s 3.80 1.10 0.60 0.70	<5 percent 5 to 25 perc 26 to 50 pe 51 to 75 pe >75 percen point below 4 3 3 4 3 4 eam channe tream; use t ches to the pa and or finer 9.80 5.30 1.20 0.90	of surface c cent of surfa rcent of surfa rcent of surface : 3 4 4 3 3 I substrate p he same po nearest 0.1 particles as 5.90 6.30 4.80 0.90	ce covered, face covered face covered covered, su 4 4 4 4 4 a article size. ints and par inch at each 0.08 in): 12.50 6.10 1.20 1.10	surrounded d, surrounded d, surrounded rrounded, o 3 3 4 4 4 4 Measure a ticles as use point below 6.30 7.50 8.10 1.00	I, or buried t ed, or buried r buried by f buried by f t no fewer th ed in V _{EMBED}	by fine sedin by fine sedi ine sedimen	nent iment it (or artificia	al surface)	4.30 in				
	3 3 4 V _{SUBSTRATE} Enter partic or concrete 1.20 2.30 6.40 5.90 7.10	5 4 3 2 1 ngs at each 4 4 4 4 3 Median stre along the s ile size in inc as 0.0 in, s 3.80 1.10 0.60 0.70 1.10	<5 percent 5 to 25 perc 26 to 50 pe 51 to 75 pe >75 percen point below 4 3 3 4 eam channe tream; use t ches to the p and or finer 9.80 5.30 1.20 0.90 6.40	of surface c cent of surfa rcent of surfa rcent of surface : 3 4 4 3 3 I substrate p he same po nearest 0.1 particles as 5.90 6.30 4.80 0.90 11.00	ce covered, face covered face covered covered, su 4 4 4 4 4 0 article size. ints and par inch at each 0.08 in): 12.50 6.10 1.20 1.10 0.80	surrounded d, surrounded d, surrounded rrounded, o 3 3 4 4 4 4 Measure a ticles as use point below 6.30 7.50 8.10 1.00 0.80	I, or buried t id, or buried id, or buried r buried by f t no fewer th ed in V _{EMBED} v (bedrock s	by fine sedin by fine sedi ine sedimen an 30 roug hould be con	nent iment iment nt (or artificia hly equidista unted as 99	al surface)	4.30 in				
3	3 3 4 3 4 V _{SUBSTRATE} Enter partic or concrete 1.20 2.30 6.40 5.90	5 4 3 2 1 ngs at each 4 4 4 4 3 Median stre along the s along the s along the s along the s along the s 3.80 1.10 0.60 0.70 1.10 Total perce	<5 percent $5 to 25 perc$ $26 to 50 pe$ $51 to 75 pe$ $>75 percen$ point below 4 3 3 3 4 eam channe tream; use t ches to the r and or finer 9.80 5.30 1.20 0.90 6.40 nt of erodec e total perce	of surface c cent of surfa rcent of surfa rcent of surface : 3 4 4 3 3 I substrate p he same po hearest 0.1 particles as 5.90 6.30 4.80 0.90 11.00 I stream cha	ce covered, face covered face covered covered, su 4 4 4 4 4 a 4 barticle size. ints and par inch at each 0.08 in): 12.50 6.10 1.20 1.10 0.80 annel bank.	surrounded d, surrounded d, surrounded rrounded, o 3 3 4 4 4 4 Measure a ticles as use point below 6.30 7.50 8.10 1.00 0.80 Enter the to	I, or buried ted, or buried ted, or buried by f r buried by f r buried by f t no fewer th ed in V _{EMBED} r (bedrock s	by fine sedin by fine sedi ine sedimen and 30 roug hould be con bould be con bould be con	nent iment it (or artificia	al surface)	4.30 in 80 %				

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Sampl	e Variable	s 5-9 within th	ne entire ri	parian/buff	er zone adj	acent to th	e stream ch	annel (25 i	feet from ea	ich bank).		
5	V _{LWD}	Number of d stream reac per 100 feet	h. Enter th	e number fr	om the entir						4.0	
							oody stems:		4			
6	V_{TDBH}	Average dbh inches (10 c					ng cover is a	t least 20%). Trees are	at least 4	6.1	
		List the dbh	measurem	ents of indiv	vidual trees	(at least 4 in	n) within the	buffer on e	ach side of			
		the stream b										
			Left Side		1			Right Side		-		
	12	10	5	5	6	4	5	4	6	5		
	5											
7	V	Number of s	naga (at la	aat 4" dhh a	nd 26" tall)	por 100 foo	t of otroom	Entor num	por of opega	an aaah		
/	V _{SNAG}	side of the s							oer of shays	oneach	0.0	
			Left Side:		0		Right Side:		0			
8	V_{SSD}	Number of s							Not Used			
		if tree cover per 100 ft of				ys and shru	os on each s		stream, and	the amount	Not Used	
		•	Left Side:		80		Right Side:		45			
9	V _{SRICH}	Riparian veg Group 1 in tl									0.80	
		richness per		nd the subir	ndex will be	calculated t	from these d					
		-	0 1 = 1.0			Group 2 (-1.0)						
	Acer rubr			Magnolia ti			Ailanthus a			Lonicera ja		
	Acer sace	charum		Nyssa sylv	atica		Albizia julik	orissin		Lonicera ta	tarica	
	Aesculus	flava		Oxydendrun	n arboreum		Alliaria peti	iolata		Lotus corni	culatus	
\checkmark	Asimina t	riloba		Prunus ser	otina		Alternanthe			Lythrum sa	licaria	
	Betula alle	eghaniensis		Quercus al	ba		philoxeroid	les		Microstegiur	n vimineum	
	Betula ler	nta		Quercus co	occinea		Aster tatari	cus		Paulownia	tomentosa	
	Carya alb	a		Quercus in	nbricaria		Cerastium	fontanum		Polygonum d	cuspidatum	
	Carya gla	abra		Quercus pr	rinus		Coronilla v	aria		Pueraria m	ontana	
	Carya ova	alis		Quercus ru	bra		Elaeagnus u	ımbellata		Rosa multi	flora	
	Carya ova	ata		Quercus ve	elutina		Lespedeza	bicolor		Sorghum h	alepense	
	Cornus fle	orida		Sassafras	albidum		Lespedeza	cuneata		Verbena br	rasiliensis	
	Fagus gra	andifolia		Tilia amerio	cana		Ligustrum ol					
		americana		Tsuga cana	adensis		Ligustrum					
		on tulipifera	~	Ulmus ame			-					
		acuminata										
	<u>-</u> u											
		3 3	Species in	Group 1				2	Species in	Group 2		

	e Variables The four sub								zone within	25 feet fror	n each
10		Average pe	rcent cover	of leaves, s	ticks, or oth t cover of th	er organic n	naterial. Wo	ody debris	<4" diamete	er and <36"	20.00 %
			Left	Side			Righ	t Side] '	
		20				20					
11	V _{HERB}				aceous vege						
			percentages		h and 36" ta 1 200% are a						Not Used
				Side			Righ	t Side] '	
		70				70					
0	. Mariak la d	O anaithe installed									
Sample Variable 12 within the entire catchment of the stream. 12 VwLuse Weighted Average of Runoff Score for watershed:											
12	V _{WLUSE}	weighted A	verage of n		e ior watersi	ieu.					0.58
	Land Use (Choose From Drop List)									% in Catch- ment	Running Percent (not >100)
	Forest and n	ative range (>	>75% ground	cover)				-	1	40	40
	Open space	(pasture, lawr	ns, parks, etc.	.), grass cove	r >75%			-	0.3	60	100
								-			
								-			
								•			
								•			
								•			
								-			
	Summary: S	SAA Numbe	r 16				No	tes:			
V	ariable	Value	VSI								
Vc	CANOPY	45 %	0.42								
VE	MBED	3.6	1.00								
Vs	UBSTRATE	4.30 in	1.00								
VB	ERO	80 %	0.65								
VL	WD	4.0	0.50								
VT	V _{товн} 6.1 0.50										
	NAG	0.0	0.10								
Vs		Not Used	Not Used								
	RICH	0.80	0.38								
	ETRITUS	20.0 %	0.24								
	ERB	Not Used	Not Used								
Vw	LUSE	0.58	0.61								

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: AEP Mitchell Landfill Project Location: Stream 17. Cresap, Marshall County, WV Sampling Date: 28 Sept 2011

Project Site Bef

Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR:

Tree/Sapling Strata

SAR number: 17

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.99
Biogeochemical Cycling	0.95
Habitat	0.85

Variable	Name	Average Measure	Subindex
VCCANOPY	Percent canpoy over channel.	61.50	0.65
V _{EMBED}	Average embeddedness of channel.	3.43	0.98
V _{SUBSTRATE}	Median stream channel substrate particle size.	5.25	1.00
V _{BERO}	Total percent of eroded stream channel bank.	15.00	0.99
V _{LWD}	Number of down woody stems per 100 feet of stream.	11.00	1.00
V _{TDBH}	Average dbh of trees.	9.25	1.00
V _{SNAG}	Number of snags per 100 feet of stream.	3.00	1.00
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	Not Used	Not Used
V _{SRICH}	Riparian vegetation species richness.	3.20	1.00
VDETRITUS	Average percent cover of leaves, sticks, etc.	45.63	0.56
V _{HERB}	Average percent cover of herbaceous vegetation.	Not Used	Not Used
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	1.00	1.00

	High-G	aradient	Headwat			stern Ke et and C		-		ern Wes	t Virginia	a	
	Team [.]	Dawn York	and Mary G				aiou			A Northina.	39 49 18.79	03	
Pro	oject Name:										80 46 43.01		
	-		Cresap, Ma		tv. WV			-	-	-	28 Sept 201		
SA	AR Number:	17		Length (ft):		Stream Ty	ne.	Enhor					
0,		17	riodon	Longth (it).	100	- Choann ry	p0.	Epher	neral Stream			•	
	Top Strata:	Tre	e/Sapling St	rata	(determine	d from perce	ent calc	culated	d in V _{CCANOF}	_Y)			
Site	and Timing:	Project Site				•	Before	e Projec	t			•	
Sample	e Variables	1-4 in strea	m channel										
20%, enter at least one value between 0 and 19 to trigger Top Strata choice.)											61.5 %		
	List the percent cover measurements at each point below:										I		
	95	60	30	70	20								
	80	65	70	100	25								
2	V _{EMBED}		nbeddednes tream. Sele									3.4	
			d area surroi										
	to the following table. If the bed is an artificial surface, or composed of fine sediments, use a rating score												
	of 1. If the bed is composed of bedrock, use a rating score of 5.												
		Embeddedness rating for gravel, cobble and boulder particles (rescaled from Platts, Megahan, and Minshall 1983)											
		Rating	Rating Des	scription									
		5				rounded, or)		
		4				, surrounded d, surrounde							
		2				d, surrounde d, surrounde							
		1				rrounded, o			-		al surface)		
	List the rati	ngs at each	point below	:									
	5	3	3	5	4	4							
	5	4	3	2	2	5							
	4	1	5	4	5	2							
	5	4	2	4	3	2							
	3	2	4	3	3	2							
3	V _{SUBSTRATE}		eam channe tream; use t							nly equidista	ant points	5.25 in	
			ches to the r and or finer			point below	/ (bedr	ock sł	nould be cou	unted as 99	in, asphalt		
	5.00	17.80	2.50	7.50	1.50	11.90							
	8.50	17.80	99.00	2.25	1.20	1.50							
	11.90	0.75	1.20	19.00	4.50	9.00							
	5.50	5.00	1.20	4.20	99.00	99.00							
	99.00	1.70	1.20	6.20	19.30	10.00							
4	V _{BERO}	Total perce	nt of eroded e total perce	l stream cha	innel bank.	Enter the to						15 %	
			Left Bank:	12	2 ft		Right E	Bank:	3	ft	-		

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Sampl	e Variable	s 5-9 within the	entire ri	parian/buffe	er zone adj	acent to the	e stream ch	annel (25 f	eet from ea	ach bank).	
5	V_{LWD}	Number of do stream reach per 100 feet o	. Enter th	e number fro	om the entir						11.0
						f downed wo	oody stems:		11		
6	V_{TDBH}	Average dbh inches (10 cm					ig cover is a	t least 20%). Trees are	e at least 4	9.3
		List the dbh n) within the	buffer on e	ach side of		
		the stream be				(at react	.)				
		l	_eft Side					Right Side	ļ		
	13					8.5					
	15					8					
	5					4					
	6.5 6					8.5 5.5					
	8.5					12					
	13					9					
						12.5					
						13					
7	V_{SNAG}	Number of sn side of the str						Enter numb	per of snags	s on each	3.0
		I	_eft Side:	1			Right Side:		2		
8	V _{SSD}	Number of sa if tree cover is per 100 ft of s	s <20%).	Enter numb	er of sapling						Not Used
			_eft Side:				Right Side:		58		
9	V _{SRICH}	Riparian vege Group 1 in the richness per	e tallest s	tratum. Che	ck all exotic	and invasiv	ve species p	resent in al			3.20
		Group							2 (-1.0)		
	Acer rubr			Magnolia tri	ipetala		Ailanthus a		~	Lonicera ja	ponica
~	Acer sace	charum		Nyssa sylva	atica		Albizia julib	orissin		Lonicera ta	
	Aesculus	flava		Oxydendrum	arboreum		Alliaria peti	olata		Lotus corn	iculatus
	Asimina t	riloba		Prunus sero	otina		Alternanthe	era		Lythrum sa	licaria
	Betula alle	eghaniensis		Quercus all	ba		philoxeroid			Microstegiur	m vimineum
	Betula lei	nta		Quercus co	ccinea		Aster tatari	cus		Paulownia	tomentosa
	Carya alb	a		Quercus im	bricaria		Cerastium	fontanum		Polygonum	cuspidatum
	Carya gla	ibra		Quercus pr	inus		Coronilla va	aria		Pueraria m	ontana
	Carya ov	alis		Quercus ru	bra		Elaeagnus u	mbellata		Rosa multi	flora
1	Carya ov	ata		Quercus ve	lutina		Lespedeza	bicolor		Sorghum h	alepense
	Cornus fl	orida		Sassafras a	albidum		Lespedeza	cuneata		Verbena bi	rasiliensis
1	Fagus gra	andifolia		Tilia americ	ana		Ligustrum ob	otusifolium			
	Fraxinus	americana		Tsuga cana	densis		Ligustrum s	sinense			
~	Liriodendro	on tulipifera		Ulmus ame	ricana						
	Magnolia	acuminata									
		6 S	pecies in	Group 1				2	Species in	Group 2	
		0 0		choop i				<u> </u>			

	e Variables The four sub								one within	25 feet from	n each
10	V _{DETRITUS}				ticks, or oth t cover of th			ody debris . Subplot.	<4" diamete	er and <36"	45.63 %
			Left	Side			Righ	t Side] '	
		90 40	20 60			10 60	35 50				
11	V _{HERB}			over of herba	aceous vege			tree cover is	s <20%). De	o not	
			percentages					be several la cent cover c			Not Used
			Left	Side			Righ	t Side] '	
Sample	e Variable 1	2 within the	entire cat	chment of t	he stream						
12	V _{WLUSE}				e for watersh	ed:					1.00
	Land Use (Choose From Drop List) Runoff Score										Running Percent (not >100)
	Forest and n	ative range (>	-	1	100	100					
								•			
	-										
								•			
								•			
								-			
								-			
								•			
	Summary: S	SAA Numbe	r 17				No	tes:			
V	ariable	Value	VSI								
Vc	CANOPY	62 %	0.65								
VE	MBED	3.4	0.98								
Vs	UBSTRATE	5.25 in	1.00								
VB	ERO	15 %	0.99								
VL	WD	11.0	1.00								
VT	DBH	9.3	1.00								
	NAG	3.0	1.00								
Vs		Not Used	Not Used								
	RICH	3.20	1.00								
	ETRITUS	45.6 %	0.56								
	ERB	Not Used	Not Used								
Vw	LUSE	1	1.00								