

Attachment C-2

Stream Quality and Wetlands Assessment Report

**Addendum to Foundation Mine
Refuse Area Site Selection Study**

Foundation Mine

**STREAM QUALITY AND WETLANDS
ASSESSMENT REPORT**

Prepared for:

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1.0 INTRODUCTION

1.1 BACKGROUND

In March of 2009, Michael Baker Jr., Inc. submitted an analysis report titled *Foundation Mine Refuse Disposal Area Site Selection Study Alternatives Analysis*. Wallace and Pancher, Inc. (WPI) had prepared a detailed Stream and Wetland Assessment report which was included as an appendix within the master document submitted by Michael Baker Jr., Inc. Since the submission of this report, Foundation Coal has determined there is a necessity to focus on areas suitable for coarse coal refuse disposal as Foundation Coal predicts to have a significant amount of coarse refuse in the beginning stages of mining. The following report is an addendum to the WPI Stream and Wetland Assessment report and focuses on those areas that hold potential for coarse refuse disposal areas.

1.2 PURPOSE AND OBJECTIVES

The purpose of this addendum is to provide site assessments that provide baseline biological and chemical monitoring of benthic macroinvertebrate communities, stream habitat and water chemistry for sites selected as potential coarse coal refuse disposal areas. The biological and chemical monitoring data will be used to assess the pre-disturbance conditions in each of the selected areas and as a baseline to compare existing conditions between the alternate sites.

2.0 STUDY AREAS

CR-1B

This site is located north of Bristoria Road. Stream 40636 flows through the site and empties into the House Run mainstem. The majority of the area is forested with various networks of trails/access roads. This site is bordered on its western edge by an open agricultural field.

CR-4

The majority of this site is located along the south border of Church Hollow Road between its intersections with Butternut Hollow Road and Covered Bridge Road. Stream 40683, a tributary to South Fork Tenmile Creek, flows through this area. The majority of this area is moderately forested with large portions of pasture/agriculture field. There are a small number of homesteads located to the east of the project area.,.

CR-6

This site is located directly west of the Tower Road/Norman Hollow Road Intersection. This site is made up of primarily forest with agricultural/pasture fields bordering the outskirts and with one (1) occurring within the site. There is a small homestead located along the border of the site, with some associated driveways/access roads leading into the site area. Streams 40603 and 40603-R1, along with their associate tributaries flow through the site. Both of these streams and their tributaries are tributaries of Pursley Creek.

CR-8

This site is located along McQuay Road and is comprised of forested and agricultural land uses (pasture field/crop land). Streams 40673, 40673-L2, and 40673-R3 originate from, and flow through this area and are all tributaries of South Fork Tenmile Creek.

CR-9

This site is located south of the Pine Road/Rock Hill Road intersection and extends southward along the western side of Rock Hill Road. The area is heavily forested with only a small portion of the surrounding agricultural fields being included in its boundary. Stream 40882's headwaters and its associated tributaries flow through the site. There is a small dwelling just outside of the site boundary along the southeastern edge.

CR-11A

This site is located west of the Macedonia Road/Hampton Road intersection. The majority of the site is forested with fringes of agricultural/pasture field. Stream 40639 and some associated tributaries flow through the site. There is a farm located at the southern tip of this site along Macedonia Road.

CR-11B

This site is directly adjacent to CR-11A. Unlike CR-11A this site contains more open field/pasture land. Stream 40639-R5 and its associated tributaries flow through this site before entering stream 40639. There is a single homestead located within the northern site boundary and the same farm described in CR-11A occurs just outside of the northeastern boundary.

CR-12

This site is located north of the intersection of Bristoria Road and Knight Road; southeast of CR-11B. The entire site is heavily forested with stream 40635-L6 and associated tributaries originating within and flowing through the area. There are no structures within the site boundary.

CR 15

This site is located off of Golden Oaks Road. The area is forested but has numerous networks of dirt paths/access roads throughout. There is the presence of some agricultural/pasture fields in the area as well. Stream 40651 originates in the site boundary and flows through it. There is a farm and associated home located to the southeast of the proposed site.

CR-16

This site is located northeast of CR-15. This site shares the same characteristics as CR-15, but has more of a forest component. Stream 40650 originates in the site boundary and flows through it until emptying into Garner Run. There is a farm and associated home located to the southeast of the proposed site.

CR-17

This site is located directly north of CR-16, and shares a boundary with CR-16. This site is heavily forested, though does contain a network of scattered paths/access roads. Stream 40649 originates in the site and flows through the area along with its associated tributaries into Garner Run. There is a small home located to the southeast of the site.

CR-18

This site is located northeast of CR-17. An unnamed tributary flows through this site and into Garner Run. There is a small trailer that falls within the project boundary in the south eastern section.

CR-19A

This site is located south of the Edgar Road/Foxwood Road. The site is primarily forested with some areas of field/early successional species. Stream 40647-R8 and its associated tributaries originate within the site and flow into Grinnage Run. There are two homes located outside the site boundary; one (1) in the northeastern section and one (1) in the northwestern section.

CR-19B

This site is located east of the Grinnage Run Road/Tunnel Road Intersection. The site is mainly forested with a few small portions of agricultural/pasture fields on the outer edges. Stream 40647 (Grinnage Run mainstem) has its headwaters occurring within the site area along with a few associate tributaries. There are two (2) homesteads in close proximity to the boundary and one (1) that falls inside the boundary. The single home located inside the boundary is along the western border. The two (2) remaining homes located just outside the boundary in the northern section and western section, directly adjacent to the single home which falls inside the boundary.

CR-20

This site occurs east of the Grinnage Run Road/Cole Hollow Road intersection. The area is heavily forested with patches of less dense forest scattered throughout along with a

network of paths/access roads. Stream 40662's headwaters originate within the site boundary along with several associated tributaries. There is one home located outside of the western boundary.

CR-21

This site is located northeast of CR-20 along Center Highlands Road. As with CR-20, the area is heavily forested with patches of less dense forest and a network of paths/access roads scattered throughout. There are also some residential areas included within the site boundary. Stream 40661's headwaters originate within the site boundaries and flow southeast out of the site. There are three (3) residential areas within the site boundary; two (2) in the northern section and one (1) along the western section. There is also a single home located directly outside the northeastern section.

CR-22

This site is located northeast of CR-21 on Center Highlands Road. The area is mostly forested, but there are areas of field/pasture that are in the early stages of succession. There appears to be the presence and/or remnants of a few paths/access roads. There are three (3) homes lying within the site boundary and two (2) just outside the northeastern section of the boundary.

CR-23

This site is located northwest of the Butternut Hollow Road/Church Hill Road intersection. The majority of the site is forested; with the northern-most section containing a portion of open field/agricultural area. Stream 40668's headwaters originate within the site and the stream flows southeast out of the site. A small portion of the site is used for residential purposes; located within the north-central portion of the site. The home associated with this structure is located to the east of the project area..

CR-24

The approximate center of this site is marked by the intersection of Muddy Hollow Road and Church Hill Road. The entire site is heavily forested with the exception of a small

parcel of land in the northern section of the site and some small fields in the central portion. Stream 40705 originates within the site and flows northwest along Muddy Hollow Road.

CR-25

This site is abutting CR-Area #9 on its northwest corner. The site is heavily forested but has some open areas of field along the site margins. Stream 40642 originates and flows through the site. There is also a large pond that occurs within the site as well. There is a small house located within the western edge of the site boundary.

CR-26

This site is located east of the Golden Oaks Road/Crooked Hill Road intersection. The site is heavily forested with the presence of some open fields along the margins. There are several potential paths/access roads that occur on the site as well. Streams 40648 and 40648-L1 both originate in the site and flow northeast out the site.

CR-27

This site is located along Cole Hollow Road, just south of CR-20; these two (2) potential refuse areas share a common border. The site is mostly forested with some small, open areas of field scattered throughout. There is one residential dwelling located in the southwestern corner of this site. Stream 40663 and its associated tributaries (40663-L1, L2, and R3) originate in this site and flow slightly southeast out of the site. As with many of the other proposed sites, there is a network of access roads/paths within the site, most notably north of stream 40663.

CR-28A

This site is located northeast of the Foxwood/Edgar Road intersection. Much of the area is forested with some open/agricultural field areas included. There are two (2) residential dwelling located within this site; one (1) located within the site boundaries along the eastern border and one (1) within the far western border. Stream 40665-L1 originates in this site and flows southwest out the site into the 40665 mainstem.

CR-28B

This site is located directly south of CR-28A. The site is heavily forested and includes some areas of open/agricultural filed and residential landscapes along the outer rim of the site boundaries. Stream 40655 originates within this site and flows northeast out of the site. The boundaries of this site overlap into residential dwelling properties; one (1) occurs within, and along the southern boundary and the other occurs along the northwestern boundary.

CR-29

This site occurs west of the Turkey Hollow/Iron Rock Road intersection on Turkey Hollow Road. This site is predominantly forested with some less dense areas intermixed. There is one residential dwelling located just outside the site boundary at its northern-most tip. Stream 40659 and its associated tributaries (40659-L1 and R1) flow through the site and continue in a northeast direction. Streams 40659 and 40659-L1 originate on the site while 40659-R1 originates outside the site boundary and flows into it.

CR-30

This site is located west of the Buckhill/Willow Road intersection, with Willow Road passing through the site. The site is mostly forested but also contains definitive areas of open/agricultural/abandoned fields. There are five (5) residential dwelling on this site; two (2) in the eastern portion and three (3) in the western portion. Stream 40658 and its associated tributaries (40658-R2, R2a, and R3) originate within the site and flow west out of the site.

CR-Area #1

This site is located directly west of the Higgins Cemetery/Falling Timber Road intersection, with Falling Timber Road running through the site within the eastern boundary. The majority of this area is dominated by agricultural/pasture fields with forested patches occurring in the southern portion of the site. There is a single farm with numerous associated structures located at the center of the site. Falling Timber Run

(40627) and several associated tributaries (streams 40627-R1 and R1a) originate within the site and flow north out of the site.

CR-Area #3

This site is located south of the Shady/Mt. Zion Road intersection. The site has a core forested section in its northern half, but is bounded by fringes of open field. The southern half of the site is dominated by open/agricultural fields and patches of forest. There are four (4) residential dwellings that occur within the site boundary; three (3) in the southeastern corner and one (1) in the northeastern corner. Access to this site was denied by the property owner; therefore secondary source mapping was evaluated to determine the presence of streams. Existing GIS mapping does not show a stream in this area, although aerial photography suggests the presence of streams associated with a pond in the south-central region of the site.

CR-Area #4

This site occurs directly north of CR-Area #3. The majority of this site is forested with the presence of open fields in the southern portion and along the eastern boundary of the site. There are two (2) residential dwelling areas and one (1) cemetery located within the site boundary. The residential areas occur along the southeastern section of the boundary and the cemetery occurs along the northeastern section of the boundary. Access to this site was denied by the property owner; therefore secondary source mapping was evaluated to determine the presence of streams. GIS mapping shows that stream 41835 occurs within the site in the southwestern corner; however, upon further review of aerial imagery, it appears as though this stream continues further upstream than what current data displays, and there may be the presence of other tributaries within the site as well.

CR-Area #9

This site is located west of the Bristoria/Higgins Cemetery Road intersection. The site is dominated by pasture/agricultural fields, with some forested tracts in the southern half of the site. There are three (3) residential areas within the site; all along the eastern site boundary. There are two (2) additional residential dwellings just outside the northern

boundary reach. There is a single access road/path in the northern half of the site which runs the entire length of the site from East to West. Stream 32625 and its associated tributary (stream 32625-R1) originate within the site and flow north out of the site.

CR-Area #10A

This site is located southwest of the Hampton/Muddy Hollow Road intersection, with Muddy Hollow Road passing through the site. The site appears to be a nearly even split between forested area and open/agricultural fields. There are two (2) residential dwelling located within the site boundary; one (1) in the northeastern section and one (1) in the southwestern section. Streams 32622-R2 and R2c along with their associated tributaries flow south out of the site boundary.

CR-Area 10B1

This site is located southeast of Middy Hollow/Macedonia Road intersection. The site is primarily forested with early successional/open fields present in areas. There are no residential dwelling located within this site. Stream 40622-R1 and its associated tributary (stream 40622-R1c) originate within the site and drain southwest out of the site.

CR-Area 10B2

This site is located southeast of CR-Area-10B1. The area is predominantly forested with a small number of open field areas and one (1) residential area. The residential area is located within the southern boundary. The Webster Run mainstem (stream 32622) originates within this site and flows southwest out of the site. Two (2) additional streams flow north into the site and empty into the Webster Run mainstem (streams 32622-L3 and L4).

3.0 Biological Data

Water Chemistry Sampling and Analysis

Many of the sites included in this study area contain streams that were evaluated as part of the Foundation Underground Permit area, and therefore were subject to stream

classification and sampling per TGD 563-2000-655. *In situ* measurements of temperature, dissolved oxygen and pH were conducted at each Appendix A and Appendix B sampling station, in conjunction with the benthic macroinvertebrate sampling. All measurements were taken using a YSI 550A meter for dissolved oxygen and an Oakton Meter for pH, conductivity and temperature.

Physical Habitat

Physical habitat characteristics were also visually determined and recorded on the physical characterization/ water quality field data sheets. These data were used to evaluate the benthic community structure at each of the sampling stations. The physical habitat descriptors/ features observed and recorded during the field assessment included:

- (1) Visual appearance of water and sediment quality;
- (2) Water depths at each station;
- (3) Stream channel width;
- (4) Stream velocity;
- (5) Substrate composition (the proportion of cobble, gravel, sand and silt substrate)
- (6) Degree of canopy cover over the sample area; and
- (7) Description of vegetation.

Additionally, stream habitat was numerically scored at each sampling station using habitat assessment field data sheets. The United States Environmental Protection Agency (USEPA) classifies the relative value of habitat according to numerical scores as follows; (1) optimum (100-76%), (2) sub-optimal (75-51%), (3) Marginal (50-26%); and (4) Poor (25-0%). Percent scores are determined by applying a (12) metric analysis to the physical structure of the reach. Each metric has a possible score of (20), subdivided as follows; (20-16) optimal, (15-11) sub-optimal, (10-6) marginal and (5-0) represents poor habitat. Station total raw score is divided by total possible score of (240) to arrive at a percent score.

There are two separate indices for stream segments with high gradient (riffle/ run) morphology, or low gradient (pool/ glide) morphology. The scoring procedures and categories are identical for each; however the metrics are site specific to allow for

morphology variations among stream channel types. (It should be noted that WPI updated Stream Habitat Assessment protocols in the Fall of 2009. Formerly, all sampling events employed a 10 metric index with a total possible score of 200. Presently, the 12 metric index is in use to more accurately characterize conditions at the time of sampling.). The tables below illustrate the Appendix A and Appendix B sampling point results for those sites falling within specific proposed Coarse Refuse Disposal sites. Note: Several of the alternative sites could not be sampled due to lack of permission from landowners. Where possible, sampling was conducted at the nearest available stream downstream of the site (typically a public road bridge or culvert). However, several sites did not have suitable areas downstream that would characterize the conditions found within them, and therefore do not have data available.

Physiochemical and Stream Habitat Data of Appendix A sampling point for Foundation Coarse Coal Refuse sampling points.

Proposed Coarse Rufuse Site		CR-1B	CR-8						
			HOU T4 FU	RA 8 VAR	RA 8 FU	RA 8 T1 FU	RA 8 T2 FU	RA 8 T3 VAR	RA 8 T3 FU
Sample Site		11/10/06	05/29/07	11/06/07	04/22/08	10/21/08	03/16/09	02/23/10	04/05/10
Sample Date		7.51	7.14	6.55	7.03	NA	7.31	7.24	7.76
pH (Standard Units)		8.8	6.2	7.4	6.4	NA	5.6	6.0	9.7
Temperature (Degree Celsius)		8.93	11.34	11.4	10.9	NA	13.7	12.4	9.7
Dissolved Oxygen (Parts Per Million)		150	185.4	151	331	NA	217	259	366
Conductance (Micro Siemens)									
Habitat Score			62%	50%	46%	34%	37%	59%	46%

Proposed Coarse Rufuse Site		CR-9						
		RA 9 VAR	RA 9 T3 VAR	RA 9 T3A VAR	RA 9 T5 FU	RA 9 T5A FU	RA 9 T8 FU	RA 9 T4 DIV
Sample Site		12/27/07	12/27/07	12/27/07	12/27/07	12/27/07	12/27/07	12/27/07
Sample Date		7.07	7.3	7.4	7.01	7.22	6.95	7.16
pH (Standard Units)		6.9	5.8	5.9	5.6	5.9	6.7	7.8
Temperature (Degree Celsius)		11.75	12.0	9.6	11.54	11.7	9.98	5.7
Dissolved Oxygen (Parts Per Million)		135.7	255	245	842	129.4	198.5	219
Conductance (Micro Siemens)								
Habitat Score			56%	57%	52%	51%	50%	47%

Proposed Coarse Rufuse Site		CR-11A						
Sample Site	HOU T2b9 F.U.	HOU T2b11 F.U.	HOU T2b11c VAR	HOU T2b11 DIV	HOU T2b11 VAR	HOU T2b12 VAR	HOU T2b DIV	
Sample Date		12/29/06	12/29/06	12/29/06	12/29/06	12/29/06	12/29/06	12/29/06
pH (Standard Units)		7.31	7.16	7.75	7.35	7.08	7.72	7.69
Temperature (Degree Celsius)		6.4	8.6	8.9	7.8	6.3	6.3	3.3
Dissolved Oxygen (Parts Per Million)		10.8	9.78	11.66	9.59	8.91	11.40	12.72
Conductance (Micro Siemens)		149.6	160	231	174	145	136	188
Habitat Score		69%	65%	73%	66%	69%	71%	68%

Proposed Coarse Rufuse Site		CR-11B	CR-15	CR-16	CR-17	CR-28B	CR-Area #1	CR-Area #9
Sample Site	HOU T2a DIV	GAR T4 FU	GAR T3 FU	GAR T2 FU	HAR T7 FU	FT FU	WR T5c FU	
Sample Date		11/10/06	11/30/06	11/30/06	11/02/06	11/30/06	11/29/06	11/28/06
pH (Standard Units)		8.24	7.75	8.29	7.71	7.32	7.64	7.61
Temperature (Degree Celsius)		9.3	11.9	12.5	9.1	11.8	11.0	9.0
Dissolved Oxygen (Parts Per Million)		12.66	10.10	9.62	9.60	9.25	9.86	7.08
Conductance (Micro Siemens)		146	159	162	151	190	194	159
Habitat Score		72%	71%	66%	62%	66%	65%	33%

Proposed Coarse Rufuse Site		CR-20						CR-22	
Sample Site	HAR T9A5 VAR	HAR T9A VAR	HAR T9A4 VAR	HAR T9A6 VAR	HAR T9A3 FU	HAR T9A2 FU	HAR T15 FU	HAR T15G FU	
Sample Date	12/29/06	12/29/06	12/29/06	12/29/06	12/29/06	12/29/06	11/02/06	11/02/06	
pH (Standard Units)	7.97	7.51	7.8	7.45	7.75	7.43	7.3	7.41	
Temperature (Degree Celsius)	6.1	5.7	6.4	7	6.1	4.9	11.0	9.6	
Dissolved Oxygen (Parts Per Million)	8.8	9.5	9.3	8.1	9.6	9.4	8.80	9.40	
Conductance (Micro Siemens)	334	131	134	231	132	180	220	171	
Habitat Score	59%	62%	64%	47%	60%	59%	68%	73%	

Proposed Coarse Rufuse Site	CR-25							
Sample Site	HOU T7b VAR	HOU T7b1 VAR	HOU T7b2 DIV	HOU T7b3 DIV	HOU T7b4 DIV	HOU T7b7 DIV	HOU T7b8 VAR	HOU T7b9 DIV
Sample Date	01/03/07	01/03/07	01/03/07	01/03/07	01/03/07	01/04/07	01/04/07	01/04/07
pH (Standard Units)	7.57	7.56	7.63	7.91	7.56	7.88	8.01	7.62
Temperature (Degree Celsius)	4.9	7.3	8.0	7.8	8.7	6.8	6.7	6.6
Dissolved Oxygen (Parts Per Million)	10.3	10.2	9.1	9.5	8.3	8.9	8.6	9.1
Conductance (Micro Siemens)	196	185	190	238	178	314	224	191
Habitat Score	70%	67%	59%	56%	59%	68%	61%	59%

Proposed Coarse Rufuse Site	CR-27							
Sample Site	HAR T9b F.U.	HAR T9b5 F.U.	HAR T9b5 VAR	HAR T9b3 F.U.	HAR T9b3 DIV	HAR T9b4 VAR	HAR T9b2 VAR	
Sample Date	12/29/06	12/29/06	12/29/06	12/29/06	12/29/06	12/29/06	12/29/06	
pH (Standard Units)	7.61	7.47	7.78	7.06	7.17	7.33	7.47	
Temperature (Degree Celsius)	6.1	6.5	6.0	6.8	7.6	6.3	6.6	
Dissolved Oxygen (Parts Per Million)	8.7	8.2	8.7	7.3	6.8	8.5	8.3	
Conductance (Micro Siemens)	199	163	156	204	198	188	173	
Habitat Score	66%	55%	66%	65%	66%	45%	55%	

Proposed Coarse Rufuse Site	CR-Area #10A										
Sample Site	WR T1b3 F.U.	WR T1b3 VAR	WR T1b4 F.U.	WR T1b DIV	WR T1b1 DIV	WR T1c VAR	WR T1c1 DIV	WR T1d F.U.	WR T1d VAR	WR T1 DIV	
Sample Date	01/09/07	01/09/07	01/09/07	01/09/07	01/04/07	01/04/07	01/04/07	01/04/07	01/04/07	01/04/07	
pH (Standard Units)	7.8	7.82	7.85	7.83	7.7	7.64	7.95	7.63	7.61	7.69	7.61
Temperature (Degree Celsius)	5.7	6.5	6.9	7.9	7.8	8.5	9.2	8.1	7.2	7.7	0.4
Dissolved Oxygen (Parts Per Million)	11.4	11.2	11.2	10.4	9.6	9.0	8.2	9.0	8.3	8.8	12.6
Conductance (Micro Siemens)	183	167	157	179	181	187	226	178	184	172	210.0
Habitat Score	63%	64%	62%	68%	53%	60%	75%	57%	60%	68%	44%

Proposed Coarse Rufuse Site		CR-Area #10B1				CR-Area #10B2	
		WR T4 DIV	WR T4a DIV	WR T4c VAR	WR T4e F.U.	WR F.U.	WR VAR
Sample Site		11/09/07	11/09/07	11/09/07	11/09/07	11/10/06	11/10/06
Sample Date		7.71	7.64	7.8	7.33	7.55	8.01
pH (Standard Units)		6.5	6.3	6.2	5.9	10.7	10.3
Temperature (Degree Celsius)		11.1	10.4	10.8	10.5	9.27	10.02
Dissolved Oxygen (Parts Per Million)		170	218	189	187	197	145
Conductance (Micro Siemens)							
Habitat Score		70%	66%	66%	71%	66%	67%

Physiochemical and Stream Habitat Data of Appendix B sampling for Foundation Coarse Coal Refuse sampling points.

Proposed Coarse Rufuse Site	CR-11A							
Sample Site	HOU 14							
Sample Date	04/04/07	05/30/07	12/10/07	04/22/08	10/20/08	03/04/09	03/01/10	04/16/10
pH (Standard Units)	7.6	7.95	6.76	7.45	N/A (Dry)	7.75	7.61	7.72
Temperature (Degree Celsius)	12.4	15.9	8.3	13.5	N/A (Dry)	3.2	2.9	12.0
Dissolved Oxygen (Parts Per Million)	9.54	9.98	21.28	13.43	N/A (Dry)	13.50	14.26	9.0
Conductance (Micro Siemens)	148.7	169	114.4	157.1	N/A (Dry)	177	147.1	146.6
Habitat Score	61%	59%	67%	68%	41%	66%	61%	58%

Proposed Coarse Rufuse Site	CR-11A							
Sample Site	HOU 15							
Sample Date	04/04/07	05/30/07	11/07/07	04/22/08	10/20/08	03/04/09	11/05/09	04/16/10
pH (Standard Units)	7.71	7.83	7.76	7.61	N/A (Dry)	7.67	7.62	7.66
Temperature (Degree Celsius)	13.4	15.7	5.9	15.8	N/A (Dry)	0.0	7.5	16.1
Dissolved Oxygen (Parts Per Million)	7.49	9.89	13.2	12.58	N/A (Dry)	12.90	6.29	9.2
Conductance (Micro Siemens)	149.6	194.6	220	154	N/A (Dry)	152.4	188.8	151.9
Habitat Score	58%	63%	66%	67%	51%	77%	75%	67%

Proposed Coarse Rufuse Site	CR-29							
Sample Site	HAR T14b							
Sample Date	04/04/07	05/31/07	11/07/07	04/16/08	10/20/08	03/05/09	02/05/10	02/24/10
pH (Standard Units)	7.63	7.57	7.71	7.75	N/A (Dry)	7.67	7.95	7.47
Temperature (Degree Celsius)	10.9	18.6	7.1	5.2	N/A (Dry)	1.2	1.7	3.1
Dissolved Oxygen (Parts Per Million)	14	8.7	10.1	20.4	N/A (Dry)	15.0	14.3	13.5
Conductance (Micro Siemens)	175.6	215	230	197.7	N/A (Dry)	166.4	164.1	159
Habitat Score	77%	89%	55%	63%	40%	71%	76%	67%

Proposed Coarse Rufuse Site	CR-Area #10A							
Sample Site	WR 6							
Sample Date	04/10/07	05/29/07	11/06/07	04/22/08	10/21/08	03/16/09	02/23/10	04/05/10
pH (Standard Units)	7.82	7.42	7.77	7.77	N/A (Dry)	7.79	7.73	7.91
Temperature (Degree Celsius)	11.9	25.2	7.0	12.4	N/A (Dry)	8.5	1.6	15.8
Dissolved Oxygen (Parts Per Million)	2.84	5.46	12.0	19.9	N/A (Dry)	9.7	13.8	10.9
Conductance (Micro Siemens)	153	252	225	180	N/A (Dry)	175	187	175
Habitat Score	36%	36%	58%	45%	43%	45%	49%	51%

Proposed Coarse Rufuse Site	CR-Area #10B1							
Sample Site	WR 8							
Sample Date	04/10/07	05/30/07	11/06/07	04/22/08	10/21/08	03/16/09	02/23/10	03/30/10
pH (Standard Units)	7.96	7.95	7.94	7.74	N/A (Dry)	8.2	7.5	7.55
Temperature (Degree Celsius)	7.7	14.3	7.0	13.5	N/A (Dry)	8.9	2.9	10.2
Dissolved Oxygen (Parts Per Million)	3.94	9.20	12.9	16.7	N/A (Dry)	12.6	13.6	11.3
Conductance (Micro Siemens)	189.6	174	301	190.4	N/A (Dry)	171	118.8	154.4
Habitat Score	64%	66%	63%	61%	34%	63%	65%	70%

Summary of Average Physiochemical and Stream Habitat Data for Appendix A Points for Foundation Proposed Coarse Refuse sites.

Proposed Coarse Refuse Site		CR-1B	CR-8	CR-9	CR-11A	CR-11B	CR-15	CR-16	CR-17
Average pH (Standard Units)		7.51	7.17	7.16	7.44	8.24	7.75	8.29	7.71
Average Temperature (Degree Celsius)		8.8	6.9	6.40	6.8	9.3	11.9	12.5	9.1
Average Dissolved Oxygen (Parts Per Million)		8.93	11.58	10.32	10.7	12.66	10.10	9.62	9.60
Average Conductance (Micro Siemens)		150	251.6	289.23	169.09	146	159	162	151
Average Habitat Score		62%	48%	52%	69%	72%	71%	66%	62%

Proposed Coarse Refuse Site		CR-28B	CR-Area #1	CR-Area #9	CR-20	CR-22	CR-25	CR-27	CR-Area #10A
Average pH (Standard Units)		7.32	7.64	7.61	7.65	7.36	7.72	7.41	7.74
Average Temperature (Degree Celsius)		11.8	11.0	9.0	6.0	10.3	7.1	6.6	6.9
Average Dissolved Oxygen (Parts Per Million)		9.25	9.86	7.08	9.1	9.1	9.25	8.07	9.97
Average Conductance (Micro Siemens)		190	194	159	190.33	195.5	214.5	183	184
Average Habitat Score		66%	65%	33%	59%	71%	62%	60%	61%

Proposed Coarse Refuse Site		CR-Area #10B1	CR-Area #10B2
Average pH (Standard Units)		7.62	7.78
Average Temperature (Degree Celsius)		6.2	10.5
Average Dissolved Oxygen (Parts Per Million)		10.70	9.65
Average Conductance (Micro Siemens)		191	171
Average Habitat Score		68%	67%

Summary of Average Physiochemical and Stream Habitat Data for Appendix B Points for Foundation Proposed Coarse Refuse sites.

Proposed Coarse Rufuse Site		CR-11A	CR-29	CR-Area #10A	CR-Area #10B1
Sample Site		HOU 14	HOU 15	HAR T14b	WR 6
Average pH (Standard Units)		7.55	7.69	7.68	7.74
Average Temperature (Degree Celsius)		9.74	10.63	6.83	11.8
Average Dissolved Oxygen (Parts Per Million)		13	10.22	13.71	10.7
Average Conductance (Micro Siemens)		151.41	173.04	186.83	192.41
Average Habitat Score		60%	66%	67%	45%
					61%

4.0 Summary

The following brief summary intends to provide an overall picture of the current water quality and habitat availability of the sites considered for coarse refuse disposal. Of all the available sampling points located within potential refuse sites, three (3) of them (CR-8, CR-Area #9, and CR-Area #10A) had habitat scores within the marginal range. The remaining sites all scored in the sub-optimal range for habitat ratings.

Additionally, these alternative sites (CR-8, CR-Area #9, and CR-Area #10A) have current land cover/land use that is predominantly open field areas, reducing the amount of potential forest impacts if any of these sites would be selected as the disposal area.

Across all potential refuse areas, pH readings ranged from 7.16-8.29, Dissolved Oxygen readings ranged from 7.08-13.71 PPM, Conductivity ranged from 146-289 mS, and Habitat Scores ranged from 33-72%.

Those sites containing sample locations with higher average pH readings (above 8) were CR-11B and CR-16. Sites with lower average Dissolve Oxygen readings were CR-1B, CR-Area #9, and CR-27. Sites with higher average Conductivity out of all sites were CR-8, CR-9, and CR-25.

In general, all potential refuse sites are generally conducive to aquatic life. Based upon the analysis presented herein, no sites stand out as being any more or less suitable for use as a Coarse Refuse Disposal area. While three sites did have slightly depressed habitat scores and a lack of forested area, these areas were not found to be significantly impacted in such a way to make them stand out as obvious sites for development.



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	11/10/2006
Time:	10:25
Investigator:	JNA, LMD, MRW, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU T4
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		60%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	0%
Gravel	2-64 mm (.1"-2.5")	25%
Sand	.06-2 mm (gritty)	15%
Silt	.004-.06 mm	0%
Clay	<.004 mm (slick)	0%

Use Classification:	
Diverse	
Variable	
First Use	X

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	11
2. Pool Substrate Characterization	5
3. Pool Variability	3
4. Sediment Deposition	17
5. Channel Flow Status	10
6. Channel Alteration	17
7. Channel Sinuosity	7
8. Bank Stability	
LB	8
RB	8
9. Vegetative Protection	
LB	9
RB	10
10. Riparian Vegetative Zone Width	
LB	9
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	45%
Pool	0%
Run	55%

Notes:
No macros

Dominant Macro Families		



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/28/2007
Time:	9:40am
Investigator:	SG, GG

Project Name/Area:	Foundation Mine Refuse Area
Sample Identifier:	RA 8 VAR
Heavy Rain In Past 7 Days?	y

Mainstem:	x	Tributary:	
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Use Classification:	
Diverse	
Variable	x
First Use	

Land Use %	
Residential	20%
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	60%
Cropland	
Pasture	20%
Other	

Physiochemical Data	
Stream Width (Feet)	3
Stream Depth (Inches)	1.5
pH	7.14
Temp. (°C)	6.2
Conductivity (uohms)	185.4
D.O. (mg/L)	11.34
Velocity (ft/sec)	0.1
% CPOM	40%
% FPOM	
Wetted Width (Feet)	1.5
% Morphology Types:	
Riffle	40%
Pool	60%
Run	

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	30%
Gravel	2-64 mm (.1"-2.5")	40%
Sand	.06-2 mm (gritty)	10%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	10%

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	10
2. Pool Substrate Characterization	8
3. Pool Variability	16
4. Sediment Deposition	13
5. Channel Flow Status	10
6. Channel Alteration	14
7. Channel Sinuosity	6
8. Bank Stability	
LB	3
RB	3
9. Vegetative Protection	
LB	2
RB	2
10. Riparian Vegetative Zone Width	
LB	3
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

Notes: Trash in stream (appliances)

Dominant Macro Families	Crangonyctidae-1	
	Cambaridae-1	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/28/2007
Time:	8:45am
Investigator:	GG, SG

Project Name/Area:	Foundation Mine Refuse Area
Sample Identifier:	RA 8 FU
Heavy Rain In Past 7 Days?	y

Mainstem:	x	Tributary:
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Use Classification:	
Diverse	
Variable	
First Use	x

Land Use %	
Residential	20%
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	60%
Cropland	
Pasture	20%
Other	

Physiochemical Data	
Stream Width (Feet)	5
Stream Depth (Inches)	0.5
pH	6.55
Temp. (°C)	7.4
Conductivity (uohms)	151
D.O. (mg/L)	11.4
Velocity (ft/sec)	0.1
% CPOM	60%
% FPOM	
Wetted Width (Feet)	1
% Morphology Types:	
Riffle	60%
Pool	40%
Run	

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	10%
Cobble	64-256 mm (2.5"-10")	20%
Gravel	2-64 mm (.1"-2.5")	40%
Sand	.06-2 mm (gritty)	10%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	10%

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	10
2. Pool Substrate Characterization	8
3. Pool Variability	10
4. Sediment Deposition	13
5. Channel Flow Status	6
6. Channel Alteration	16
7. Channel Sinuosity	4
8. Bank Stability	
LB	4
RB	4
9. Vegetative Protection	
LB	2
RB	2
10. Riparian Vegetative Zone Width	
LB	3
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

Notes: Trash in stream (appliances)	
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Dominant Macro Families	
	NO MACROS



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/28/2007
Time:	9:10am
Investigator:	SG, GG

Project Name/Area:	Foundation Mine Refuse Area
Sample Identifier:	RA 8 T1 FU
Heavy Rain In Past 7 Days?	y

Mainstem:	Tributary:	x
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Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	20%
Cobble	64-256 mm (2.5"-10")	10%
Gravel	2-64 mm (.1"-2.5")	40%
Sand	.06-2 mm (gritty)	10%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	10%

Land Use %	
Residential	20%
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	60%
Cropland	
Pasture	20%
Other	

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	8
2. Pool Substrate Characterization	8
3. Pool Variability	0
4. Sediment Deposition	13
5. Channel Flow Status	8
6. Channel Alteration	13
7. Channel Sinuosity	1
8. Bank Stability	
LB	4
RB	4
9. Vegetative Protection	
LB	2
RB	2
10. Riparian Vegetative Zone Width	
LB	2
RB	2
Max. Score = 200	Total
Total/200*100=	Habitat Score

Physiochemical Data	
Stream Width (Feet)	3.5
Stream Depth (Inches)	0.25
pH	7.03
Temp. (°C)	6.4
Conductivity (uohms)	331
D.O. (mg/L)	10.92
Velocity (ft/sec)	0.01
% CPOM	70%
% FPOM	
Wetted Width (Feet)	1
% Morphology Types:	
Riffle	10%
Pool	90%
Run	

Notes: Road runoff and trash in stream

Dominant Macro Families	
	NO MACROS



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date: 12/28/2007	Project Name/Area: Foundation Mine Refuse Area	
Time: 9:50am	Sample Identifier: RA 8 T2 FU	
Investigator: SG, GG	Heavy Rain In Past 7 Days? y	
Mainstem: <input checked="" type="checkbox"/> Tributary: <input type="checkbox"/>	Substrate Type: Diameter % Composition	
	Bedrock	
	Boulder	<256 mm(10") 40%
	Cobble	64-256 mm (2.5"-10") 20%
	Gravel	2-64 mm (.1"-2.5") 20%
	Sand	.06-2 mm (gritty) 10%
	Silt	.004-.06 mm
	Clay	<.004 mm (slick) 10%
Land Use %	Habitat Assessment Parameters: Score	
Residential 20%	1. Epifanual Substrate/Available Cover 5	
Abd. Mining	2. Pool Substrate Characterization 0	
Commercial / Industrial	3. Pool Variability 0	
Old Fields	4. Sediment Deposition 13	
Forest 60%	5. Channel Flow Status 6	
Cropland	6. Channel Alteration 20	
Pasture 20%	7. Channel Sinuosity 0	
Other	8. Bank Stability LB 3	
	RB 3	
Physiochemical Data	9. Vegetative Protection LB 2	
Stream Width (Feet) 1.5	RB 2	
Stream Depth (Inches) 0.25	10. Riparian Vegetative Zone Width LB 10	
pH	RB 10	
Temp. (°C)	Max. Score = 200 Total 74	
Conductivity (uohms)	Total/200*100= Habitat Score 37%	
D.O. (mg/L)		
Velocity (ft/sec) 0.01		
% CPOM 60%		
% FPOM		
Wetted Width (Feet) 3 inches		
% Morphology Types:	Notes: Stream has some sediment sorting and a spring but the stream is less than 25 feet in length	
Riffle 100%		
Pool		
Run		
Dominant Macro Families		
	NO MACROS	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/28/2007
Time:	11:30am
Investigator:	SG, GG

Project Name/Area:	Foundation Mine Refuse Area
Sample Identifier:	RA 8 T3 VAR
Heavy Rain In Past 7 Days?	y

Mainstem:	Tributary:	x
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Use Classification:	
Diverse	
Variable	x
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	60%
Cropland	40%
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	3
Stream Depth (Inches)	1
pH	7.31
Temp. (°C)	5.6
Conductivity (uohms)	217
D.O. (mg/L)	13.7
Velocity (ft/sec)	1
% CPOM	20%
% FPOM	
Wetted Width (Feet)	1.5
% Morphology Types:	
Riffle	80%
Pool	20%
Run	

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	
Gravel	2-64 mm (.1"-2.5")	70%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	
Clay	<.004 mm (slick)	10%

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	18
2. Pool Substrate Characterization	8
3. Pool Variability	8
4. Sediment Deposition	16
5. Channel Flow Status	10
6. Channel Alteration	20
7. Channel Sinuosity	8
8. Bank Stability	
LB	3
RB	3
9. Vegetative Protection	
LB	2
RB	2
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score
	59%

Notes:

Dominant Macro Families	Chloroperlidae-1
	Planaria-1
	Unknown-1



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/28/2007
Time:	10:30am
Investigator:	SG, GG

Project Name/Area:	Foundation Mine Refuse Area
Sample Identifier:	RA 8 T3 FU
Heavy Rain In Past 7 Days?	y

Mainstem:	Tributary:	x
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Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	20%
Gravel	2-64 mm (.1"-2.5")	40%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	
Clay	<.004 mm (slick)	20%

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	60%
Cropland	40%
Pasture	
Other	

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	8
2. Pool Substrate Characterization	8
3. Pool Variability	5
4. Sediment Deposition	13
5. Channel Flow Status	10
6. Channel Alteration	20
7. Channel Sinuosity	5
8. Bank Stability	
LB	3
RB	3
9. Vegetative Protection	
LB	2
RB	2
10. Riparian Vegetative Zone Width	
LB	3
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

Notes:

Dominant Macro Families	
	NO MACROS



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/7/2008
Time:	12:47 PM
Investigator:	MRW, JK

Project Name/Area:	Foundation Mine Refuse Area
Sample Identifier:	RA 8 T7 DIV
Heavy Rain In Past 7 Days?	NO

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	15%
Cobble	64-256 mm (2.5"-10")	15%
Gravel	2-64 mm (.1"-2.5")	20%
Sand	.06-2 mm (gritty)	15%
Silt	.004-.06 mm	15%
Clay	<.004 mm (slick)	20%

Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	75%
Cropland	
Pasture	20%
Other	5%

Physiochemical Data	
Stream Width (Feet)	4
Stream Depth (Inches)	0.5
pH	7.76
Temp. (°C)	9.7
Conductivity (uohms)	366
D.O. (mg/L)	9.7
Velocity (ft/sec)	0.37
% CPOM	0%
% FPOM	0%
Wetted Width (Feet)	1.5
% Morphology Types:	
Riffle	75%
Pool	15%
Run	10%

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	16
2. Pool Substrate Characterization	11
3. Pool Variability	13
4. Sediment Deposition	19
5. Channel Flow Status	14
6. Channel Alteration	20
7. Channel Sinuosity	7
8. Bank Stability	
LB	6
RB	6
9. Vegetative Protection	
LB	5
RB	5
10. Riparian Vegetative Zone Width	
LB	1
RB	3
Max. Score = 200	Total
Total/200*100=	Habitat Score
	126
	63%

Macro Jackpot

Dominant Macro Families	Chloroperlidae 1
Glossostomatidae 1	Corydalidae 1
Hydropsychidae 1	Tipulidae 1
Perlidae 1	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/27/2007
Time:	12:00pm
Investigator:	MRW, GG

Project Name/Area:	Foundation Mine Refuse Area
Sample Identifier:	RA 9 VAR
Heavy Rain In Past 7 Days?	y

Mainstem:	x	Tributary:	
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Use Classification:	
Diverse	
Variable	x
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	90%
Cropland	10%
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	3
Stream Depth (Inches)	1
pH	7.07
Temp. (°C)	6.9
Conductivity (uohms)	135.7
D.O. (mg/L)	11.75
Velocity (ft/sec)	0.1
% CPOM	60%
% FPOM	
Wetted Width (Feet)	1
% Morphology Types:	
Riffle	10%
Pool	90%
Run	

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	10%
Cobble	64-256 mm (2.5"-10")	20%
Gravel	2-64 mm (.1"-2.5")	50%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	
Clay	<.004 mm (slick)	

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	11
2. Pool Substrate Characterization	10
3. Pool Variability	5
4. Sediment Deposition	16
5. Channel Flow Status	10
6. Channel Alteration	20
7. Channel Sinuosity	5
8. Bank Stability	
LB	4
RB	4
9. Vegetative Protection	
LB	2
RB	2
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

Notes:

Dominant Macro Families	Crangonyctidae-1	
	Tipulidae-1	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/27/2007
Time:	1:00pm
Investigator:	MRW, GG

Project Name/Area:	Foundation Mine Refuse Area
Sample Identifier:	RA 9 T3 VAR
Heavy Rain In Past 7 Days?	y

Mainstem:	Tributary:	x
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Use Classification:	
Diverse	
Variable	x
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	90%
Cropland	10%
Pasture	
Other	

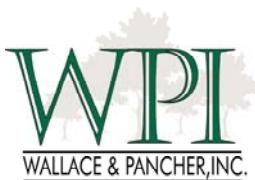
Physiochemical Data	
Stream Width (Feet)	3.5
Stream Depth (Inches)	1
pH	7.3
Temp. (°C)	5.8
Conductivity (uohms)	255
D.O. (mg/L)	11.98
Velocity (ft/sec)	0.2
% CPOM	50%
% FPOM	
Wetted Width (Feet)	1
% Morphology Types:	
Riffle	50%
Pool	50%
Run	

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	10%
Gravel	2-64 mm (.1"-2.5")	60%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	
Clay	<.004 mm (slick)	10%

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	13
2. Pool Substrate Characterization	6
3. Pool Variability	16
4. Sediment Deposition	15
5. Channel Flow Status	7
6. Channel Alteration	20
7. Channel Sinuosity	6
8. Bank Stability	
LB	3
RB	3
9. Vegetative Protection	
LB	2
RB	2
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score
	57%

Notes:

Dominant Macro Families	Corydalidae-1
	Limnephilidae-1



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/27/2007
Time:	1:15pm
Investigator:	MRW, GG

Project Name/Area:	Foundation Mine Refuse Area
Sample Identifier:	RA 9 T3a VAR
Heavy Rain In Past 7 Days?	y

Mainstem:	Tributary:	x
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Use Classification:	
Diverse	
Variable	x
First Use	

Land Use %	
Residential	10%
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	90%
Cropland	
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	1.5
Stream Depth (Inches)	0.5
pH	7.4
Temp. (°C)	5.9
Conductivity (uohms)	245
D.O. (mg/L)	9.6
Velocity (ft/sec)	0.1
% CPOM	40%
% FPOM	
Wetted Width (Feet)	0.5
% Morphology Types:	
Riffle	60%
Pool	40%
Run	

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	10%
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	30%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	20%

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	13
2. Pool Substrate Characterization	8
3. Pool Variability	5
4. Sediment Deposition	16
5. Channel Flow Status	8
6. Channel Alteration	20
7. Channel Sinuosity	5
8. Bank Stability	
LB	2
RB	2
9. Vegetative Protection	
LB	2
RB	2
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

Notes:

Dominant Macro Families	Glossosomatidae-1	
	Perlodidae-1	
	Planaria-1	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/27/2007	Project Name/Area:	Foundation Mine Refuse Area
Time:	2:15 PM	Sample Identifier:	RA 9 T5 FU
Investigator:	MRW, GG	Heavy Rain In Past 7 Days?	y
Mainstem:	Tributary:	x	
Use Classification:			
Diverse			
Variable			
First Use		x	
Land Use %			
Residential		10%	
Abd. Mining			
Commercial / Industrial			
Old Fields			
Forest		90%	
Cropland			
Pasture			
Other			
Physiochemical Data			
Stream Width (Feet)		3	
Stream Depth (Inches)		0.25	
pH		7.01	
Temp. (°C)		5.6	
Conductivity (uohms)		84.2	
D.O. (mg/L)		11.54	
Velocity (ft/sec)		0.1	
% CPOM		20%	
% FPOM			
Wetted Width (Feet)		3 inches	
% Morphology Types:			
Riffle		30%	
Pool		70%	
Run			
Dominant Macro Families		NO MACROS	
Habitat Assessment Parameters:			
1. Epifanual Substrate/Available Cover			Score 9
2. Pool Substrate Characterization			8
3. Pool Variability			4
4. Sediment Deposition			16
5. Channel Flow Status			8
6. Channel Alteration			20
7. Channel Sinuosity			5
8. Bank Stability			
			LB 2
			RB 2
9. Vegetative Protection			
			LB 4
			RB 4
10. Riparian Vegetative Zone Width			
			LB 10
			RB 10
Max. Score = 200			Total 102
Total/200*100=			Habitat Score 51%
Notes: Dry until the confluence with RA 9 T5a			



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/27/2007
Time:	2:00pm
Investigator:	MRW, GG

Project Name/Area:	Foundation Mine Refuse Area
Sample Identifier:	RA 9 T5a FU
Heavy Rain In Past 7 Days?	y

Mainstem:	Tributary:	x
-----------	------------	---

Use Classification:	
Diverse	
Variable	
First Use	x

Land Use %	
Residential	10%
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	90%
Cropland	
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	1.5
Stream Depth (Inches)	0.25
pH	7.22
Temp. (°C)	5.9
Conductivity (uohms)	129.4
D.O. (mg/L)	11.67
Velocity (ft/sec)	0.1
% CPOM	30%
% FPOM	
Wetted Width (Feet)	0.5
% Morphology Types:	
Riffle	70%
Pool	30%
Run	

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	40%

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	5
2. Pool Substrate Characterization	8
3. Pool Variability	5
4. Sediment Deposition	16
5. Channel Flow Status	9
6. Channel Alteration	20
7. Channel Sinuosity	6
8. Bank Stability	
LB	3
RB	3
9. Vegetative Protection	
LB	2
RB	2
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

Notes: Stream dries up before it flows into RA 9 T5

Dominant Macro Families	
	NO MACROS



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date: 12/27/2007	Project Name/Area: Foundation Mine Refuse Area																																						
Time: 2:30pm	Sample Identifier: RA 9 T8 FU																																						
Investigator: MRW, GG	Heavy Rain In Past 7 Days? y																																						
Mainstem: <input checked="" type="checkbox"/> Tributary: <input type="checkbox"/>																																							
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">Use Classification:</th> </tr> <tr> <td>Diverse</td> <td></td> </tr> <tr> <td>Variable</td> <td></td> </tr> <tr> <td>First Use</td> <td><input checked="" type="checkbox"/></td> </tr> </table>		Use Classification:		Diverse		Variable		First Use	<input checked="" type="checkbox"/>																														
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<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2">Land Use %</th> </tr> <tr> <td>Residential</td> <td>10%</td> </tr> <tr> <td>Abd. Mining</td> <td></td> </tr> <tr> <td>Commercial / Industrial</td> <td></td> </tr> <tr> <td>Old Fields</td> <td></td> </tr> <tr> <td>Forest</td> <td>90%</td> </tr> <tr> <td>Cropland</td> <td></td> </tr> <tr> <td>Pasture</td> <td></td> </tr> <tr> <td>Other</td> <td></td> </tr> </table>		Land Use %		Residential	10%	Abd. Mining		Commercial / Industrial		Old Fields		Forest	90%	Cropland		Pasture		Other																					
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RB	4																																						
9. Vegetative Protection																																							
LB	2																																						
RB	2																																						
10. Riparian Vegetative Zone Width																																							
LB	10																																						
RB	10																																						
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Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/27/2007
Time:	1:40pm
Investigator:	MRW, GG

Project Name/Area:	Foundation Mine Refuse Area
Sample Identifier:	RA 9 T4 DIV
Heavy Rain In Past 7 Days?	y

Mainstem:	Tributary:	x
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Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	10%
Gravel	2-64 mm (.1"-2.5")	20%
Sand	.06-2 mm (gritty)	
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	60%

Land Use %	
Residential	10%
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	90%
Cropland	
Pasture	
Other	

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	11
2. Pool Substrate Characterization	8
3. Pool Variability	5
4. Sediment Deposition	16
5. Channel Flow Status	7
6. Channel Alteration	20
7. Channel Sinuosity	5
8. Bank Stability	
LB	4
RB	4
9. Vegetative Protection	
LB	2
RB	2
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score
	52%

Physiochemical Data	
Stream Width (Feet)	4
Stream Depth (Inches)	0.5
pH	7.16
Temp. (°C)	7.8
Conductivity (uohms)	219
D.O. (mg/L)	5.7
Velocity (ft/sec)	0.1
% CPOM	60%
% FPOM	
Wetted Width (Feet)	1
% Morphology Types:	
Riffle	30%
Pool	70%
Run	

Notes:

Dominant Macro Families	Corydalidae-1
	Rhyacophilidae-1
	Perlodidae-1



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	9:45
Investigator:	LMD, MRW

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU T2b9
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	0%
Gravel	2-64 mm (.1"-2.5")	0%
Sand	.06-2 mm (gritty)	50%
Silt	.004-.06 mm	50%
Clay	<.004 mm (slick)	0%

Use Classification:	
Diverse	
Variable	
First Use	X

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	10
2. Pool Substrate Characterization	10
3. Pool Variability	6
4. Sediment Deposition	18
5. Channel Flow Status	15
6. Channel Alteration	20
7. Channel Sinuosity	7
8. Bank Stability	
LB	6
RB	6
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	50%
Pool	50%
Run	0%

Notes:

Dominant Macro Families	
Oligochaete=	1



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	11:40
Investigator:	LMD, MRW

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU T2b11
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	5%
Gravel	2-64 mm (.1"-2.5")	20%
Sand	.06-2 mm (gritty)	60%
Silt	.004-.06 mm	15%
Clay	<.004 mm (slick)	0%

Use Classification:	
Diverse	
Variable	
First Use	X

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	10
2. Pool Substrate Characterization	8
3. Pool Variability	4
4. Sediment Deposition	18
5. Channel Flow Status	15
6. Channel Alteration	20
7. Channel Sinuosity	7
8. Bank Stability	
LB	4
RB	4
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	80%
Pool	20%
Run	0%

Notes:

Dominant Macro Families		
Perlodidae= 1		



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	
Investigator:	LMD, MRW

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU T2b11c
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
-----------	------------	---

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	10%
Gravel	2-64 mm (.1"-2.5")	10%
Sand	.06-2 mm (gritty)	70%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	0%

Use Classification:	
Diverse	
Variable	X
First Use	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	13
2. Pool Substrate Characterization	9
3. Pool Variability	6
4. Sediment Deposition	19
5. Channel Flow Status	15
6. Channel Alteration	20
7. Channel Sinuosity	7
8. Bank Stability	
LB	8
RB	8
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	40%
Pool	60%
Run	0%

Notes:

Dominant Macro Families	
Peltoperlidae= 1	
Perlodidae= 1	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	10:35
Investigator:	LMD, MRW

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU T2b11
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
-----------	------------	---

Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	75%
Cropland	
Pasture	25%
Other	

Physiochemical Data	
Stream Width (Feet)	2.5
Stream Depth (Inches)	5
pH	7.35
Temp. (°C)	7.8
Conductivity (uohms)	174
D.O. (mg/L)	9.59
Velocity (ft/sec)	
% CPOM	5%
% FPOM	

% Morphology Types:	
Riffle	20%
Pool	20%
Run	60%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	0%
Gravel	2-64 mm (.1"-2.5")	10%
Sand	.06-2 mm (gritty)	75%
Silt	.004-.06 mm	15%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	15
2. Pool Substrate Characterization	10
3. Pool Variability	10
4. Sediment Deposition	18
5. Channel Flow Status	14
6. Channel Alteration	20
7. Channel Sinuosity	7
8. Bank Stability	
LB	6
RB	8
9. Vegetative Protection	
LB	3
RB	10
10. Riparian Vegetative Zone Width	
LB	1
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

Notes:	

Dominant Macro Families	
Tipulidae= 1	Sialidae= 1
Phryganeidae= 2	Oligochaete= 1
Ephemerellidae= 3	Chironomidae= 1



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	11:15
Investigator:	LMD, MRW

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU T2b11
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Use Classification:	
Diverse	
Variable	X
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	100%
Cropland	
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	2
Stream Depth (Inches)	6
pH	7.08
Temp. (°C)	6.3
Conductivity (uohms)	145
D.O. (mg/L)	8.91
Velocity (ft/sec)	0.5
% CPOM	75%
% FPOM	

% Morphology Types:	
Riffle	95%
Pool	0%
Run	5%

Dominant Macro Families	
Perlodidae= 5	
Tipulidae= 1	

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	5%
Gravel	2-64 mm (.1"-2.5")	70%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	5%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	15
2. Pool Substrate Characterization	10
3. Pool Variability	10
4. Sediment Deposition	16
5. Channel Flow Status	15
6. Channel Alteration	18
7. Channel Sinuosity	7
8. Bank Stability	
LB	7
RB	7
9. Vegetative Protection	
LB	8
RB	8
10. Riparian Vegetative Zone Width	
LB	8
RB	9
Max. Score = 200	Total
Total/200*100=	Habitat Score
	138
	69%

Notes:



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	12:00
Investigator:	LMD, MRW

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU T2b12
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Use Classification:		
Diverse		
Variable	X	
First Use		

Land Use %		
Residential		
Abd. Mining		
Commercial / Industrial		
Old Fields		
Forest	100%	
Cropland		
Pasture		
Other		

Physiochemical Data		
Stream Width (Feet)	1.5	
Stream Depth (Inches)	6	
pH	7.72	
Temp. (°C)	6.3	
Conductivity (uohms)	136	
D.O. (mg/L)	11.4	
Velocity (ft/sec)	0.5	
% CPOM	75%	
% FPOM		

% Morphology Types:		
Riffle	100%	
Pool	0%	
Run	0%	

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	5%
Cobble	64-256 mm (2.5"-10")	10%
Gravel	2-64 mm (.1"-2.5")	70%
Sand	.06-2 mm (gritty)	10%
Silt	.004-.06 mm	5%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	10
2. Pool Substrate Characterization	9
3. Pool Variability	5
4. Sediment Deposition	15
5. Channel Flow Status	17
6. Channel Alteration	17
7. Channel Sinuosity	16
8. Bank Stability	
LB	8
RB	8
9. Vegetative Protection	
LB	9
RB	9
10. Riparian Vegetative Zone Width	
LB	9
RB	9
Max. Score = 200	Total
Total/200*100=	Habitat Score
	71%

Notes:		
VARIABLE UNTIL STREAM		
IS DRY		

Dominant Macro Families		
Tipulidae= 2		
Corydalidae= 1		



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	7:35
Investigator:	LMD, MRW

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU T2b
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
-----------	------------	---

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	5%
Gravel	2-64 mm (.1"-2.5")	80%
Sand	.06-2 mm (gritty)	15%
Silt	.004-.06 mm	0%
Clay	<.004 mm (slick)	0%

Use Classification:	
Diverse	X
Variable	
First Use	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	19
2. Pool Substrate Characterization	7
3. Pool Variability	5
4. Sediment Deposition	17
5. Channel Flow Status	17
6. Channel Alteration	15
7. Channel Sinuosity	16
8. Bank Stability	
LB	4
RB	7
9. Vegetative Protection	
LB	6
RB	9
10. Riparian Vegetative Zone Width	
LB	5
RB	9
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	95%
Pool	5%
Run	0%

Notes:

Dominant Macro Families	
Ephemeralidae=	6
Perlodidae=	2
Tipulidae=	3



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/28/2006
Time:	12:20
Investigator:	LMD, MRW

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU T2a
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
-----------	------------	---

Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	25%
Abd. Mining	
Commercial / Industrial	
Old Fields	70%
Forest	5%
Cropland	
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	2
Stream Depth (Inches)	15
pH	7.59
Temp. (°C)	6.5
Conductivity (uohms)	182
D.O. (mg/L)	10.41
Velocity (ft/sec)	2
% CPOM	5%
% FPOM	

% Morphology Types:	
Riffle	80%
Pool	20%
Run	0%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	0%
Gravel	2-64 mm (.1"-2.5")	80%
Sand	.06-2 mm (gritty)	15%
Silt	.004-.06 mm	5%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	18
2. Pool Substrate Characterization	7
3. Pool Variability	11
4. Sediment Deposition	17
5. Channel Flow Status	15
6. Channel Alteration	18
7. Channel Sinuosity	16
8. Bank Stability	
LB	7
RB	4
9. Vegetative Protection	
LB	1
RB	2
10. Riparian Vegetative Zone Width	
LB	1
RB	4
Max. Score = 200	Total
Total/200*100=	Habitat Score

Notes:	

Dominant Macro Families	
Tipulidae= 4	Perlodidae= 2
Hydropsychidae= 2	Ephemerellidae= 1
Phryganeidae= 2	Oligochaete= 1



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	11/30/2006
Time:	12:20 PM
Investigator:	JNA, MRW

Project Name/Area:	Foundation Mine
Sample Identifier:	GAR T4
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	15%
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	50%
Silt	.004-.06 mm	15%
Clay	<.004 mm (slick)	0%

Use Classification:	
Diverse	
Variable	
First Use	X

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	13
2. Pool Substrate Characterization	14
3. Pool Variability	16
4. Sediment Deposition	17
5. Channel Flow Status	14
6. Channel Alteration	15
7. Channel Sinuosity	7
8. Bank Stability	
LB	6
RB	7
9. Vegetative Protection	
LB	8
RB	8
10. Riparian Vegetative Zone Width	
LB	8
RB	8
Max. Score = 200	Total
Total/200*100=	Habitat Score
	71%

% Morphology Types:	
Riffle	40%
Pool	15%
Run	45%

Notes:

Dominant Macro Families		
Perlodidae= 2		



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	11/30/2006
Time:	12:45 PM
Investigator:	JNA, MRW

Project Name/Area:	Foundation Mine
Sample Identifier:	GAR T3
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	30%
Gravel	2-64 mm (.1"-2.5")	40%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	0%

Use Classification:	
Diverse	
Variable	
First Use	X

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	12
2. Pool Substrate Characterization	14
3. Pool Variability	11
4. Sediment Deposition	14
5. Channel Flow Status	15
6. Channel Alteration	17
7. Channel Sinuosity	7
8. Bank Stability	
LB	7
RB	6
9. Vegetative Protection	
LB	8
RB	6
10. Riparian Vegetative Zone Width	
LB	8
RB	6
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	45%
Pool	25%
Run	30%

Notes:

Dominant Macro Families	
Tipulidae= 2	
Oligochaete= 1	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	11/2/2006
Time:	1:19 PM
Investigator:	JNA, LMD, MRW

Project Name/Area:	Foundation Mine
Sample Identifier:	GAR T2
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
-----------	------------	---

Use Classification:	
Diverse	
Variable	
First Use	X

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	100%
Cropland	
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	1.5
Stream Depth (Inches)	4
pH	7.71
Temp. (°C)	9.1
Conductivity (uohms)	151
D.O. (mg/L)	9.6
Velocity (ft/sec)	0.5
% CPOM	20%
% FPOM	

% Morphology Types:	
Riffle	70%
Pool	10%
Run	20%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	10%
Gravel	2-64 mm (.1"-2.5")	10%
Sand	.06-2 mm (gritty)	70%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	6
2. Pool Substrate Characterization	6
3. Pool Variability	3
4. Sediment Deposition	20
5. Channel Flow Status	13
6. Channel Alteration	19
7. Channel Sinuosity	7
8. Bank Stability	
LB	5
RB	5
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score
	62%

Notes:

Dominant Macro Families		
Peltoperlidae= 1		



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	11/30/2006
Time:	4:20 PM
Investigator:	JNA, MRW

Project Name/Area:	Foundation Mine
Sample Identifier:	HAR T7
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	30%
Gravel	2-64 mm (.1"-2.5")	25%
Sand	.06-2 mm (gritty)	40%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	5%

Use Classification:	
Diverse	
Variable	
First Use	X

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	12
2. Pool Substrate Characterization	13
3. Pool Variability	14
4. Sediment Deposition	17
5. Channel Flow Status	10
6. Channel Alteration	14
7. Channel Sinuosity	7
8. Bank Stability	
LB	5
RB	7
9. Vegetative Protection	
LB	8
RB	8
10. Riparian Vegetative Zone Width	
LB	8
RB	8
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	40%
Pool	15%
Run	45%

Notes:

Dominant Macro Families		
Tipulidae= 1		



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	11/29/2006
Time:	12:30 PM
Investigator:	JNA, MRW

Project Name/Area:	Foundation Mine
Sample Identifier:	FT
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	25%
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	45%
Silt	.004-.06 mm	
Clay	<.004 mm (slick)	

Use Classification:	
Diverse	
Variable	
First Use	X

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	14
2. Pool Substrate Characterization	11
3. Pool Variability	7
4. Sediment Deposition	16
5. Channel Flow Status	13
6. Channel Alteration	17
7. Channel Sinuosity	7
8. Bank Stability	
LB	5
RB	4
9. Vegetative Protection	
LB	8
RB	9
10. Riparian Vegetative Zone Width	
LB	9
RB	9
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	40%
Pool	5%
Run	55%

Notes:

Dominant Macro Families	
Oligochaete= 1	
Perlodidae= 1	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	11/28/2006
Time:	13:10
Investigator:	MW, JEB

Project Name/Area:	Foundation Mine
Sample Identifier:	WR T5c
Heavy Rain In Past 7 Days?	No

Mainstem:	Tributary:	X
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Use Classification:	
Diverse	
Variable	
First Use	X

Land Use %	
Residential	5%
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	40%
Cropland	
Pasture	55%
Other	

Physiochemical Data	
Stream Width (Feet)	2
Stream Depth (Inches)	2
pH	7.61
Temp. (°C)	9
Conductivity (uohms)	159
D.O. (mg/L)	7.08
Velocity (ft/sec)	
% CPOM	
% FPOM	

% Morphology Types:	
Riffle	20%
Pool	10%
Run	70%

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	5%
Cobble	64-256 mm (2.5"-10")	
Gravel	2-64 mm (.1"-2.5")	10%
Sand	.06-2 mm (gritty)	70%
Silt	.004-.06 mm	5%
Clay	<.004 mm (slick)	10%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	3
2. Pool Substrate Characterization	4
3. Pool Variability	3
4. Sediment Deposition	16
5. Channel Flow Status	8
6. Channel Alteration	12
7. Channel Sinuosity	10
8. Bank Stability	
LB	1
RB	1
9. Vegetative Protection	
LB	1
RB	1
10. Riparian Vegetative Zone Width	
LB	3
RB	3
Max. Score = 200	Total
	66
Total/200*100=	Habitat Score
	33%

Notes:
Pasture, grazed, mine drainage

Dominant Macro Families	
Chironomidae= 2	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	10:25 AM
Investigator:	JNA JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HAR T9a5
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Use Classification:		
Diverse		
Variable	X	
First Use		

Land Use %		
Residential		
Abd. Mining		
Commercial / Industrial		
Old Fields		
Forest	100%	
Cropland		
Pasture		
Other		

Physiochemical Data		
Stream Width (Feet)	2.5	
Stream Depth (Inches)	1	
pH	7.97	
Temp. (°C)	6.1	
Conductivity (uohms)	334	
D.O. (mg/L)	8.8	
Velocity (ft/sec)	0.5	
% CPOM	10%	
% FPOM		

% Morphology Types:		
Riffle	35%	
Pool	5%	
Run	60%	

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	10%
Cobble	64-256 mm (2.5"-10")	30%
Gravel	2-64 mm (.1"-2.5")	35%
Sand	.06-2 mm (gritty)	15%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	9
2. Pool Substrate Characterization	13
3. Pool Variability	4
4. Sediment Deposition	12
5. Channel Flow Status	7
6. Channel Alteration	15
7. Channel Sinuosity	6
8. Bank Stability	
LB	5
RB	6
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
	117
Total/200*100=	Habitat Score
	59%

Notes:		
	GPS POINT HAR Ta5	

Dominant Macro Families		
Gammaridae= 2		
Tipulidae= 1		
Perlodidae= 1		



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	10:00 AM
Investigator:	JNA, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HAR T9a
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Use Classification:		
Diverse		
Variable	X	
First Use		

Land Use %		
Residential		
Abd. Mining		
Commercial / Industrial		
Old Fields		
Forest	100%	
Cropland		
Pasture		
Other		

Physiochemical Data		
Stream Width (Feet)	3	
Stream Depth (Inches)	1	
pH	7.51	
Temp. (°C)	5.7	
Conductivity (uohms)	131	
D.O. (mg/L)	9.5	
Velocity (ft/sec)	0.5	
% CPOM	15%	
% FPOM		

% Morphology Types:		
Riffle	35%	
Pool	15%	
Run	50%	

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	25%
Cobble	64-256 mm (2.5"-10")	35%
Gravel	2-64 mm (.1"-2.5")	20%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	12
2. Pool Substrate Characterization	14
3. Pool Variability	7
4. Sediment Deposition	12
5. Channel Flow Status	7
6. Channel Alteration	13
7. Channel Sinuosity	6
8. Bank Stability	
LB	6
RB	6
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
	123
Total/200*100=	Habitat Score
	62%

Notes:		

Dominant Macro Families		
Peltoperlidae= 1		
Gammaridae= 2		
Perlodidae= 1		



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	9:45 AM
Investigator:	JNA JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HAR T9a4
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	20%
Cobble	64-256 mm (2.5"-10")	15%
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	15%
Silt	.004-.06 mm	20%
Clay	<.004 mm (slick)	0%

Use Classification:	
Diverse	
Variable	X
First Use	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	13
2. Pool Substrate Characterization	14
3. Pool Variability	9
4. Sediment Deposition	11
5. Channel Flow Status	10
6. Channel Alteration	12
7. Channel Sinuosity	7
8. Bank Stability	
LB	6
RB	5
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	35%
Pool	0%
Run	65%

Notes:

Dominant Macro Families	
Peltoperlidae= 2	
Gammaridae= 1	
Oligochaete= 1	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	10:45 AM
Investigator:	JNA JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HAR T9a6
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Use Classification:	
Diverse	
Variable	X
First Use	

Land Use %	
Residential	5%
Abd. Mining	
Commercial / Industrial	
Old Fields	5%
Forest	90%
Cropland	
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	3
Stream Depth (Inches)	2
pH	7.45
Temp. (°C)	7
Conductivity (uohms)	231
D.O. (mg/L)	8.1
Velocity (ft/sec)	1
% CPOM	20%
% FPOM	

% Morphology Types:	
Riffle	40%
Pool	30%
Run	30%

Dominant Macro Families	
Tipulidae= 3	
Limnephilidae= 1	
Gammaridae= 1	

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	5%
Gravel	2-64 mm (.1"-2.5")	25%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	35%
Clay	<.004 mm (slick)	15%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	9
2. Pool Substrate Characterization	7
3. Pool Variability	6
4. Sediment Deposition	8
5. Channel Flow Status	9
6. Channel Alteration	11
7. Channel Sinuosity	7
8. Bank Stability	
LB	6
RB	7
9. Vegetative Protection	
LB	10
RB	2
10. Riparian Vegetative Zone Width	
LB	10
RB	2
Total	94
Total/200*100=	47%

Notes:	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	9:21 AM
Investigator:	JNA JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HAR T9a3
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Use Classification:	
Diverse	
Variable	
First Use	X

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	100%
Cropland	
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	3
Stream Depth (Inches)	2
pH	7.75
Temp. (°C)	6.1
Conductivity (uohms)	132
D.O. (mg/L)	9.6
Velocity (ft/sec)	0.5
% CPOM	15%
% FPOM	

% Morphology Types:	
Riffle	40%
Pool	20%
Run	40%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	25%
Cobble	64-256 mm (2.5"-10")	30%
Gravel	2-64 mm (.1"-2.5")	20%
Sand	.06-2 mm (gritty)	15%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	14
2. Pool Substrate Characterization	13
3. Pool Variability	5
4. Sediment Deposition	11
5. Channel Flow Status	7
6. Channel Alteration	10
7. Channel Sinuosity	7
8. Bank Stability	
LB	7
RB	6
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score
	60%

Notes:	

Dominant Macro Families		
Gammaridae= 2		



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	8:44 AM
Investigator:	JNA, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HAR T9a2
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Use Classification:	
Diverse	
Variable	
First Use	X

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	100%
Cropland	
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	3
Stream Depth (Inches)	1
pH	7.43
Temp. (°C)	4.9
Conductivity (uohms)	180
D.O. (mg/L)	9.4
Velocity (ft/sec)	0.25
% CPOM	
% FPOM	

% Morphology Types:	
Riffle	35%
Pool	15%
Run	50%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	5%
Cobble	64-256 mm (2.5"-10")	35%
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	13
2. Pool Substrate Characterization	9
3. Pool Variability	5
4. Sediment Deposition	13
5. Channel Flow Status	8
6. Channel Alteration	16
7. Channel Sinuosity	6
8. Bank Stability	
LB	5
RB	4
9. Vegetative Protection	
LB	9
RB	9
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score
	59%

Notes:	

Dominant Macro Families	
Gammaridae= 1	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	11/2/2006
Time:	11:00
Investigator:	JNA, LMD, MRW

Project Name/Area:	Foundation Mine
Sample Identifier:	HAR T15
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	10%
Cobble	64-256 mm (2.5"-10")	10%
Gravel	2-64 mm (.1"-2.5")	70%
Sand	.06-2 mm (gritty)	10%
Silt	.004-.06 mm	0%
Clay	<.004 mm (slick)	0%

Use Classification:	
Diverse	
Variable	
First Use	X

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	19
2. Pool Substrate Characterization	16
3. Pool Variability	3
4. Sediment Deposition	15
5. Channel Flow Status	6
6. Channel Alteration	19
7. Channel Sinuosity	7
8. Bank Stability	
LB	6
RB	8
9. Vegetative Protection	
LB	8
RB	9
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	95%
Pool	5%
Run	0%

Notes:

Dominant Macro Families		
Chironomidae= 1		



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	11/2/2006
Time:	11:30
Investigator:	JNA, LMD, MRW

Project Name/Area:	Foundation Mine
Sample Identifier:	HAR T15g
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Use Classification:	
Diverse	
Variable	
First Use	X

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	100%
Cropland	
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	2
Stream Depth (Inches)	2
pH	7.41
Temp. (°C)	9.6
Conductivity (uohms)	171
D.O. (mg/L)	9.4
Velocity (ft/sec)	0.5
% CPOM	15%
% FPOM	

% Morphology Types:	
Riffle	35%
Pool	0%
Run	65%

Dominant Macro Families	
Oligochaete=	4

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	15%
Gravel	2-64 mm (.1"-2.5")	40%
Sand	.06-2 mm (gritty)	40%
Silt	.004-.06 mm	5%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	11
2. Pool Substrate Characterization	13
3. Pool Variability	5
4. Sediment Deposition	18
5. Channel Flow Status	15
6. Channel Alteration	19
7. Channel Sinuosity	7
8. Bank Stability	
LB	8
RB	9
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score
	73%

Notes:



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/3/2007
Time:	14:59
Investigator:	JNA, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU T7b
Heavy Rain In Past 7 Days?	No

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	10%
Cobble	64-256 mm (2.5"-10")	35%
Gravel	2-64 mm (.1"-2.5")	25%
Sand	.06-2 mm (gritty)	15%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	5%

Use Classification:	
Diverse	
Variable	X
First Use	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	16
2. Pool Substrate Characterization	14
3. Pool Variability	13
4. Sediment Deposition	15
5. Channel Flow Status	16
6. Channel Alteration	17
7. Channel Sinuosity	7
8. Bank Stability	
LB	8
RB	6
9. Vegetative Protection	
LB	4
RB	10
10. Riparian Vegetative Zone Width	
LB	4
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score
	70%

% Morphology Types:	
Riffle	30%
Pool	60%
Run	10%

Notes:

Dominant Macro Families	
Perlodidae= 1	Baetidae= 2
Tipulidae= 3	
Chiromonid= 1	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/3/2007
Time:	15:15
Investigator:	JNA, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU T7b1
Heavy Rain In Past 7 Days?	No

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	15%
Gravel	2-64 mm (.1"-2.5")	40%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	15%
Clay	<.004 mm (slick)	10%

Use Classification:	
Diverse	
Variable	X
First Use	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	15
2. Pool Substrate Characterization	13
3. Pool Variability	9
4. Sediment Deposition	10
5. Channel Flow Status	14
6. Channel Alteration	15
7. Channel Sinuosity	5
8. Bank Stability	
LB	7
RB	7
9. Vegetative Protection	
LB	9
RB	10
10. Riparian Vegetative Zone Width	
LB	9
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	55%
Pool	5%
Run	40%

Notes:

Dominant Macro Families	
Perlodidae= 2	
Tipulidae= 1	
Oligochaete= 1	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/3/2007
Time:	15:30
Investigator:	JNA, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU T7b2
Heavy Rain In Past 7 Days?	No

Mainstem:	Tributary:	X
-----------	------------	---

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	20%
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	30%
Silt	.004-.06 mm	15%
Clay	<.004 mm (slick)	10%

Use Classification:	
Diverse	X
Variable	
First Use	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	13
2. Pool Substrate Characterization	10
3. Pool Variability	4
4. Sediment Deposition	11
5. Channel Flow Status	6
6. Channel Alteration	16
7. Channel Sinuosity	2
8. Bank Stability	
LB	8
RB	8
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	50%
Pool	10%
Run	40%

Notes:

Dominant Macro Families	
Perlodidae= 2	Chironomid= 1
Tipulidae= 1	
Hydropsychidae= 1	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/3/2007
Time:	15:45
Investigator:	JNA, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU T7b3
Heavy Rain In Past 7 Days?	No

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		10%
Boulder	<256 mm(10")	20%
Cobble	64-256 mm (2.5"-10")	35%
Gravel	2-64 mm (.1"-2.5")	25%
Sand	.06-2 mm (gritty)	10%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	0%

Use Classification:	
Diverse	X
Variable	
First Use	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	11
2. Pool Substrate Characterization	10
3. Pool Variability	1
4. Sediment Deposition	13
5. Channel Flow Status	8
6. Channel Alteration	16
7. Channel Sinuosity	4
8. Bank Stability	
LB	7
RB	7
9. Vegetative Protection	
LB	8
RB	9
10. Riparian Vegetative Zone Width	
LB	9
RB	9
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	60%
Pool	0%
Run	40%

Notes:
drains into pond

Dominant Macro Families	
Perlodidae= 1	Chironomid= 1
Tipulidae= 1	Peltoperlidae= 3
Hydropsychidae= 2	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/3/2007
Time:	16:30
Investigator:	JNA, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU T7b4
Heavy Rain In Past 7 Days?	No

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	10%
Gravel	2-64 mm (.1"-2.5")	25%
Sand	.06-2 mm (gritty)	30%
Silt	.004-.06 mm	25%
Clay	<.004 mm (slick)	10%

Use Classification:	
Diverse	X
Variable	
First Use	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	11
2. Pool Substrate Characterization	7
3. Pool Variability	4
4. Sediment Deposition	11
5. Channel Flow Status	7
6. Channel Alteration	17
7. Channel Sinuosity	5
8. Bank Stability	
LB	7
RB	8
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	40%
Pool	15%
Run	45%

Notes:

Dominant Macro Families	
Perlodidae= 1	Leuctridae= 1
Limnephilidae= 1	Peltoperlidae= 1
Nemouridae= 2	Baetidae= 1



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/4/2007
Time:	10:30
Investigator:	JNA, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU T7b7
Heavy Rain In Past 7 Days?	No

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	15%
Cobble	64-256 mm (2.5"-10")	25%
Gravel	2-64 mm (.1"-2.5")	40%
Sand	.06-2 mm (gritty)	10%
Silt	.004-.06 mm	5%
Clay	<.004 mm (slick)	5%

Use Classification:	
Diverse	X
Variable	
First Use	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	13
2. Pool Substrate Characterization	12
3. Pool Variability	8
4. Sediment Deposition	13
5. Channel Flow Status	15
6. Channel Alteration	14
7. Channel Sinuosity	5
8. Bank Stability	
LB	8
RB	8
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	35%
Pool	10%
Run	45%

Notes:

Dominant Macro Families		
Perlodidae= 2	Polycentropodidae= 2	
Peltoperlidae= 1	Oligochaete= 2	
Nemouridae= 2	Chironomid= 1	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/4/2007
Time:	11:00
Investigator:	JNA, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU T7b8
Heavy Rain In Past 7 Days?	No

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	5%
Gravel	2-64 mm (.1"-2.5")	10%
Sand	.06-2 mm (gritty)	65%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	10%

Use Classification:	
Diverse	
Variable	X
First Use	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	8
2. Pool Substrate Characterization	9
3. Pool Variability	1
4. Sediment Deposition	8
5. Channel Flow Status	14
6. Channel Alteration	19
7. Channel Sinuosity	7
8. Bank Stability	
LB	8
RB	8
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	30%
Pool	0%
Run	70%

Notes:

Dominant Macro Families	
Perlodidae= 1	
Tipulidae= 2	
Stratiomyidae= 1	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/4/2007
Time:	11:30
Investigator:	JNA, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU T7b9
Heavy Rain In Past 7 Days?	No

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	0%
Gravel	2-64 mm (.1"-2.5")	40%
Sand	.06-2 mm (gritty)	25%
Silt	.004-.06 mm	20%
Clay	<.004 mm (slick)	15%

Use Classification:	
Diverse	X
Variable	
First Use	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	15
2. Pool Substrate Characterization	10
3. Pool Variability	3
4. Sediment Deposition	11
5. Channel Flow Status	8
6. Channel Alteration	16
7. Channel Sinuosity	8
8. Bank Stability	
LB	6
RB	6
9. Vegetative Protection	
LB	7
RB	7
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	25%
Pool	5%
Run	70%

Notes:
spring above div point

Dominant Macro Families	
Corydalidae= 1	
Peltoperlidae= 2	
Perlodidae= 2	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	1:55 AM
Investigator:	JNA JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HAR T9b
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
-----------	------------	---

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	40%
Cobble	64-256 mm (2.5"-10")	20%
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	5%
Silt	.004-.06 mm	5%
Clay	<.004 mm (slick)	0%

Use Classification:	
Diverse	
Variable	
First Use	x

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	12
2. Pool Substrate Characterization	11
3. Pool Variability	9
4. Sediment Deposition	13
5. Channel Flow Status	9
6. Channel Alteration	14
7. Channel Sinuosity	7
8. Bank Stability	
LB	8
RB	8
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	45%
Pool	5%
Run	50%

Notes:

Dominant Macro Families		
Tipulidae= 2		



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	14:15
Investigator:	JNA JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HAR T9b5
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Use Classification:	
Diverse	
Variable	
First Use	X

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	100%
Cropland	
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	2
Stream Depth (Inches)	2
pH	7.47
Temp. (°C)	6.5
Conductivity (uohms)	163
D.O. (mg/L)	8.2
Velocity (ft/sec)	0.25
% CPOM	5%
% FPOM	

% Morphology Types:	
Riffle	45%
Pool	0%
Run	55%

Dominant Macro Families		
NO MACROS		

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	10%
Gravel	2-64 mm (.1"-2.5")	25%
Sand	.06-2 mm (gritty)	45%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	10%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	7
2. Pool Substrate Characterization	6
3. Pool Variability	1
4. Sediment Deposition	11
5. Channel Flow Status	5
6. Channel Alteration	16
7. Channel Sinuosity	7
8. Bank Stability	
LB	8
RB	8
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Total	109
Total/200*100=	55%

Notes:



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	13:30
Investigator:	JNA JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HAR T9b5
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Use Classification:		
Diverse		
Variable	X	
First Use		

Land Use %		
Residential		
Abd. Mining		
Commercial / Industrial		
Old Fields		
Forest	100%	
Cropland		
Pasture		
Other		

Physiochemical Data		
Stream Width (Feet)	3	
Stream Depth (Inches)	2	
pH	7.78	
Temp. (°C)	6	
Conductivity (uohms)	156	
D.O. (mg/L)	8.7	
Velocity (ft/sec)	0.5	
% CPOM	10%	
% FPOM		

% Morphology Types:		
Riffle	45%	
Pool	10%	
Run	45%	

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	5%
Cobble	64-256 mm (2.5"-10")	20%
Gravel	2-64 mm (.1"-2.5")	35%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	10%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	13
2. Pool Substrate Characterization	14
3. Pool Variability	5
4. Sediment Deposition	17
5. Channel Flow Status	6
6. Channel Alteration	16
7. Channel Sinuosity	7
8. Bank Stability	
LB	8
RB	8
9. Vegetative Protection	
LB	9
RB	10
10. Riparian Vegetative Zone Width	
LB	9
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score
	66%

Notes:		

Dominant Macro Families		
Oligochaete= 2		
Perlodidae= 2		
Chironomidae= 1		



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	12:40
Investigator:	JNA JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HAR T9b3
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Use Classification:	
Diverse	
Variable	
First Use	X

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	100%
Cropland	
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	3
Stream Depth (Inches)	2.5
pH	7.06
Temp. (°C)	6.8
Conductivity (uohms)	204
D.O. (mg/L)	7.3
Velocity (ft/sec)	0.5
% CPOM	10%
% FPOM	

% Morphology Types:	
Riffle	45%
Pool	30%
Run	25%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	5%
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	40%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	15%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	11
2. Pool Substrate Characterization	11
3. Pool Variability	6
4. Sediment Deposition	14
5. Channel Flow Status	9
6. Channel Alteration	16
7. Channel Sinuosity	7
8. Bank Stability	
LB	8
RB	8
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score
	65%

Notes:	

Dominant Macro Families	
Oligochaete= 3	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	12:25 PM
Investigator:	JNA, LMD, MRW

Project Name/Area:	Foundation Mine
Sample Identifier:	HAR T9b3
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	100%
Cropland	
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	3
Stream Depth (Inches)	1.5
pH	7.17
Temp. (°C)	7.6
Conductivity (uohms)	198
D.O. (mg/L)	6.8
Velocity (ft/sec)	0.5
% CPOM	5%
% FPOM	

% Morphology Types:	
Riffle	40%
Pool	20%
Run	40%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	15%
Cobble	64-256 mm (2.5"-10")	35%
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	15%
Silt	.004-.06 mm	5%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	15
2. Pool Substrate Characterization	16
3. Pool Variability	7
4. Sediment Deposition	14
5. Channel Flow Status	10
6. Channel Alteration	16
7. Channel Sinuosity	7
8. Bank Stability	
LB	5
RB	5
9. Vegetative Protection	
LB	9
RB	9
10. Riparian Vegetative Zone Width	
LB	9
RB	9
Max. Score = 200	Total
Total/200*100=	Habitat Score
	66%

Notes:	

Dominant Macro Families	
Tipulidae= 2	Gammaridae= 2
Perlodidae= 2	Elmidae= 1
Oligochaete= 2	Limnephilidae= 1



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	13:00
Investigator:	JNA JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HAR T9b4
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Use Classification:		
Diverse		
Variable	X	
First Use		

Land Use %		
Residential		
Abd. Mining		
Commercial / Industrial		
Old Fields		
Forest	100%	
Cropland		
Pasture		
Other		

Physiochemical Data		
Stream Width (Feet)	3	
Stream Depth (Inches)	1	
pH	7.33	
Temp. (°C)	6.3	
Conductivity (uohms)	188	
D.O. (mg/L)	8.5	
Velocity (ft/sec)	0.5	
% CPOM	5%	
% FPOM		

% Morphology Types:		
Riffle	35%	
Pool	0%	
Run	65%	

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	5%
Cobble	64-256 mm (2.5"-10")	20%
Gravel	2-64 mm (.1"-2.5")	15%
Sand	.06-2 mm (gritty)	40%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	8
2. Pool Substrate Characterization	3
3. Pool Variability	1
4. Sediment Deposition	10
5. Channel Flow Status	5
6. Channel Alteration	12
7. Channel Sinuosity	7
8. Bank Stability	
LB	4
RB	3
9. Vegetative Protection	
LB	9
RB	9
10. Riparian Vegetative Zone Width	
LB	9
RB	9
Max. Score = 200	Total
Total/200*100=	Habitat Score
	45%

Notes:	

Dominant Macro Families	
Tipulidae= 1	Limnephilidae= 2
Oligochaete= 1	Gammaridae= 1



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	12/29/2006
Time:	11:45 AM
Investigator:	JNA JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	HAR T9b2
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
-----------	------------	---

Use Classification:		
Diverse		
Variable	X	
First Use		

Land Use %		
Residential		
Abd. Mining		
Commercial / Industrial		
Old Fields	80%	
Forest	15%	
Cropland		
Pasture	5%	
Other		

Physiochemical Data		
Stream Width (Feet)		
Stream Depth (Inches)		
pH	7.47	
Temp. (°C)	6.6	
Conductivity (uohms)	173	
D.O. (mg/L)	8.3	
Velocity (ft/sec)	0.5	
% CPOM	5%	
% FPOM		

% Morphology Types:		
Riffle	25%	
Pool		
Run	75%	

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	0%
Gravel	2-64 mm (.1"-2.5")	15%
Sand	.06-2 mm (gritty)	55%
Silt	.004-.06 mm	25%
Clay	<.004 mm (slick)	5%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	10
2. Pool Substrate Characterization	11
3. Pool Variability	1
4. Sediment Deposition	17
5. Channel Flow Status	8
6. Channel Alteration	17
7. Channel Sinuosity	7
8. Bank Stability	
LB	8
RB	8
9. Vegetative Protection	
LB	5
RB	6
10. Riparian Vegetative Zone Width	
LB	5
RB	6
Max. Score = 200	Total
Total/200*100=	Habitat Score
	55%

Notes:
GRASS IN CHANNEL

Dominant Macro Families		
Perlodidae= 1	Gammaridae= 1	
Oligochaete= 2		
Limnephilidae=3		



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/9/2007
Time:	12:30
Investigator:	JNA, JDS

Project Name/Area:	Foundation Mine
Sample Identifier:	WR T1b3
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
-----------	------------	---

Use Classification:	
Diverse	
Variable	
First Use	X

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	100%
Cropland	
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	3
Stream Depth (Inches)	1
pH	7.8
Temp. (°C)	5.7
Conductivity (uohms)	183
D.O. (mg/L)	11.4
Velocity (ft/sec)	1.5
% CPOM	25%
% FPOM	10%

% Morphology Types:	
Riffle	30%
Pool	5%
Run	65%

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	10%
Cobble	64-256 mm (2.5"-10")	15%
Gravel	2-64 mm (.1"-2.5")	35%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	10%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	12
2. Pool Substrate Characterization	13
3. Pool Variability	5
4. Sediment Deposition	14
5. Channel Flow Status	7
6. Channel Alteration	16
7. Channel Sinuosity	7
8. Bank Stability	
LB	7
RB	5
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

Notes:	

Dominant Macro Families		
Oligochaete= 1		



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/9/2007
Time:	12:10
Investigator:	JNA, JDS

Project Name/Area:	Foundation Mine
Sample Identifier:	WR T1b3
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
-----------	------------	---

Use Classification:		
Diverse		
Variable	X	
First Use		

Land Use %		
Residential		
Abd. Mining		
Commercial / Industrial		
Old Fields		
Forest	100%	
Cropland		
Pasture		
Other		

Physiochemical Data		
Stream Width (Feet)	4	
Stream Depth (Inches)	2.5	
pH	7.82	
Temp. (°C)	6.5	
Conductivity (uohms)	167	
D.O. (mg/L)	11.2	
Velocity (ft/sec)	1.5	
% CPOM	30%	
% FPOM	15%	

% Morphology Types:		
Riffle	30%	
Pool	15%	
Run	55%	

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	20%
Cobble	64-256 mm (2.5"-10")	35%
Gravel	2-64 mm (.1"-2.5")	20%
Sand	.06-2 mm (gritty)	15%
Silt	.004-.06 mm	5%
Clay	<.004 mm (slick)	5%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	13
2. Pool Substrate Characterization	7
3. Pool Variability	5
4. Sediment Deposition	14
5. Channel Flow Status	10
6. Channel Alteration	17
7. Channel Sinuosity	7
8. Bank Stability	
LB	8
RB	7
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score
	64%

Notes:		

Dominant Macro Families		
Chironomidae= 2		
Perlodidae= 2		



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/9/2007
Time:	12:45
Investigator:	JNA, JDS

Project Name/Area:	Foundation Mine
Sample Identifier:	WR T1b4
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
-----------	------------	---

Use Classification:	
Diverse	
Variable	
First Use	X

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	100%
Cropland	
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	3
Stream Depth (Inches)	1
pH	7.85
Temp. (°C)	6.9
Conductivity (uohms)	157
D.O. (mg/L)	11.2
Velocity (ft/sec)	0.50
% CPOM	20%
% FPOM	5%

% Morphology Types:	
Riffle	55%
Pool	
Run	45%

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	10%
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	25%
Silt	.004-.06 mm	30%
Clay	<.004 mm (slick)	5%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	14
2. Pool Substrate Characterization	11
3. Pool Variability	7
4. Sediment Deposition	13
5. Channel Flow Status	8
6. Channel Alteration	15
7. Channel Sinuosity	7
8. Bank Stability	
LB	5
RB	4
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

Notes:	

Dominant Macro Families	
Oligochaete=	1



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/9/2007
Time:	13:00
Investigator:	JNA, JDS

Project Name/Area:	Foundation Mine
Sample Identifier:	WR T1b
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	5%
Cobble	64-256 mm (2.5"-10")	15%
Gravel	2-64 mm (.1"-2.5")	35%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	15%
Clay	<.004 mm (slick)	10%

Use Classification:	
Diverse	
Variable	
First Use	X

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	13
2. Pool Substrate Characterization	12
3. Pool Variability	13
4. Sediment Deposition	14
5. Channel Flow Status	8
6. Channel Alteration	15
7. Channel Sinuosity	7
8. Bank Stability	
LB	6
RB	7
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	30%
Pool	15%
Run	55%

Notes:

Dominant Macro Families	
Oligochaete= 1	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/4/2007
Time:	16:30
Investigator:	JNA, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	WR T1b
Heavy Rain In Past 7 Days?	No

Mainstem:	Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	25%
Abd. Mining	
Commercial / Industrial	
Old Fields	35%
Forest	40%
Cropland	
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	5
Stream Depth (Inches)	2
pH	7.7
Temp. (°C)	7.8
Conductivity (uohms)	181
D.O. (mg/L)	9.6
Velocity (ft/sec)	1.5
% CPOM	15%
% FPOM	5%

% Morphology Types:	
Riffle	50%
Pool	20%
Run	30%

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	15%
Cobble	64-256 mm (2.5"-10")	20%
Gravel	2-64 mm (.1"-2.5")	35%
Sand	.06-2 mm (gritty)	30%
Silt	.004-.06 mm	
Clay	<.004 mm (slick)	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	14
2. Pool Substrate Characterization	11
3. Pool Variability	11
4. Sediment Deposition	16
5. Channel Flow Status	10
6. Channel Alteration	16
7. Channel Sinuosity	7
8. Bank Stability	
LB	8
RB	8
9. Vegetative Protection	
LB	1
RB	1
10. Riparian Vegetative Zone Width	
LB	1
RB	1
Max. Score = 200	Total
Total/200*100=	Habitat Score
	53%

Notes:	

Dominant Macro Families	
Peltoperlidae= 2	Chironomid= 1
Tipulidae= 1	Limnephilidae= 2
Oligochaete= 1	Baetidae= 1



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/4/2007
Time:	15:10
Investigator:	JNA, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	WR T1d1
Heavy Rain In Past 7 Days?	No

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		5%
Boulder	<256 mm(10")	10%
Cobble	64-256 mm (2.5"-10")	15%
Gravel	2-64 mm (.1"-2.5")	35%
Sand	.06-2 mm (gritty)	15%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	5%

Use Classification:	
Diverse	X
Variable	
First Use	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	14
2. Pool Substrate Characterization	9
3. Pool Variability	2
4. Sediment Deposition	11
5. Channel Flow Status	13
6. Channel Alteration	15
7. Channel Sinuosity	7
8. Bank Stability	
LB	4
RB	4
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	50%
Pool	0%
Run	50%

Notes:

Dominant Macro Families	
Tipulidae= 1	Peltoperlidae= 2
Sialidae= 2	Chironomid= 1
Perlodidae= 1	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/4/2007
Time:	14:30
Investigator:	JNA, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	WR T1c
Heavy Rain In Past 7 Days?	No

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	10%
Cobble	64-256 mm (2.5"-10")	25%
Gravel	2-64 mm (.1"-2.5")	40%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	5%
Clay	<.004 mm (slick)	

Use Classification:	
Diverse	
Variable	X
First Use	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	14
2. Pool Substrate Characterization	17
3. Pool Variability	13
4. Sediment Deposition	14
5. Channel Flow Status	16
6. Channel Alteration	18
7. Channel Sinuosity	7
8. Bank Stability	
LB	8
RB	8
9. Vegetative Protection	
LB	7
RB	10
10. Riparian Vegetative Zone Width	
LB	7
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score
	75%

% Morphology Types:	
Riffle	45%
Pool	10%
Run	45%

Notes:

Dominant Macro Families	
Tipulidae= 1	
Cambaridae= 1	
Perlodidae= 3	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/4/2007
Time:	14:45
Investigator:	JNA, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	WR T1c1
Heavy Rain In Past 7 Days?	No

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	20%
Cobble	64-256 mm (2.5"-10")	35%
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	10%
Silt	.004-.06 mm	5%
Clay	<.004 mm (slick)	

Use Classification:	
Diverse	X
Variable	
First Use	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	10
2. Pool Substrate Characterization	6
3. Pool Variability	3
4. Sediment Deposition	11
5. Channel Flow Status	13
6. Channel Alteration	15
7. Channel Sinuosity	7
8. Bank Stability	
LB	4
RB	5
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	45%
Pool	
Run	55%

Notes:

Dominant Macro Families	
Tipulidae= 2	
Limnephilidae= 1	
Perlodidae= 1	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/4/2007
Time:	15:30
Investigator:	JNA, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	WR T1d
Heavy Rain In Past 7 Days?	No

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	40%
Gravel	2-64 mm (.1"-2.5")	35%
Sand	.06-2 mm (gritty)	15%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	

Use Classification:	
Diverse	
Variable	
First Use	X

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	11
2. Pool Substrate Characterization	7
3. Pool Variability	5
4. Sediment Deposition	11
5. Channel Flow Status	7
6. Channel Alteration	18
7. Channel Sinuosity	7
8. Bank Stability	
LB	7
RB	7
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	40%
Pool	
Run	60%

Notes:

Dominant Macro Families	
Perlodidae= 2	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/4/2007
Time:	15:40
Investigator:	JNA, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	WR T1d
Heavy Rain In Past 7 Days?	No

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	20%
Cobble	64-256 mm (2.5"-10")	15%
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	25%
Silt	.004-.06 mm	5%
Clay	<.004 mm (slick)	5%

Use Classification:	
Diverse	
Variable	X
First Use	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	14
2. Pool Substrate Characterization	13
3. Pool Variability	7
4. Sediment Deposition	13
5. Channel Flow Status	13
6. Channel Alteration	17
7. Channel Sinuosity	7
8. Bank Stability	
LB	8
RB	8
9. Vegetative Protection	
LB	8
RB	10
10. Riparian Vegetative Zone Width	
LB	8
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	35%
Pool	25%
Run	40%

Notes:

Dominant Macro Families		
Elmidae= 2		
Limnephilidae= 2		



Appendix A- Low Gradient Stream Sampling Field Delineation Form

Use Classification	
First Use	
Variable	
Diverse	X

Tributary:

Mainstem:

Land Use (%)	
Residential	8
Abandoned Mining	8
Active Mining/Surface Activities	8
Commercial/Industrial	8
Old Fields/Old Pasture	8
Forest	8
Cropland	8
Pasture	100
Other (explain below in notes)	8

Physiochemical Data	
Stream Width (feet / inches)	2
Wetted Stream Width (feet / inches)	1.4
Stream Depth (feet / inches)	0.19
pH	7.101
Temperature (°C)	0.4
Conductivity (mhos)	210
D.O.(mg/L)	12.6
Velocity (ft/sec.)	0.15
%CPOM	15
%FPOM	6

% Morphology Types	
Riffle	75
Pool	5
Run	20

Project Name/Area:	Foundation
Sample Identifier:	WLF-DIV WR T1 DIV
Date:	1/6/10
Time:	11:50 AM
Investigator(s):	SJ, BF, BL

Latitude: $39^{\circ} 51' 36.7'' N$
Longitude: $80^{\circ} 22' 4.7'' W$

Precipitation in last 7 days?		Y	N
Substrate Type	Diameter	% Composition	
Bedrock		0%	
Boulder	>256mm (10")	0%	
Cobble	64-256mm (2.5"-10")	15%	
Gravel	2-64mm (0.1"-2.5")	40%	
Sand	0.06-2mm (gritty)	30%	
Silt	.004-0.06mm	15%	
Clay	<0.004mm (slick)	0%	

Habitat Assessment Parameters	Score
1. Instream Cover (fish)	18
2. Epifaunal Substrate (riffle quality)	15
3. Pool Substrate Characterization	8
4. Pool Variability	3
5. Channel Alteration	18
6. Sediment Deposition	11
7. Channel Sinuosity	7
8. Channel Flow Status	12
9. Condition of Banks (both banks combined)	6
10. Bank Veg. Protection (both banks combined)	12
11. Grazing/Other Disruptive Pressure	1
12. Riparian Veg. Zone Width (both banks combined)	1
Total Score (maximum=240)	106
Total / 240 x 100 = Habitat Score	44

Notes:

Stream runs through pasture
mostly gravel w/ some cobble
RB unstable, RB moderately stable

Investigator(s) Signature:

Revised 6/09



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/9/2007
Time:	13:30
Investigator:	JNA, JDS

Project Name/Area:	Foundation Mine
Sample Identifier:	WR T4
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	10%
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	90%
Cropland	
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	5
Stream Depth (Inches)	2
pH	7.71
Temp. (°C)	6.5
Conductivity (uohms)	170
D.O. (mg/L)	11.1
Velocity (ft/sec)	1.5
% CPOM	15%
% FPOM	5%

% Morphology Types:	
Riffle	40%
Pool	25%
Run	35%

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	10%
Cobble	64-256 mm (2.5"-10")	25%
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	5%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	14
2. Pool Substrate Characterization	13
3. Pool Variability	10
4. Sediment Deposition	14
5. Channel Flow Status	10
6. Channel Alteration	17
7. Channel Sinuosity	7
8. Bank Stability	
LB	8
RB	6
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score
	70%

Notes:	

Dominant Macro Families		
Tipulidae= 2		
Perlodidae= 2		
Hydropsychidae= 3		



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/9/2007
Time:	14:00
Investigator:	JNA, JDS

Project Name/Area:	Foundation Mine
Sample Identifier:	WR T4a
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	30%
Cobble	64-256 mm (2.5"-10")	30%
Gravel	2-64 mm (.1"-2.5")	20%
Sand	.06-2 mm (gritty)	15%
Silt	.004-.06 mm	5%
Clay	<.004 mm (slick)	

Use Classification:	
Diverse	X
Variable	
First Use	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	12
2. Pool Substrate Characterization	13
3. Pool Variability	9
4. Sediment Deposition	14
5. Channel Flow Status	10
6. Channel Alteration	17
7. Channel Sinuosity	7
8. Bank Stability	
LB	5
RB	4
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	40%
Pool	5%
Run	55%

Notes:

Dominant Macro Families	
Corydalidae= 2	Hydropsychidae= 2
Perlodidae= 1	
Tipulidae= 2	



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/9/2007
Time:	14:25
Investigator:	JNA, JDS

Project Name/Area:	Foundation Mine
Sample Identifier:	WR T4c
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Use Classification:		
Diverse		
Variable	X	
First Use		

Land Use %		
Residential		
Abd. Mining		
Commercial / Industrial		
Old Fields		
Forest	100%	
Cropland		
Pasture		
Other		

Physiochemical Data		
Stream Width (Feet)	2	
Stream Depth (Inches)	2	
pH	7.8	
Temp. (°C)	6.2	
Conductivity (uohms)	189	
D.O. (mg/L)	10.8	
Velocity (ft/sec)	1.0	
% CPOM	10%	
% FPOM		

% Morphology Types:		
Riffle	25%	
Pool	5%	
Run	70%	

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	5%
Gravel	2-64 mm (.1"-2.5")	25%
Sand	.06-2 mm (gritty)	30%
Silt	.004-.06 mm	20%
Clay	<.004 mm (slick)	10%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	13
2. Pool Substrate Characterization	14
3. Pool Variability	7
4. Sediment Deposition	14
5. Channel Flow Status	4
6. Channel Alteration	17
7. Channel Sinuosity	7
8. Bank Stability	
LB	8
RB	8
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score
	66%

Notes:		

Dominant Macro Families		
Perlodidae= 3		
Tipulidae= 1		



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	1/9/2007
Time:	14:50
Investigator:	JNA, JDS

Project Name/Area:	Foundation Mine
Sample Identifier:	WR T4e
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
-----------	------------	---

Use Classification:	
Diverse	
Variable	
First Use	X

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	100%
Cropland	
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	2
Stream Depth (Inches)	1
pH	7.33
Temp. (°C)	5.9
Conductivity (uohms)	187
D.O. (mg/L)	10.5
Velocity (ft/sec)	0.7
% CPOM	5%
% FPOM	

% Morphology Types:	
Riffle	40%
Pool	20%
Run	40%

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	20%
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	35%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	5%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	12
2. Pool Substrate Characterization	11
3. Pool Variability	9
4. Sediment Deposition	13
5. Channel Flow Status	20
6. Channel Alteration	14
7. Channel Sinuosity	7
8. Bank Stability	
LB	8
RB	8
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score
	71%

Notes:	

Dominant Macro Families	
Oligochaete=	2



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	11/10/2006
Time:	12:30
Investigator:	JNA, LMD, MRW, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	WR
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	30%
Gravel	2-64 mm (.1"-2.5")	40%
Sand	.06-2 mm (gritty)	25%
Silt	.004-.06 mm	5%
Clay	<.004 mm (slick)	

Use Classification:	
Diverse	
Variable	
First Use	X

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	11
2. Pool Substrate Characterization	13
3. Pool Variability	9
4. Sediment Deposition	16
5. Channel Flow Status	10
6. Channel Alteration	17
7. Channel Sinuosity	7
8. Bank Stability	
LB	5
RB	6
9. Vegetative Protection	
LB	9
RB	9
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score

% Morphology Types:	
Riffle	45%
Pool	20%
Run	35%

Notes:

Dominant Macro Families	
Oligochaete=	3



Appendix A-Low Gradient Stream Sampling Field Delineation Form

Date:	11/10/2006
Time:	12:45
Investigator:	JNA, LMD, MRW, JTS

Project Name/Area:	Foundation Mine
Sample Identifier:	WR
Heavy Rain In Past 7 Days?	Yes

Mainstem:	Tributary:	X
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Use Classification:	
Diverse	
Variable	X
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	100%
Cropland	
Pasture	
Other	

Physiochemical Data	
Stream Width (Feet)	3
Stream Depth (Inches)	2
pH	8.01
Temp. (°C)	10.3
Conductivity (uohms)	145
D.O. (mg/L)	10.02
Velocity (ft/sec)	1
% CPOM	10%
% FPOM	

% Morphology Types:	
Riffle	30%
Pool	30%
Run	40%

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	10%
Cobble	64-256 mm (2.5"-10")	25%
Gravel	2-64 mm (.1"-2.5")	40%
Sand	.06-2 mm (gritty)	15%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	11
2. Pool Substrate Characterization	12
3. Pool Variability	10
4. Sediment Deposition	14
5. Channel Flow Status	17
6. Channel Alteration	16
7. Channel Sinuosity	7
8. Bank Stability	
LB	5
RB	6
9. Vegetative Protection	
LB	9
RB	9
10. Riparian Vegetative Zone Width	
LB	9
RB	9
Max. Score = 200	Total
Total/200*100=	Habitat Score
	67%

Notes:	

Dominant Macro Families	
Oligochaete= 1	Chironomidae= 1
Tipulidae= 2	
Elmidae= 1	

**Stream Quality
Assessment Report
July 28, 2011**



High Gradient Habitat Data Sheet

Waterbody Name: House Run

Str. Code: 40636

Station ID: H04 T4 F0

Date: 7-28-11

Investigators: CSE

Time: 10:50 AM

Form Completed By: CSE

County: Greene

Location: Foundation

Habitat Parameter	Category							
	Optimal	Suboptimal		Marginal		Poor		
1. Instream Cover (Fish)	Greater than 50% mix of boulder, cobble, submerged logs, undercut banks, or other stable habitat.	30-50% mix of boulder, cobble, or other stable habitat; adequate habitat.		10-30% mix of boulder, cobble, or other stable habitat; availability less than desirable.		Less than 10% mix of boulder, cobble, or other stable habitat; lack of habitat is obvious.		
Score: 0 1	20 19 18 17 16	15 14 13 12 11		10 9 8 7 6		5 4 3 2 1		
2. Epifaunal Substrate	Well developed riffle and run, riffle is as wide as stream and length extends two times the width of the stream; abundance of cobble.	Riffle is as wide as stream but length is <2X width; abundance of cobble; boulders and gravel common.		Run area may be lacking; riffle not as wide as stream and length is <2X the stream width; gravel or large boulders and bedrock common; some cobble present.		Riffles or run virtually nonexistent; large boulders and bedrock prevalent; cobble lacking.		
Score: 0 2	20 19 18 17 16	15 14 13 12 11		10 9 8 7 6		6 4 3 (2) 1		
3. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment.	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: 0 14	20 19 18 17 16	15 (14) 13 12 11		10 9 8 7 6		5 4 3 2 1		
4. Velocity/Depth Regimes	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow).	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 lower than if missing other regimes).		Dominated by 1 velocity/depth regime (usually slow-deep).		
Score: 0 3	20 19 18 17 16	15 14 13 12 11		10 9 8 7 6		5 4 (3) 2 1		
5. Channel Alteration	No channelization or dredging present.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (> past 20 yrs) may be present, but recent channelization is not.		New embankments present on both banks; 40-80% of stream reach channelized and disrupted.		Banks shored gabion or cement; over 80% of the stream reach channelized and disrupted.		
Score: 0 20	(20) 19 18 17 16	15 14 13 12 11		10 9 8 7 6		5 4 3 2 1		
6. 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 coarse gravel; 5-30% of the bottom affected; slight deposition in pools.		Moderate deposition of new gravel, coarse sand on old and new bars; 30-50% of the bottom affected; sediment deposits at obstruction, constriction, and bends; moderate deposition in pools prevalent.		Heavy deposits of fine material; increased bar development; >50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.		
Score: 0 15	20 19 18 17 16	(15) 14 13 12 11		10 9 8 7 6		5 4 3 2 1		

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7. Frequency of Riffles	Occurrence of riffles relatively frequent; distance between riffles divided by the width of the stream equals 5-7; variety of habitat.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream equals 7-15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15-25.	Generally all flat water or shallow riffles; poor habitat. Distance between riffles divided by the width of the stream is >25.
Score: 0/6	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
8. Channel Flow Status	Water reaches base of both lower banks and minimal amount of channel substrate is exposed.	Water fills >75% of channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
Score: 0/7	20 19 18 17 16	15 14 13 12 11	10 9 8 (7) 6	5 4 3 2 1
9. Condition of Banks (combined score)	Banks Stable; no evidence of erosion or bank failure.	Moderately stable; infrequent, small areas of erosion mostly healed over.	Moderately unstable; up to 60% of banks in reach have areas of erosion.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; on side slopes, 80-100% of bank has erosional scars.
Score: 0/7	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
10. Bank Vegetative Protection (combined score)	More than 90% of the streambank surface covered by vegetation.	70-90% of the streambank surface covered by vegetation.	50-70% of the streambank surfaces covered by vegetation.	Less than 50% of the streambank surface covered by vegetation.
Score: 0/5	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
11. Grazing/Other Disruptive Pressure	Vegetative disruption, through grazing or mowing, minimal or not evident; almost all plants allowed to grow naturally.	Disruption evident but not affecting full plant growth potential to any great extent; more than 1/2 of the potential plant stubble height remaining.	Disruption obvious; patches of bare soil or closely cropped vegetation common; less than 1/2 of the potential plant stubble height remaining.	Disruption of vegetation is very high; vegetation has been removed to 2 in. or less in average stubble height.
Score: 0/11	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1
12. Riparian Vegetative Zone Width (combined score)	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: 0/10	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1

Station ID

Habitat Score =

$$\frac{131}{240} = 55\%$$

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Notes:

Banks and streambed mostly bedrock. Area recovering from recent logging.

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HOU T4 FU



Low Gradient Habitat Data Sheet

Waterbody Name: House Run
 Station ID: HOU TY VAR
 Investigators: CST
 Form Completed By: CST
 Location: Foundation

Str. Code: 40636

Date: 7-28-11

Time: 10:00 AM

County: Greene

Habitat Parameter	Category																					
	Optimal			Suboptimal			Marginal			Poor												
1. Instream Cover (Fish)	Greater than 60% mix of snags, submerged logs, undercut banks, or other stable habitat; rubble, gravel may be present.					30-50% mix of boulder, cobble, or other stable habitat; adequate habitat.	10-30% mix of boulder, cobble, or other stable habitat; habitat availability less than desirable.			Less than 10% mix of boulder, cobble, or other stable habitat; lack of habitat is obvious.												
Score:	0	11	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
2. Epifaunal Substrate	Preferred benthic substrate (to be sampled) abundant throughout stream site and at stage to allow full colonization potential (i.e., logs, snags that are <u>not</u> new fall and <u>not</u> transient).					Substrate common but not prevalent or well suited for full colonization potential.	Substrate frequently disturbed or removed.			Substrate unstable or lacking.												
Score:	0	13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
3. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.			Hard-pan clay or bedrock; no root mat or vegetation.												
Score:	0	3	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	③	2	1
4. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.			Majority of pools small-shallow or pools absent.												
Score:	0	3	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	③	2	1
5. Channel Alteration	No channelization or dredging present.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (> past 20 yrs) may be present, but recent channelization is not present.	New embankments present on both banks; channelization may be extensive, usually in urban areas or drainage areas of agriculture lands; and >80% of stream reach channelized and disrupted.			Extensive channelization; banks shored with gabion or cement; heavily urbanized areas; Instream habitat greatly altered or removed entirely.												
Score:	0	18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	③	2	1
6. Sediment Deposition	<20% of bottom affected; minor accumulation of fine and coarse material at snags and submerged vegetation; little or no enlargement of islands or point bars.					20-50% affected; moderate accumulation; substantial sediment movement only during major storm event; some new increase in bar formation.	50-80% affected; major deposition; pools shallow, heavily silted; embankments may be present on both banks; frequent and substantial sediment movement during storm events.			Channelized; mud, silt, and/or sand in braided or non-braided channels; pools almost absent due to substantial sediment deposition.												
Score:	0	12	20	19	18	17	16	15	14	13	(12)	11	10	9	8	7	6	5	4	3	2	1

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	The bends in the stream increase the stream length 3-4X longer than if it was in a straight line.	The bends in the stream increase the stream length 2-3X longer than if it was in a straight line.	The bends in the stream increase the stream length 1-2X longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
7. Channel Sinuosity Score: 6	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
8. Channel Flow Status Score: 8	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.
9. Condition of Banks (combined score) Score: 14	Banks stable; no evidence of erosion or bank failure; side slopes generally <30%; little potential for future problems.	Moderately stable; infrequent, small areas of erosion mostly healed over; side slopes up to 40% on one bank; slight erosion potential in extreme floods.	Moderately unstable; moderate frequency and size of erosional areas; side slopes up to 60% on some banks; high erosion potential during extremely high flow.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; side slopes >60% common.
10. Bank Vegetative Protection (combined score) Score: 16	>90% of the streambank surface covered by vegetation.	70-90% of the streambank surfaces covered by vegetation.	60-70% of the streambank surfaces covered by vegetation.	<50% of the streambank surfaces covered by vegetation.
11. Grazing/Other Disruptive Pressure Score: 14	Vegetative disruption is minimal or not evident; almost all plants allowed to grow naturally.	Disruption is evident but not affecting full plant growth potential to any great extent; >1/2 of the potential plant stubble height remaining.	Disruption obvious; patches of bare soil or closely cropped vegetation common; <1/2 of the potential stubble height remaining.	Disruption of streambank vegetation is very high; vegetation has been removed to 2 in. or less in average stubble height.
12. Riparian Vegetative Zone Width (combined score) Score: 11	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.

Station ID
Habitat Score =

$$147/240 = 61\%$$

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Notes:

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HOU TH VAR

FORM 8.13A
BACKGROUND or MONITORING REPORT
(Check appropriate block)

Operator: Alpha Natural Resources
Operation Name: Foundation Mine
Collected By: Wallace & Pancher, Inc.
Township: _____
County: _____

Monitoring Point I.D. HOU T4 FU
 Latitude: ° ' " N and
 Longitude: ° ' " W
 Grid Coordinate:
 Surface Elevation:

Description of sample point

Latitude:	$\text{_____}^{\circ} \text{ } \text{_____}' \text{ } \text{_____}''$ N and	Existing use(s): _____
Longitude:	$\text{_____}^{\circ} \text{ } \text{_____}' \text{ } \text{_____}''$ W	Planned future use(s): _____
Grid Coordinate:	_____	If sampling point is a well, when was the well drilled: _____
Surface Elevation:	_____	
Note: Use a separate sheet for each sample point and list results consecutively by date.		

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Industrial Lab Analysis, Inc.

Lab Name

Signature

Date



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	4/4/07
Time:	13:20
Investigator:	MRW, JDS

Project Name/Area:	Foundation
Sample Identifier:	HOU 14
Heavy Rain In Past 7 Days?	Yes

Mainstem:		Tributary:	X
-----------	--	------------	---

Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	50%
Cropland	
Pasture	50%
Other	
% Canopy Cover	50

Physiochemical Data	
StreamWidth (Feet)	3
Stream Depth (Inches)	3
pH	7.6
Temp. (°C)	12.3
Conductivity (uohms)	148.7
D.O. (mg/L)	9.54
Velocity (ft/sec)	1.5
% CPOM	5
% FPOM	0

% Morphology Types:	
Riffle	90%
Pool	0%
Run	10%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	0%
Gravel	2-64 mm (.1"-2.5")	35%
Sand	.06-2 mm (gritty)	15%
Silt	.004-.06 mm	15%
Clay	<.004 mm (slick)	35%

Habitat Assessment Parameters:		Score
1. Epifanual Substrate/Available Cover		7
2. Pool Substrate Characterization		9
3. Pool Variability		9
4. Sediment Deposition		14
5. Channel Flow Status		9
6. Channel Alteration		17
7. Channel Sinuosity		9
8. Bank Stability		
	LB	7
	RB	7
9. Vegetative Protection		
	LB	8
	RB	8
10. Riparian Vegetative Zone Width		
	LB	9
	RB	9
Max. Score = 200	Total	122
Total/200*100=	Habitat Score	61%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	5	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	5
CPOM			

Notes:

		Pebble Count		
Inches		Particle	Millimeters	
.04 - .08	Sand	Silt/clay	0.062	25
		Very Fine	0.062 - 0.13	
		Fine	0.13 - 0.25	
		Medium	.25 - .50	
		Coarse	.50 - 1.0	10
		Very Coarse	1.0 - 2.0	6
		Very Fine	2.0 - 4.0	7
		Fine	4.0 - 6.0	10
		Fine	6.0 - 8.0	8
		Medium	8.0 - 11.0	9
.16 - .22	Gravel	Medium	11.0 - 16.0	5
		Coarse	16 - 22	3
		Coarse	22 - 32	4
		Very Coarse	32 - 45	10
		Very Coarse	45 - 64	2
		Small	64 - 90	2
		Small	90 - 128	
		Large	128 - 180	
		Large	180 - 256	
		Small	256 - 362	
.22 - .31	Cobble	Small	362 - 512	
		Medium	512 - 1024	
		Large-Vry Large	1024 - 2048	
		Bedrock		
.31 - .44	Boulder			



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	5/30/07
Time:	9:10
Investigator:	DRL, JDS

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU 14
Heavy Rain In Past 7 Days?	No

Mainstem:		Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	50%
Cropland	
Pasture	50%
Other	
% Canopy Cover	40

Physiochemical Data	
StreamWidth (Feet)	2
Stream Depth (Inches)	2
pH	7.95
Temp. (°C)	15.9
Conductivity (uohms)	169
D.O. (mg/L)	9.98
Velocity (ft/sec)	0.2
% CPOM	10
% FPOM	10

% Morphology Types:	
Riffle	75%
Pool	15%
Run	10%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	10%
Gravel	2-64 mm (.1"-2.5")	40%
Sand	.06-2 mm (gritty)	0%
Silt	.004-.06 mm	40%
Clay	<.004 mm (slick)	10%

Habitat Assessment Parameters:		Score
1. Epifanual Substrate/Available Cover		8
2. Pool Substrate Characterization		8
3. Pool Variability		8
4. Sediment Deposition		13
5. Channel Flow Status		8
6. Channel Alteration		13
7. Channel Sinuosity		7
8. Bank Stability		
	LB	7
	RB	7
9. Vegetative Protection		
	LB	9
	RB	9
10. Riparian Vegetative Zone Width		
	LB	10
	RB	10
Max. Score = 200	Total	117
Total/200*100=	Habitat Score	59%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	5	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	5
CPOM			

Notes:

		Pebble Count		
Inches		Particle	Millimeters	
.04 - .08	Sand	Silt/clay	0.062	30
		Very Fine	0.062 - 0.13	
		Fine	0.13 - 0.25	
		Medium	.25 - .50	
		Coarse	.50 - 1.0	
		Very Coarse	1.0 - 2.0	1
0.8 - .16		Very Fine	2.0 - 4.0	7
.16 - .22		Fine	4.0 - 6.0	11
.22 - .31		Fine	6.0 - 8.0	5
.31 - .44		Medium	8.0 - 11.0	5
.44 - .63	Gravel	Medium	11.0 - 16.0	8
.63 - .89		Coarse	16 - 22	7
.89-1.3		Coarse	22 - 32	9
1.3 - 1.8		Very Coarse	32 - 45	8
1.8 - 2.5		Very Coarse	45 - 64	5
2.5 - 3.5	Cobble	Small	64 - 90	1
3.5 - 5.0		Small	90 - 128	2
5.0 - 7.1		Large	128 - 180	1
7.1 - 10.1		Large	180 - 256	
10.1 - 14.3	Boulder	Small	256 - 362	
14.3 - 20		Small	362 - 512	
20 - 40		Medium	512 - 1024	
40 - 80		Large-Vry Large	1024 - 2048	
		Bedrock		



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	12/10/07
Time:	2:30PM
Investigator:	SRG, LD

Project Name/Area:	Foundation
Sample Identifier:	HOU 14
Heavy Rain In Past 7 Days?	Yes

Mainstem:		Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	90%
Forest	10%
Cropland	
Pasture	
Other	
% Canopy Cover	5%

Physiochemical Data	
StreamWidth (Feet)	1.5
Stream Depth (Inches)	3
pH	6.76
Temp. (°C)	8.3
Conductivity (uohms)	114.4
D.O. (mg/L)	21.28
Velocity (ft/sec)	1.2
% CPOM	5
% FPOM	

% Morphology Types:	
Riffle	95%
Pool	0%
Run	5%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	0%
Gravel	2-64 mm (.1"-2.5")	25%
Sand	.06-2 mm (gritty)	0%
Silt	.004-.06 mm	25%
Clay	<.004 mm (slick)	50%

Habitat Assessment Parameters:		Score
1. Epifanual Substrate/Available Cover		17
2. Pool Substrate Characterization		16
3. Pool Variability		2
4. Sediment Deposition		16
5. Channel Flow Status		17
6. Channel Alteration		19
7. Channel Sinuosity		5
8. Bank Stability		
	LB	7
	RB	8
9. Vegetative Protection		
	LB	5
	RB	5
10. Riparian Vegetative Zone Width		
	LB	8
	RB	8
Max. Score = 200	Total	133
Total/200*100=	Habitat Score	67%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	4	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	3
CPOM	3		

Notes:

		Pebble Count		
Inches		Particle	Millimeters	
	Sand	Silt/clay	0.062	50
		Very Fine	0.062 - 0.13	15
		Fine	0.13 - 0.25	10
		Medium	.25 - .50	
		Coarse	.50 - 1.0	
		Very Coarse	1.0 - 2.0	
		Very Fine	2.0 - 4.0	2
		Fine	4.0 - 6.0	4
		Fine	6.0 - 8.0	4
		Medium	8.0 - 11.0	4
	Gravel	Medium	11.0 - 16.0	4
		Coarse	16 - 22	3
		Coarse	22 - 32	3
		Very Coarse	32 - 45	1
		Very Coarse	45 - 64	
		Small	64 - 90	
		Small	90 - 128	
		Large	128 - 180	
		Large	180 - 256	
		Small	256 - 362	
	Cobble	Small	362 - 512	
		Medium	512 - 1024	
		Large-Vry Large	1024 - 2048	
		Bedrock		



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	4/22/08
Time:	11:57 AM
Investigator:	SG, JK

Project Name/Area:	Foundation
Sample Identifier:	HOU 14
Heavy Rain In Past 7 Days?	No

Mainstem:		Tributary:	
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	70%
Cropland	
Pasture	20%
Other	
% Canopy Cover	15

Physiochemical Data	
StreamWidth (Feet)	2
Stream Depth (Inches)	4
Wetted Width (Ft)	2
pH	7.45
Temp. (°C)	13.5
Conductivity (uohms)	157.1
D.O. (mg/L)	13.43
Velocity (ft/sec)	0.23
% CPOM	
% FPOM	

% Morphology Types:	
Riffle	60%
Pool	20%
Run	20%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	0%
Gravel	2-64 mm (.1"-2.5")	40%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	20%
Clay	<.004 mm (slick)	20%

Habitat Assessment Parameters:		Score
1. Epifanual Substrate/Available Cover		15
2. Pool Substrate Characterization		11
3. Pool Variability		4
4. Sediment Deposition		12
5. Channel Flow Status		15
6. Channel Alteration		19
7. Channel Sinuosity		6
8. Bank Stability		
	LB	9
	RB	8
9. Vegetative Protection		
	LB	9
	RB	9
10. Riparian Vegetative Zone Width		
	LB	8
	RB	10
Max. Score = 200	Total	135
Total/200*100=	Habitat Score	68%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	10	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	
CPOM			

Notes:

		Pebble Count	
Inches		Particle	Millimeters
	Sand	Silt/clay	0.062
		Very Fine	0.062 - 0.13
		Fine	0.13 - 0.25
		Medium	.25 - .50
		Coarse	.50 - 1.0
		Very Coarse	1.0 - 2.0
.04 - .08	Gravel	Very Fine	2.0 - 4.0
0.8 - .16		Fine	4.0 - 6.0
.16 - .22		Fine	6.0 - 8.0
.22 - .31		Medium	8.0 - 11.0
.31 - .44		Medium	11.0 - 16.0
.44 - .63		Coarse	16 - 22
.63 - .89		Coarse	22 - 32
.89-1.3		Very Coarse	32 - 45
1.3 - 1.8		Very Coarse	45 - 64
1.8 - 2.5	Cobble	Small	64 - 90
2.5 - 3.5		Small	90 - 128
3.5 - 5.0		Large	128 - 180
5.0 - 7.1		Large	180 - 256
7.1 - 10.1	Boulder	Small	256 - 362
10.1 - 14.3		Small	362 - 512
14.3 - 20		Medium	512 - 1024
20 - 40		Large-Vry Large	1024 - 2048
40 - 80		Bedrock	



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	10/20/08
Time:	1:53 AM
Investigator:	BL,AG

Project Name/Area:	Foundation
Sample Identifier:	HOU 14 - DRY
Heavy Rain In Past 7 Days?	NO

Mainstem:		Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	50%
Forest	50%
Cropland	
Pasture	
Other	
% Canopy Cover	

Physiochemical Data	
StreamWidth (Feet)	3
Stream Depth (Inches)	N/A
Wetted Width (Ft)	"
pH	"
Temp. (°C)	"
Conductivity (uohms)	"
D.O. (mg/L)	"
Velocity (ft/sec)	"
% CPOM	"
% FPOM	"

% Morphology Types:	
Riffle	"
Pool	"
Run	"

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	
Gravel	2-64 mm (.1"-2.5")	10%
Sand	.06-2 mm (gritty)	50%
Silt	.004-.06 mm	20%
Clay	<.004 mm (slick)	20%

Habitat Assessment Parameters:		Score
1. Epifanual Substrate/Available Cover		9
2. Pool Substrate Characterization		8
3. Pool Variability		1
4. Sediment Deposition		7
5. Channel Flow Status		0
6. Channel Alteration		20
7. Channel Sinuosity		1
8. Bank Stability		
	LB	8
	RB	8
9. Vegetative Protection		
	LB	3
	RB	7
10. Riparian Vegetative Zone Width		
	LB	3
	RB	7
Max. Score = 200	Total	82
Total/200*100=	Habitat Score	41%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	N/A	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	
CPOM			

Notes:



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	3/4/09
Time:	1:50 AM
Investigator:	BF JK

Mainstem:		Tributary:	x
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Use Classification:	
Diverse	x
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	85%
Forest	15%
Cropland	
Pasture	
Other	
% Canopy Cover	

Physiochemical Data	
StreamWidth (Feet)	1
Wetted Width (Feet)	0.9
Stream Depth (Inches)	1
pH	7.75
Temp. (°C)	3.2
Conductivity (uohms)	177
D.O. (mg/L)	13.5
Velocity (ft/sec)	NA
% CPOM	
% FPOM	

% Morphology Types:	
Riffle	30.0%
Pool	25.0%
Run	45.0%

Project Name/Area:	Foundation
Sample Identifier:	Hou 14
Heavy Rain In Past 7 Days?	No

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	
Gravel	2-64 mm (.1"-2.5")	
Sand	.06-2 mm (gritty)	
Silt	.004-.06 mm	
Clay	<.004 mm (slick)	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	
2. Pool Substrate Characterization	
3. Pool Variability	
4. Sediment Deposition	
5. Channel Flow Status	
6. Channel Alteration	
7. Channel Sinuosity	
8. Bank Stability	
	LB
	RB
9. Vegetative Protection	
	LB
	RB
10. Riparian Vegetative Zone Width	
	LB
	RB
Max. Score = 200	Total
Total/200*100=	Habitat Score
	0
	0%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel		Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	
CPOM			

Notes:

lower reach is old field - upper reach is forested - small stream channel - not much water in stream, low flow- not deep enough for flow reading.



Appendix B- Stream Habitat Field Sketch Form

Date: 3/11/08
Time: 10:10
Investigator: AG, WR

Project Name/Area: Foundation
Sample Identifier: HOJ 14

LEGEND

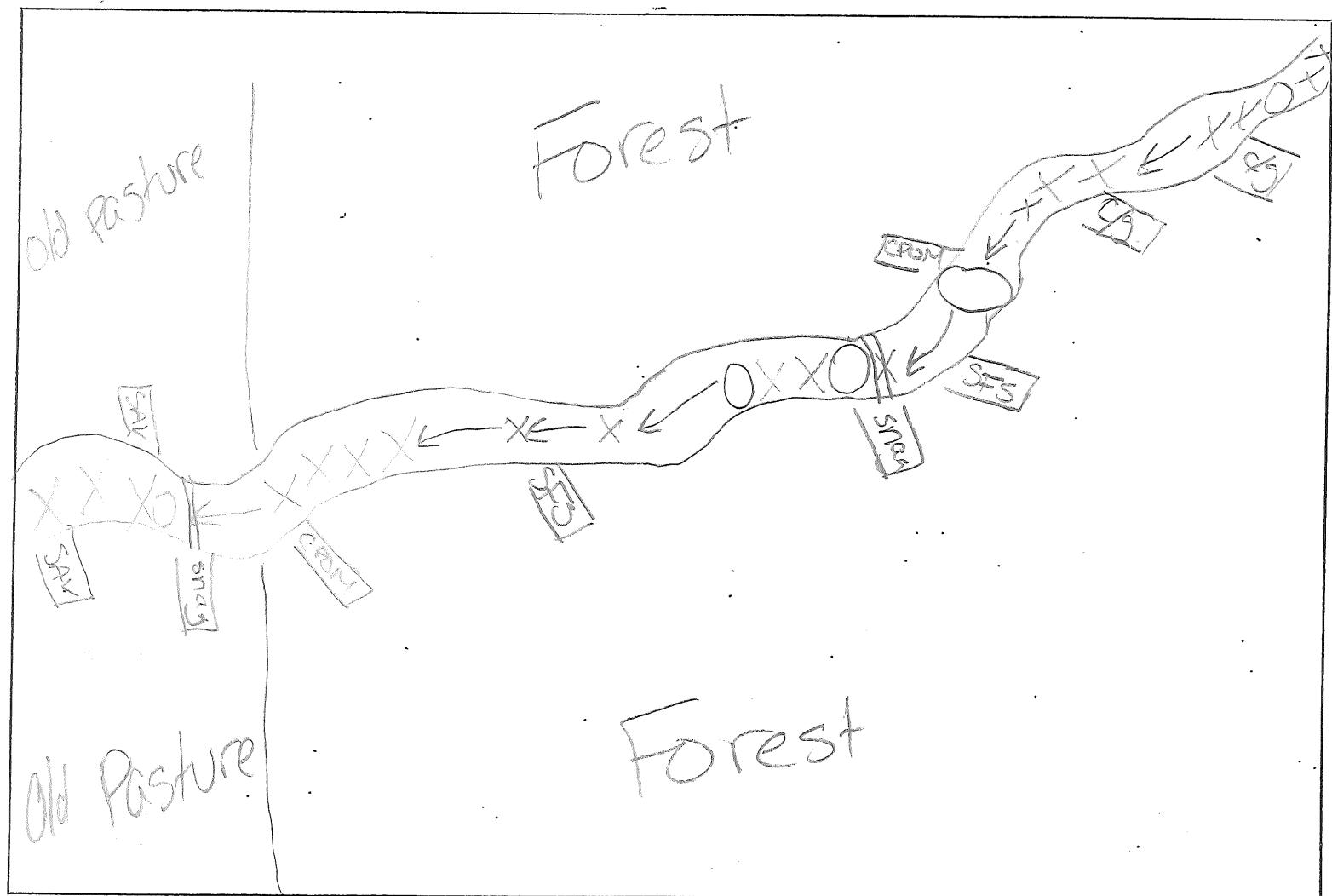
Riffle = X
Pool = 0
Run = →
Snag = —

Investigator Signature

Investigator Signature

Adam Nathan
Wes Reichard

Indicate direction of flow with an arrow





Appendix B- High Gradient Stream Sampling Field Delineation Form

Use Classification	
First Use	
Variable	
Diverse	X

Tributary:

Mainstem:

Project Name/Area:	Foundation
Sample Identifier:	HOU 14
Date:	3/11/10
Time:	10:10
Investigator(s):	AG, WR

Latitude:	39° 51' 51.1" N
Longitude:	80° 21' 12.8" W

Land Use (%)	
Residential	0
Abandoned Mining	0
Active Mining/Surface Activities	0
Commercial/Industrial	0
Old Fields/Old Pasture	25
Forest	75
Cropland	0
Pasture	0
Other (explain below in notes)	0
Canopy Cover (%)	45%

Precipitation in last 7 days? Y N

Substrate Type	Diameter	% Composition
Bedrock		8
Boulder	>256mm (10")	0
Cobble	64-256mm (2.5"-10")	5
Gravel	2-64mm (0.1"-2.5")	30
Sand	0.06-2mm (gritty)	35
Silt	.004-0.06mm	25
Clay	<0.004mm (slick)	5

Physiochemical Data	
Stream Width (feet)	2.5
Wetted Stream Width (feet)	1.7
Stream Depth (feet)	0.18
pH	7.61
Temperature (°C)	2.9
Conductivity (µS)	147.1
D.O.(mg/L)	14.21
Velocity (ft/sec.)	0.24
%CPOM	35
%FPOM	5

% Morphology Types	
Riffle	50
Pool	25
Run	25

Habitat Sampled ¹	Number of kicks
Cobble/Gravel	11
Snag	11
CPOM	11
SAV	11
Sand/Fine Sediment	11

¹The 10 kicks are to be divided evenly between the different habitat types. If one or more habitats are missing, divide remaining kicks evenly between existing habitat types.

Investigator(s) Signature:

Adam Heathman

Wes Reichard

Habitat Assessment Parameters	Score
1. Instream Cover (fish)	10
2. Epifaunal Substrate (riffle quality)	11
3. Embeddedness	11
4. Velocity/Depth Regimes	10
5. Channel Alteration	20
6. Sediment Deposition	9
7. Frequency of Riffles	15
8. Channel Flow Status	12
9. Condition of Banks (both banks combined)	7
10. Bank Veg. Protection (both banks combined)	12
11. Grazing/Other Disruptive Pressure	15
12. Riparian Veg. Zone Width (both banks combined)	15
Total Score (maximum=240)	147
Total / 240 x 100 = Habitat Score	61.25

Notes:

- Ephemeroptera, Cambaridae
- Lots of sediment in streambed
- Banks show a lot of bare soil throughout reach
- Low flow or dry earlier this season
- All habitats sampled
- Weak substrate composition
- GPM: 33.57

Inches		Pebble Count Particle	Millimeters	
	Sample	Silt/clay	0.062	/ / / / / /
		Very Fine	0.062 - 0.13	
		Fine	0.13 - 0.25	
		Medium	.25 - .50	/ /
		Coarse	.50 - 1.0	
.04 - .08		Very Coarse	1.0 - 2.0	
0.8 - .16		Very Fine	2.0 - 4.0	
.16 - .22		Fine	4.0 - 6.0	
.22 - .31		Fine	6.0 - 8.0	
.31 - .44		Medium	8.0 - 11.0	/ / / /
.44 - .63	Gravel	Medium	11.0 - 16.0	
.63 - .89		Coarse	16 - 22	
.89-1.3		Coarse	22 - 32	
1.3 - 1.8		Very Coarse	32 - 45	
1.8 - 2.5		Very Coarse	45 - 64	
2.5 - 3.5		Small	64 - 90	
3.5 - 5.0		Small	90 - 128	
5.0 - 7.1		Large	128 - 180	
7.1 - 10.1		Large	180 - 256	
10.1 - 14.3	Cobble	Small	256 - 362	
14.3 - 20		Small	362 - 512	
20 - 40		Medium	512 - 1024	
40 - 80		Large-Vry Large	1024 - 2048	
		Bedrock		

Sample Name: HOU 14

Investigator Signature

Adam Jeathwa

Investigator Signature

Wes Richard



Appendix B- Stream Habitat Field Sketch Form

Date: 04-16-10
 Time: 9:30 AM
 Investigator: GM WR

Project Name/Area: Foundation (Round 4)
 Sample Identifier: HOU 14

Investigator Signature

Gregory M. Monroe

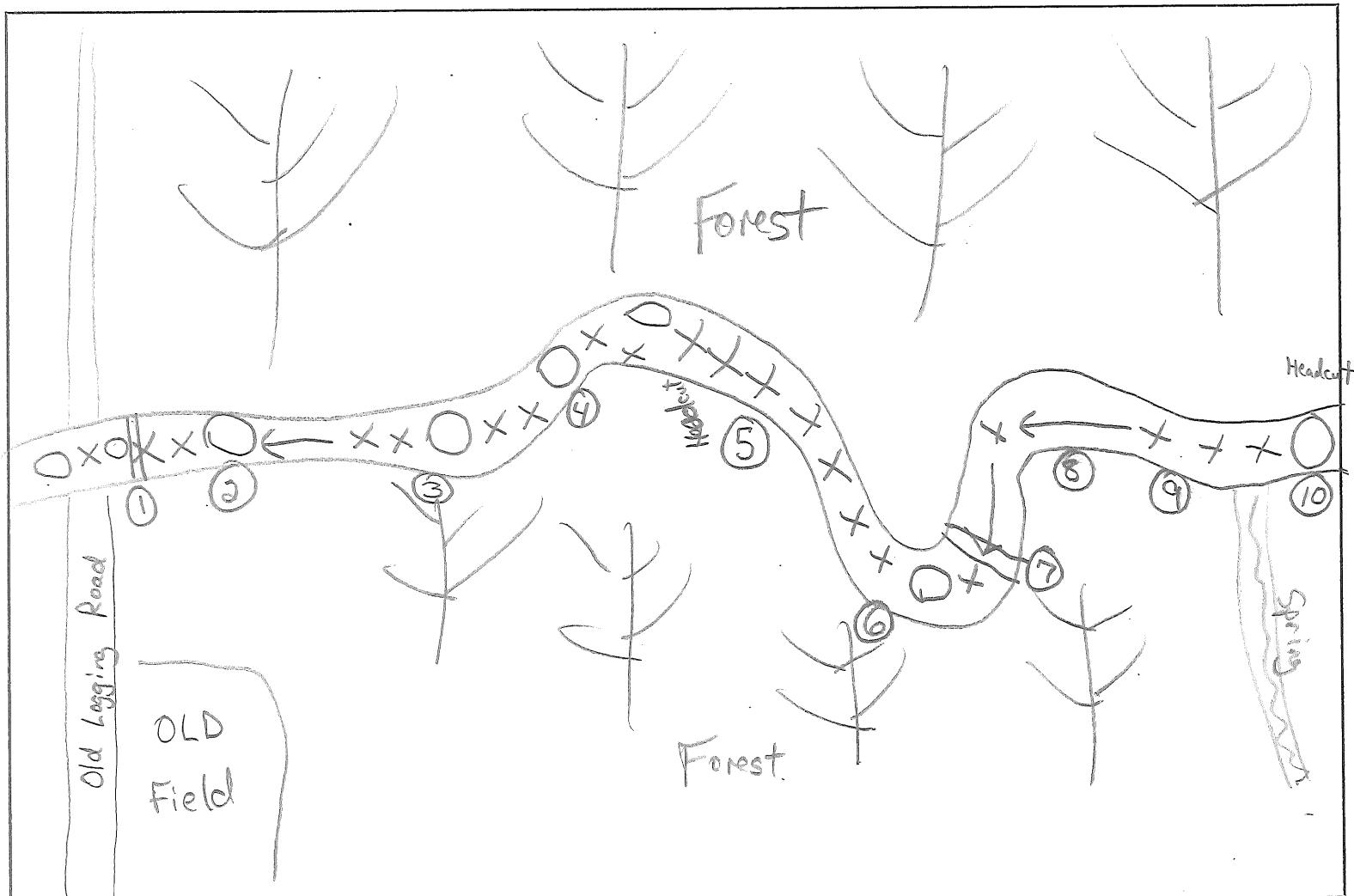
Investigator Signature

Wei Richard

LEGEND

Riffle = X
Pool = O
Run = →
Snag = —

Indicate direction of flow with an arrow



- ① Snag
- ② CPOM
- ③ SFS
- ④ SFS
- ⑤ C/G

- ⑥ CPOM
- ⑦ Snag
- ⑧ CPOM
- ⑨ C/G
- ⑩ SFS

Appendix B- High Gradient Stream Sampling Field Delineation Form



Use Classification
First Use
Variable
Diverse <input checked="" type="checkbox"/>

Tributary: X

Mainstem:

Project Name/Area:	Foundation (Round #1)
Sample Identifier:	HOU 14
Date:	04-16-10
Time:	9:30 AM
Investigator(s):	GM WR
Latitude:	39° 51' 51.3" N
Longitude:	80° 31' 12.9" W

Land Use (%)	
Residential	0
Abandoned Mining	0
Active Mining/Surface Activities	0
Commercial/Industrial	0
Old Fields/Old Pasture	10%
Forest	90%
Cropland	0
Pasture	0
Other (explain below in notes)	0
Canopy Cover (%)	70%

Precipitation in last 7 days? Y N

Substrate Type	Diameter	% Composition
Bedrock		0 %
Boulder	>256mm (10")	5 %
Cobble	64-256mm (2.5"-10")	10 %
Gravel	2-64mm (0.1"-2.5")	20 %
Sand	0.06-2mm (gritty)	35 %
Silt	.004-0.06mm	20 %
Clay	<0.004mm (slick)	10 %

Physiochemical Data	
Stream Width (feet)	4.2
Wetted Stream Width (feet)	0.8
Stream Depth (feet)	0.093
pH	7.72
Temperature (°C)	12.0
Conductivity (µS)	146.6
D.O.(mg/L)	9.0
Velocity (ft/sec.)	0.26
%CPOM	15%
%FPOM	0%

Habitat Assessment Parameters	Score
1. Instream Cover (fish)	4
2. Epifaunal Substrate (riffle quality)	8
3. Embeddedness	9
4. Velocity/Depth Regimes	10
5. Channel Alteration	18
6. Sediment Deposition	7
7. Frequency of Riffles	17
8. Channel Flow Status	6
9. Condition of Banks (both banks combined)	8
10. Bank Veg. Protection (both banks combined)	15
11. Grazing/Other Disruptive Pressure	18
12. Riparian Veg. Zone Width (both banks combined)	18
Total Score (maximum=240)	138
Total / 240 x 100 = Habitat Score	58%

Notes: Some

Macros Obs. - Cambaridae, Amelitidae, Nemouridae
Tipulidae, Hydroptychidae, Limnephilidae
Perlididae

* Low Flow

Substrate Lacking (Mostly Sand)

No SAV Habitat - Substitute CPOM & SFS

C/G are mostly gravel

Headcuts present

Old Logging Road through lower reach

The 10 kicks are to be divided evenly between the different habitat types. If one or more habitats are missing, divide remaining kicks evenly between existing habitat types.

Investigator(s) Signature:

Gregory M. Moore
Wes Bachelder

Inches	Particle Size	Pebble Count	
		Particle	Millimeters
.04 - .08	Sand	Silt/clay	0.062
		Very Fine	0.062 - 0.13
		Fine	0.13 - 0.25
		Medium	.25 - .50
		Coarse	.50 - 1.0
		Very Coarse	1.0 - 2.0
0.8 - .16	Gravel	Very Fine	2.0 - 4.0
		Fine	4.0 - 6.0
		Fine	6.0 - 8.0
		Medium	8.0 - 11.0
		Medium	11.0 - 16.0
		Coarse	16 - 22
		Coarse	22 - 32
		Very Coarse	32 - 45
		Very Coarse	45 - 64
		Small	64 - 90
2.5 - 3.5	Cobbles	Small	90 - 128
		Large	128 - 180
		Large	180 - 256
		Small	256 - 362
3.5 - 5.0	Boulders	Small	362 - 512
		Medium	512 - 1024
		Large-Vry Large	1024 - 2048
		Bedrock	

Sample Name: HOU 14

104

Investigator Signature

Gregory M. Moore

Investigator Signature

Wes Leckie



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	4/4/07
Time:	13:00
Investigator:	MRW, JDS

Project Name/Area:	Foundation
Sample Identifier:	HOU 15
Heavy Rain In Past 7 Days?	Yes

Mainstem:		Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	5%
Forest	50%
Cropland	
Pasture	45%
Other	
% Canopy Cover	

Physiochemical Data	
StreamWidth (Feet)	3
Stream Depth (Inches)	6
pH	7.71
Temp. (°C)	13.4
Conductivity (uohms)	149.6
D.O. (mg/L)	7.49
Velocity (ft/sec)	2.5
% CPOM	5
% FPOM	0

% Morphology Types:	
Riffle	80%
Pool	0%
Run	20%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	0%
Gravel	2-64 mm (.1"-2.5")	40%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	20%
Clay	<.004 mm (slick)	20%

Habitat Assessment Parameters:		Score
1. Epifanual Substrate/Available Cover		12
2. Pool Substrate Characterization		7
3. Pool Variability		7
4. Sediment Deposition		14
5. Channel Flow Status		16
6. Channel Alteration		17
7. Channel Sinuosity		6
8. Bank Stability		
	LB	6
	RB	6
9. Vegetative Protection		
	LB	4
	RB	7
10. Riparian Vegetative Zone Width		
	LB	5
	RB	9
Max. Score = 200	Total	116
Total/200*100=	Habitat Score	58%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	10	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	
CPOM			

Notes:

		Pebble Count		
Inches		Particle	Millimeters	
.04 - .08	Sand	Silt/clay	0.062	10
		Very Fine	0.062 - 0.13	
		Fine	0.13 - 0.25	
		Medium	.25 - .50	
		Coarse	.50 - 1.0	
		Very Coarse	1.0 - 2.0	4
		Very Fine	2.0 - 4.0	6
		Fine	4.0 - 6.0	8
		Fine	6.0 - 8.0	9
		Medium	8.0 - 11.0	12
.16 - .22	Gravel	Medium	11.0 - 16.0	14
		Coarse	16 - 22	13
		Coarse	22 - 32	7
		Very Coarse	32 - 45	9
		Very Coarse	45 - 64	3
		Small	64 - 90	3
		Small	90 - 128	2
		Large	128 - 180	1
		Large	180 - 256	3
		Small	256 - 362	
.22 - .31	Cobble	Small	362 - 512	
		Medium	512 - 1024	
		Large-Vry Large	1024 - 2048	
		Bedrock		
.31 - .44	Boulder			



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	5/30/07
Time:	9:00
Investigator:	JDS, DRL

Project Name/Area:	Foundation Mine
Sample Identifier:	HOU 15
Heavy Rain In Past 7 Days?	No

Mainstem:		Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	50%
Cropland	
Pasture	50%
Other	
% Canopy Cover	75

Physiochemical Data	
StreamWidth (Feet)	4
Stream Depth (Inches)	3
pH	7.83
Temp. (°C)	15.7
Conductivity (uohms)	194.6
D.O. (mg/L)	9.89
Velocity (ft/sec)	0.5
% CPOM	5
% FPOM	10

% Morphology Types:	
Riffle	75%
Pool	15%
Run	10%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	10%
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	0%
Silt	.004-.06 mm	30%
Clay	<.004 mm (slick)	30%

Habitat Assessment Parameters:		Score
1. Epifanual Substrate/Available Cover		10
2. Pool Substrate Characterization		8
3. Pool Variability		8
4. Sediment Deposition		13
5. Channel Flow Status		14
6. Channel Alteration		18
7. Channel Sinuosity		7
8. Bank Stability		
	LB	6
	RB	6
9. Vegetative Protection		
	LB	8
	RB	8
10. Riparian Vegetative Zone Width		
	LB	10
	RB	10
Max. Score = 200	Total	126
Total/200*100=	Habitat Score	63%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	7	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	3
CPOM			

Notes:

		Pebble Count		
Inches		Particle	Millimeters	
.04 - .08	Sand	Silt/clay	0.062	
		Very Fine	0.062 - 0.13	
		Fine	0.13 - 0.25	
		Medium	.25 - .50	
		Coarse	.50 - 1.0	
		Very Coarse	1.0 - 2.0	3
0.8 - .16		Very Fine	2.0 - 4.0	15
.16 - .22		Fine	4.0 - 6.0	19
.22 - .31		Fine	6.0 - 8.0	13
.31 - .44		Medium	8.0 - 11.0	24
.44 - .63	Gravel	Medium	11.0 - 16.0	6
.63 - .89		Coarse	16 - 22	6
.89-1.3		Coarse	22 - 32	6
1.3 - 1.8		Very Coarse	32 - 45	4
1.8 - 2.5		Very Coarse	45 - 64	2
2.5 - 3.5	Cobble	Small	64 - 90	2
3.5 - 5.0		Small	90 - 128	
5.0 - 7.1		Large	128 - 180	
7.1 - 10.1		Large	180 - 256	
10.1 - 14.3	Boulder	Small	256 - 362	
14.3 - 20		Small	362 - 512	
20 - 40		Medium	512 - 1024	
40 - 80		Large-Vry Large	1024 - 2048	
		Bedrock		



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	11/7/07
Time:	10:10
Investigator:	LD, JK

Project Name/Area:	Foundation
Sample Identifier:	HOU 15
Heavy Rain In Past 7 Days?	No

Mainstem:		Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	50%
Forest	50%
Cropland	
Pasture	
Other	
% Canopy Cover	90

Physiochemical Data	
StreamWidth (Feet)	3
Stream Depth (Inches)	2
pH	7.76
Temp. (°C)	5.9
Conductivity (uohms)	220
D.O. (mg/L)	13.2
Velocity (ft/sec)	0.5
% CPOM	80
% FPOM	

% Morphology Types:	
Riffle	60%
Pool	20%
Run	20%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	5%
Gravel	2-64 mm (.1"-2.5")	66%
Sand	.06-2 mm (gritty)	29%
Silt	.004-.06 mm	0%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:		Score
1. Epifanual Substrate/Available Cover		15
2. Pool Substrate Characterization		12
3. Pool Variability		10
4. Sediment Deposition		17
5. Channel Flow Status		13
6. Channel Alteration		15
7. Channel Sinuosity		7
8. Bank Stability		
	LB	9
	RB	9
9. Vegetative Protection		
	LB	5
	RB	9
10. Riparian Vegetative Zone Width		
	LB	1
	RB	9
Max. Score = 200	Total	131
Total/200*100=	Habitat Score	66%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	1	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	2
CPOM	7		

Notes: Wetted Width: 1.5'

		Pebble Count		
Inches		Particle	Millimeters	
.04 - .08	Sand	Silt/clay	0.062	
		Very Fine	0.062 - 0.13	
		Fine	0.13 - 0.25	
		Medium	.25 - .50	8
		Coarse	.50 - 1.0	8
		Very Coarse	1.0 - 2.0	13
		Very Fine	2.0 - 4.0	18
		Fine	4.0 - 6.0	10
		Fine	6.0 - 8.0	8
		Medium	8.0 - 11.0	11
.16 - .22	Gravel	Medium	11.0 - 16.0	10
		Coarse	16 - 22	1
		Coarse	22 - 32	4
		Very Coarse	32 - 45	2
		Very Coarse	45 - 64	2
		Small	64 - 90	2
		Small	90 - 128	2
		Large	128 - 180	1
		Large	180 - 256	
		Small	256 - 362	
.22 - .31	Cobble	Small	362 - 512	
		Medium	512 - 1024	
		Large-Vry Large	1024 - 2048	
		Bedrock		



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	4/22/08
Time:	12:05 PM
Investigator:	SG, JK

Project Name/Area:	Foundation
Sample Identifier:	HOU 15
Heavy Rain In Past 7 Days?	No

Mainstem:		Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	60%
Cropland	
Pasture	40%
Other	
% Canopy Cover	5

Physiochemical Data	
StreamWidth (Feet)	4
Stream Depth (Inches)	3
Wetted Width (Ft)	4
pH	7.61
Temp. (°C)	15.8
Conductivity (uohms)	154
D.O. (mg/L)	12.58
Velocity (ft/sec)	0.32
% CPOM	
% FPOM	

% Morphology Types:	
Riffle	70%
Pool	20%
Run	10%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	5%
Gravel	2-64 mm (.1"-2.5")	65%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:		Score
1. Epifanual Substrate/Available Cover		15
2. Pool Substrate Characterization		11
3. Pool Variability		5
4. Sediment Deposition		13
5. Channel Flow Status		16
6. Channel Alteration		20
7. Channel Sinuosity		7
8. Bank Stability		
	LB	6
	RB	7
9. Vegetative Protection		
	LB	8
	RB	8
10. Riparian Vegetative Zone Width		
	LB	10
	RB	8
Max. Score = 200	Total	134
Total/200*100=	Habitat Score	67%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	10	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	
CPOM			

Notes:



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	10/20/08
Time:	2:00 PM
Investigator:	BL,AG

Project Name/Area:	Foundation
Sample Identifier:	HOU 15 - DRY
Heavy Rain In Past 7 Days?	NO

Mainstem:		Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	100%
Cropland	
Pasture	
Other	
% Canopy Cover	

Physiochemical Data	
StreamWidth (Feet)	6
Stream Depth (Inches)	N/A
Wetted Width (Ft)	"
pH	"
Temp. (°C)	"
Conductivity (uohms)	"
D.O. (mg/L)	"
Velocity (ft/sec)	"
% CPOM	"
% FPOM	"

% Morphology Types:	
Riffle	"
Pool	"
Run	"

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	40%
Gravel	2-64 mm (.1"-2.5")	20%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	20%
Clay	<.004 mm (slick)	

Habitat Assessment Parameters:		Score
1. Epifanual Substrate/Available Cover		14
2. Pool Substrate Characterization		12
3. Pool Variability		2
4. Sediment Deposition		8
5. Channel Flow Status		1
6. Channel Alteration		20
7. Channel Sinuosity		3
8. Bank Stability		
	LB	7
	RB	6
9. Vegetative Protection		
	LB	6
	RB	5
10. Riparian Vegetative Zone Width		
	LB	9
	RB	9
Max. Score = 200	Total	102
Total/200*100=	Habitat Score	51%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	N/A	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	
CPOM			

Notes:



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	3/4/09
Time:	2:25 AM
Investigator:	BF JK

Mainstem:	x	Tributary:	
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Use Classification:	
Diverse	x
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	10%
Forest	90%
Cropland	
Pasture	
Other	
% Canopy Cover	65%

Physiochemical Data	
StreamWidth (Feet)	3.5
Wetted Width (Feet)	3
Stream Depth (Inches)	1
pH	7.67
Temp. (°C)	0
Conductivity (uohms)	152.4
D.O. (mg/L)	12.9
Velocity (ft/sec)	0.83
% CPOM	10.0%
% FPOM	

% Morphology Types:	
Riffle	30.0%
Pool	30.0%
Run	40.0%

Project Name/Area:	Foundation
Sample Identifier:	Hou 15
Heavy Rain In Past 7 Days?	No

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	10%
Gravel	2-64 mm (.1"-2.5")	50%
Sand	.06-2 mm (gritty)	30%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	13
2. Pool Substrate Characterization	10
3. Pool Variability	10
4. Sediment Deposition	18
5. Channel Flow Status	12
6. Channel Alteration	20
7. Channel Sinuosity	10
8. Bank Stability	
LB	10
RB	10
9. Vegetative Protection	
LB	10
RB	10
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score
	153
	77%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	6	Submerged Aquatic Vegetation	
Snag	1	Sand/Fine Sediment	
CPOM	3		

Notes:

forested bank - low flow - shallow stream - lots of ice that had to be broken to sample.



Appendix B- Stream Habitat Field Sketch Form

Date:	11-5-09
Time:	11:15
Investigator:	BL Trn MP

Project Name/Area: foundation
 Sample Identifier: Nov 15

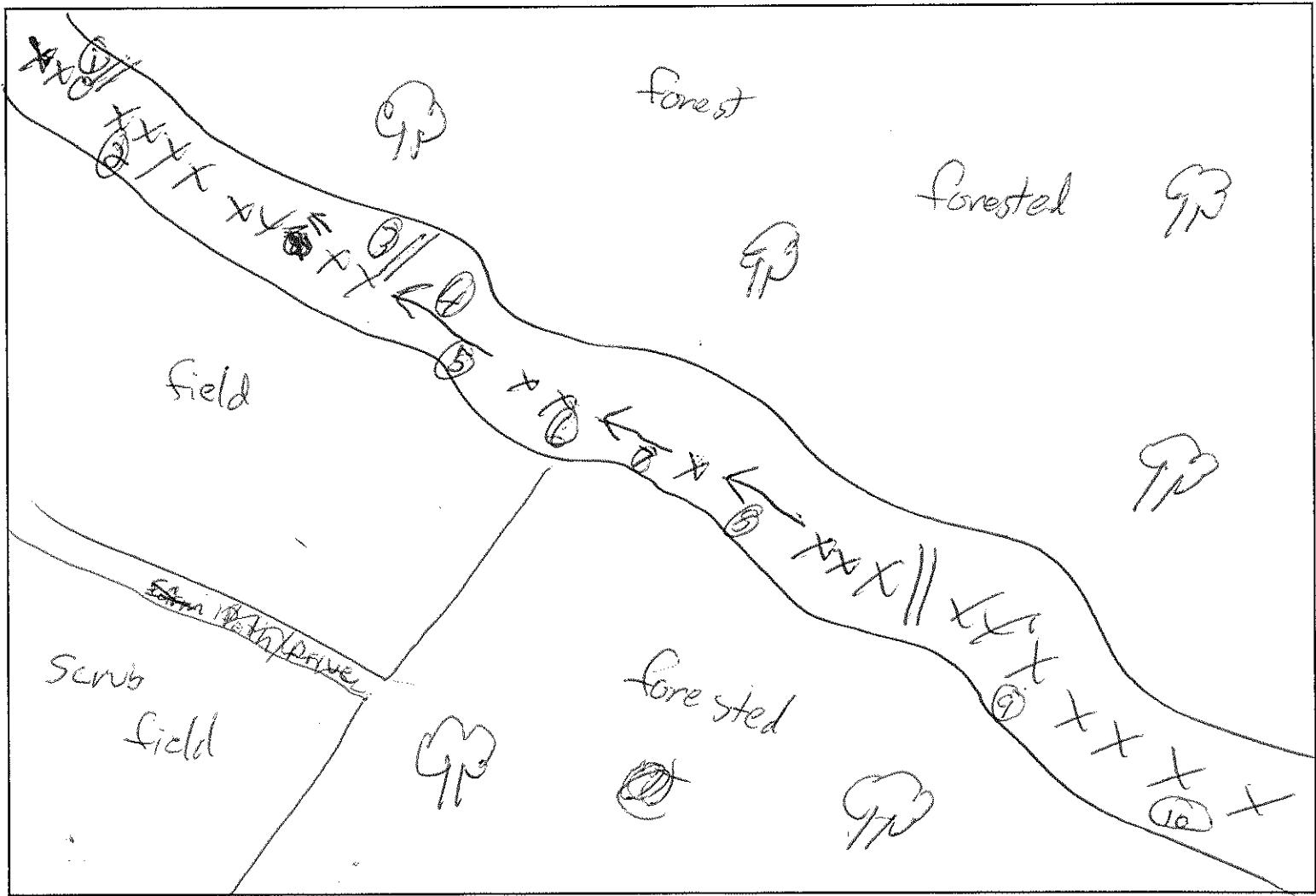
Investigator Signature

Investigator Signature

LEGEND

Riffle = X
Pool = 0
Run = →
Snag = —

Indicate direction of flow with an arrow



- | | |
|--------|-------|
| 1 Snag | 6 LG |
| 2 SfS | 7 Cpm |
| 3 Snag | 8 Gav |
| 4 Cpm | 9 CG |
| 5 Suv. | 10 CG |



Appendix B- High Gradient Stream Sampling Field Delineation Form

Use Classification	
First Use	
Variable	
Diverse	X

Tributary:

Mainstem:

Project Name/Area:	Foundation
Sample Identifier:	Hov 15
Date:	11-5-09
Time:	11:15
Investigator(s):	BL Tm mp

Latitude:	39° 57' 50.571" N
Longitude:	80° 21' 12.902" W

Land Use (%)	
Residential	0
Abandoned Mining	0
Active Mining/Surface Activities	0
Commercial/Industrial	0
Old Fields/Old Pasture	20
Forest	30
Cropland	0
Pasture	0
Other (explain below in notes)	0

Physiochemical Data	
Stream Width (feet / inches)	4, 6
Wetted Stream Width (feet / inches)	.6
Stream Depth (feet / inches)	.04
pH	7.67
Temperature (°C)	7.5
Conductivity (uohms)	156.8
D.O.(mg/L)	6.29
Velocity (ft/sec.)	6.75
%CPOM	20
%FPOM	0

% Morphology Types	
Riffle	23
Pool	23
Run	25

Substrate Type	Diameter	% Composition
Bedrock		0
Boulder	>256mm (10")	5
Cobble	64-256mm (2.5"-10")	30
Gravel	2-64mm (0.1"-2.5")	40
Sand	0.06-2mm (gritty)	10
Silt	.004-0.06mm	10
Clay	<0.004mm (slick)	5

Habitat Assessment Parameters		Score
1. Instream Cover (fish)		14
2. Epifaunal Substrate (riffle quality)		16
3. Embeddedness		14
4. Velocity/Depth Regimes		13
5. Channel Alteration		18
6. Sediment Deposition		7
7. Frequency of Riffles		17
8. Channel Flow Status		13
9. Condition of Banks (both banks combined)		17
10. Bank Veg. Protection (both banks combined)		18
11. Grazing/Other Disruptive Pressure		17
12. Riparian Veg. Zone Width (both banks combined)		15
Total Score (maximum=240)		181
Total / 240 x 100 = Habitat Score		75

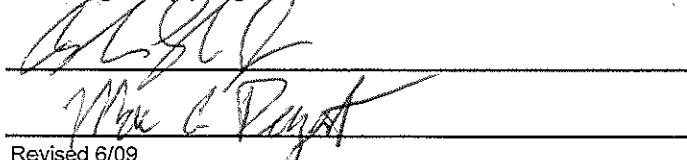
Notes:

macro observed (Caddis fly)
flow = 7.27 gpm

Habitat Sampled ¹	Number of kicks
Cobble/Gravel	11
Snag	11
CPOM	11
SAV	0/1
Sand/Fine Sediment	1

¹The 10 kicks are to be divided evenly between the different habitat types. If one or more habitats are missing, divide remaining kicks evenly between existing habitat types.

Investigator(s) Signature:


Mike C. Paynter

Inches		Pebble Count Particle	Millimeters
.04 - .08	Sand	Silt/clay	0.062
		Very Fine	0.062 - 0.13
		Fine	0.13 - 0.25
		Medium	.25 - .50
		Coarse	.50 - 1.0
		Very Coarse	1.0 - 2.0
0.8 - .16	Gravel	Very Fine	2.0 - 4.0
.16 - .22		Fine	4.0 - 6.0
.22 - .31		Fine	6.0 - 8.0
.31 - .44		Medium	8.0 - 11.0
.44 - .63		Medium	11.0 - 16.0
.63 - .89		Coarse	16 - 22
.89 - 1.3		Coarse	22 - 32
1.3 - 1.8		Very Coarse	32 - 45
1.8 - 2.5		Very Coarse	45 - 64
2.5 - 3.5	Cobble	Small	64 - 90
3.5 - 5.0		Small	90 - 128
5.0 - 7.1		Large	128 - 180
7.1 - 10.1		Large	180 - 256
10.1 - 14.3	Boulder	Small	256 - 362
14.3 - 20		Small	362 - 512
20 - 40		Medium	512 - 1024
40 - 80		Large-Vry Large	1024 - 2048
		Bedrock	

Sample Name: Hwy B 0

Investigator Signature

Investigator Signature



Appendix B- Stream Habitat Field Sketch Form

Date: 04-16-10
 Time: 10:40 AM
 Investigator: GM WR

Project Name/Area: Foundation (Round #1)
 Sample Identifier: HOU 15

LEGEND	
Riffle = X	
Pool = 0	
Run = →	
Snag = —	

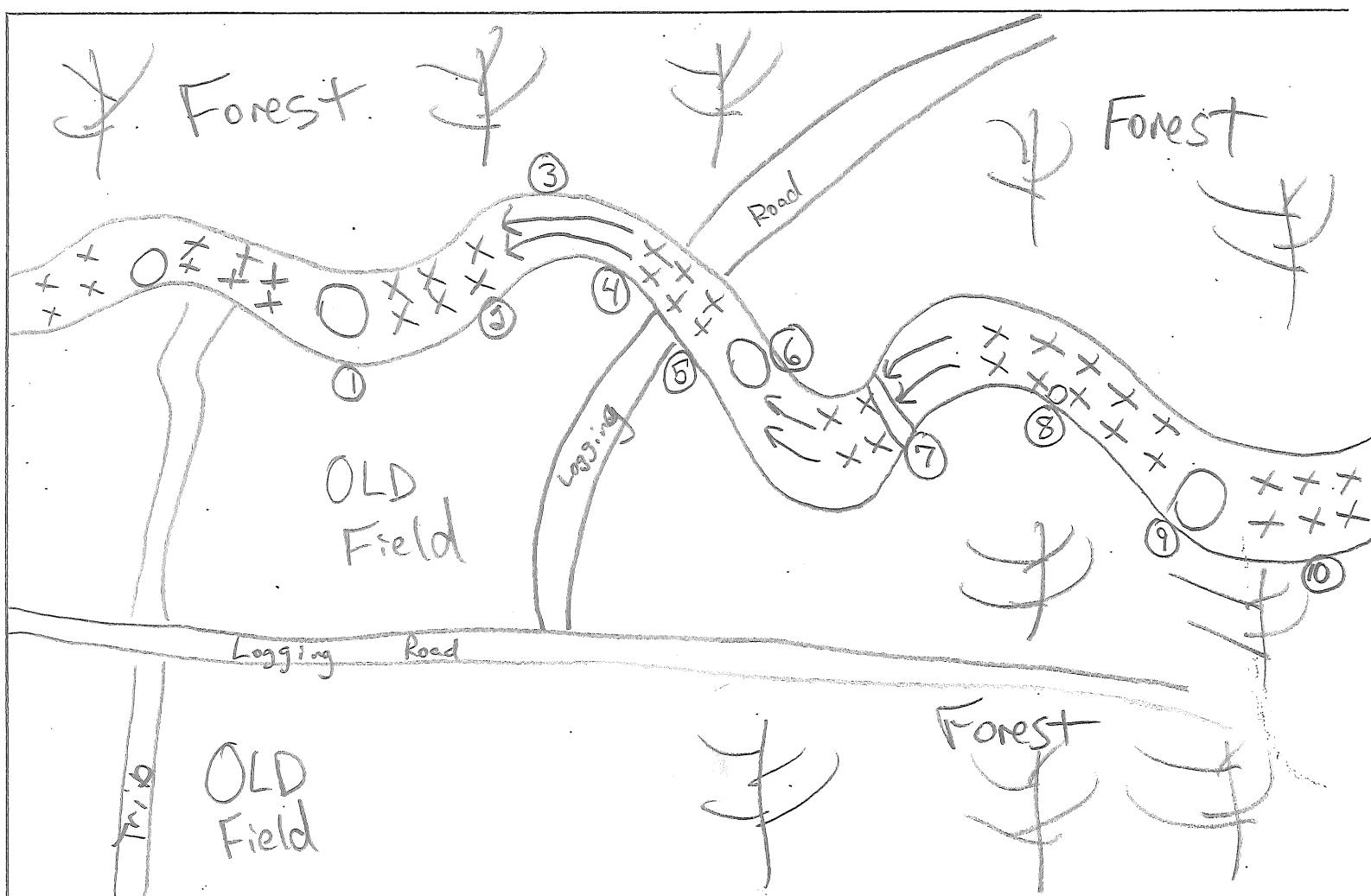
Indicate direction of flow with an arrow

Investigator Signature

Gregory M. Moore

Investigator Signature

Wes Redhead



- ① SFS
- ② SAV
- ③ CPOM
- ④ SAV
- ⑤ C/G

- ⑥ SFS
- ⑦ Snag
- ⑧ CPOM
- ⑨ Snag
- ⑩ C/G



Appendix B- High Gradient Stream Sampling Field Delineation Form

Use Classification
First Use
Variable
Diverse <input checked="" type="checkbox"/>

Tributary:

Mainstem:

Project Name/Area:	Foundation (Round #1)
Sample Identifier:	Hou 15
Date:	04-16-10
Time:	10:40 AM
Investigator(s):	G M WR
Latitude:	39° 51' 51.1" N
Longitude:	80° 21' 13.8" W

Land Use (%)	
Residential	0
Abandoned Mining	0
Active Mining/Surface Activities	0
Commercial/Industrial	0
Old Fields/Old Pasture	25%
Forest	65%
Cropland	0
Pasture	0
Other (explain below in notes)	10%
Canopy Cover (%)	50%

Precipitation in last 7 days?

Y

N

Substrate Type	Diameter	% Composition
Bedrock		0%
Boulder	>256mm (10")	5%
Cobble	64-256mm (2.5"-10")	20%
Gravel	2-64mm (0.1"-2.5")	25%
Sand	0.06-2mm (gritty)	25%
Silt	.004-0.06mm	20%
Clay	<0.004mm (slick)	5%

Physiochemical Data	
Stream Width (feet)	4.5
Wetted Stream Width (feet)	2.5
Stream Depth (feet)	0.16
pH	7.6
Temperature (°C)	16.1
Conductivity (µS)	151.9
D.O.(mg/L)	9.2
Velocity (ft/sec.)	0.35
%CPOM	10%
%FPOM	0%

% Morphology Types	
Riffle	65%
Pool	15%
Run	20%

Habitat Assessment Parameters	Score
1. Instream Cover (fish)	11
2. Epifaunal Substrate (riffle quality)	15
3. Embeddedness	13
4. Velocity/Depth Regimes	10
5. Channel Alteration	16
6. Sediment Deposition	11
7. Frequency of Riffles	17
8. Channel Flow Status	14
9. Condition of Banks (both banks combined)	10
10. Bank Veg. Protection (both banks combined)	16
11. Grazing/Other Disruptive Pressure	14
12. Riparian Veg. Zone Width (both banks combined)	14
Total Score (maximum=240)	161
Total / 240 x 100 = Habitat Score	67%

Notes:

Macros Obs. - Perlidae, Tipulidae, Ameletidae, Cambaridae, Corydalidae, Hydropsychidae, Nemouridae, Limnephilidae

* Could Not Sample bottom 60 ft. Due to new fall trees in stream from snow event

Logging Road cuts through midpoint

Good mix of substrate

All habitats sampled

Land use Other 10% - Logging Roads

¹The 10 kicks are to be divided evenly between the different habitat types. If one or more habitats are missing, divide remaining kicks evenly between existing habitat types.

Investigator(s) Signature:

Gregory M. Moore
Wes Parker

Inches		Pebble Count		
		Particle	Millimeters	
	Sand	Silt/clay	0.062	
		Very Fine	0.062 - 0.13	
		Fine	0.13 - 0.25	
		Medium	.25 - .50	
		Coarse	.50 - 1.0	
		Very Coarse	1.0 - 2.0	
	Gravel	Very Fine	2.0 - 4.0	
		Fine	4.0 - 6.0	
		Fine	6.0 - 8.0	
		Medium	8.0 - 11.0	
		Medium	11.0 - 16.0	
		Coarse	16 - 22	
		Coarse	22 - 32	
		Very Coarse	32 - 45	
		Very Coarse	45 - 64	
	Cobble	Small	64 - 90	
		Small	90 - 128	
		Large	128 - 180	
		Large	180 - 256	
	Boulder	Small	256 - 362	
		Small	362 - 512	
		Medium	512 - 1024	
		Large-Vry Large	1024 - 2048	
		Bedrock		

Sample Name: HOU 15

110

Investigator Signature

Gregory M. Moore

Investigator Signature

Wes Reichard



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	4/4/07
Time:	10:10AM
Investigator:	LMD, JNA

Project Name/Area:	Foundation Mine
Sample Identifier:	HAR T14b
Heavy Rain In Past 7 Days?	Yes

Mainstem:		Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	100%
Cropland	
Pasture	
Other	
% Canopy Cover	80

Physiochemical Data	
StreamWidth (Feet)	3
Stream Depth (Inches)	5
pH	7.63
Temp. (°C)	10.9
Conductivity (uohms)	175.6
D.O. (mg/L)	14
Velocity (ft/sec)	2.0
% CPOM	2
% FPOM	0

% Morphology Types:	
Riffle	30%
Pool	40%
Run	30%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	30%
Cobble	64-256 mm (2.5"-10")	30%
Gravel	2-64 mm (.1"-2.5")	20%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	0%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:		Score
1. Epifanual Substrate/Available Cover		15
2. Pool Substrate Characterization		10
3. Pool Variability		16
4. Sediment Deposition		15
5. Channel Flow Status		20
6. Channel Alteration		20
7. Channel Sinuosity		7
8. Bank Stability		
	LB	6
	RB	6
9. Vegetative Protection		
	LB	10
	RB	10
10. Riparian Vegetative Zone Width		
	LB	10
	RB	9
Max. Score = 200	Total	154
Total/200*100=	Habitat Score	77%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	7	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	2
CPOM	1		

Notes:

Inches		Pebble Count Particle	Millimeters	
	Sand	Silt/clay	0.062	
		Very Fine	0.062 - 0.13	
		Fine	0.13 - 0.25	
		Medium	.25 - .50	
		Coarse	.50 - 1.0	8
		Very Coarse	1.0 - 2.0	8
		Very Fine	2.0 - 4.0	15
		Fine	4.0 - 6.0	8
		Fine	6.0 - 8.0	13
		Medium	8.0 - 11.0	7
	Gravel	Medium	11.0 - 16.0	5
		Coarse	16 - 22	5
		Coarse	22 - 32	2
		Very Coarse	32 - 45	4
		Very Coarse	45 - 64	3
		Small	64 - 90	11
		Small	90 - 128	5
		Large	128 - 180	3
		Large	180 - 256	2
		Small	256 - 362	
	Cobble	Small	362 - 512	1
		Medium	512 - 1024	
		Large	1024 - 2048	
		Very Large	2048 - 4096	
		Bedrock		



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	5/31/07
Time:	11:58
Investigator:	SG, GG

Project Name/Area:	Foundation Mine
Sample Identifier:	HAR T14b
Heavy Rain In Past 7 Days?	Yes

Mainstem:		Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	100%
Cropland	
Pasture	
Other	
% Canopy Cover	95

Physiochemical Data	
StreamWidth (Feet)	3
Stream Depth (Inches)	3
pH	7.57
Temp. (°C)	18.6
Conductivity (uohms)	215
D.O. (mg/L)	8.7
Velocity (ft/sec)	0.5
% CPOM	0
% FPOM	0

% Morphology Types:	
Riffle	90%
Pool	10%
Run	0%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	10%
Cobble	64-256 mm (2.5"-10")	60%
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	0%
Silt	.004-.06 mm	0%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:		Score
1. Epifanual Substrate/Available Cover		20
2. Pool Substrate Characterization		18
3. Pool Variability		16
4. Sediment Deposition		16
5. Channel Flow Status		17
6. Channel Alteration		18
7. Channel Sinuosity		14
8. Bank Stability		
	LB	9
	RB	9
9. Vegetative Protection		
	LB	10
	RB	10
10. Riparian Vegetative Zone Width		
	LB	10
	RB	10
Max. Score = 200	Total	177
Total/200*100=	Habitat Score	89%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	10	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	
CPOM			

Notes:

		Pebble Count		
Inches		Particle	Millimeters	
.04 - .08	Sand	Silt/clay	0.062	
		Very Fine	0.062 - 0.13	
		Fine	0.13 - 0.25	
		Medium	.25 - .50	
		Coarse	.50 - 1.0	
		Very Coarse	1.0 - 2.0	15
0.8 - .16		Very Fine	2.0 - 4.0	15
.16 - .22		Fine	4.0 - 6.0	2
.22 - .31		Fine	6.0 - 8.0	1
.31 - .44		Medium	8.0 - 11.0	5
.44 - .63	Gravel	Medium	11.0 - 16.0	
.63 - .89		Coarse	16 - 22	1
.89-1.3		Coarse	22 - 32	3
1.3 - 1.8		Very Coarse	32 - 45	9
1.8 - 2.5		Very Coarse	45 - 64	18
2.5 - 3.5	Cobble	Small	64 - 90	15
3.5 - 5.0		Small	90 - 128	9
5.0 - 7.1		Large	128 - 180	1
7.1 - 10.1		Large	180 - 256	
10.1 - 14.3	Boulder	Small	256 - 362	2
14.3 - 20		Small	362 - 512	2
20 - 40		Medium	512 - 1024	1
40 - 80		Large-Vry Large	1024 - 2048	1
		Bedrock		



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	11/7/07
Time:	12:10
Investigator:	JNA, SRG

Project Name/Area:	Foundation
Sample Identifier:	HAR T14b
Heavy Rain In Past 7 Days?	Yes

Mainstem:	X	Tributary:	
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	100%
Cropland	
Pasture	
Other	
% Canopy Cover	70

Physiochemical Data	
StreamWidth (Feet)	8
Stream Depth (Inches)	3
pH	7.71
Temp. (°C)	7.1
Conductivity (uohms)	230
D.O. (mg/L)	10.09
Velocity (ft/sec)	0.0
% CPOM	15
% FPOM	1

% Morphology Types:	
Riffle	30%
Pool	45%
Run	25%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	10%
Gravel	2-64 mm (.1"-2.5")	45%
Sand	.06-2 mm (gritty)	35%
Silt	.004-.06 mm	5%
Clay	<.004 mm (slick)	5%

Habitat Assessment Parameters:		Score
1. Epifanual Substrate/Available Cover		12
2. Pool Substrate Characterization		10
3. Pool Variability		3
4. Sediment Deposition		14
5. Channel Flow Status		7
6. Channel Alteration		20
7. Channel Sinuosity		8
8. Bank Stability		
	LB	4
	RB	2
9. Vegetative Protection		
	LB	8
	RB	8
10. Riparian Vegetative Zone Width		
	LB	10
	RB	3
Max. Score = 200	Total	109
Total/200*100=	Habitat Score	55%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	9	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	1
CPOM			

Notes: Wetted Width: 3.5'

		Pebble Count		
Inches		Particle	Millimeters	
.04 - .08	Sand	Silt/clay	0.062	
		Very Fine	0.062 - 0.13	
		Fine	0.13 - 0.25	
		Medium	.25 - .50	3
		Coarse	.50 - 1.0	10
		Very Coarse	1.0 - 2.0	4
		Very Fine	2.0 - 4.0	1
		Fine	4.0 - 6.0	5
		Fine	6.0 - 8.0	3
		Medium	8.0 - 11.0	18
.16 - .22	Gravel	Medium	11.0 - 16.0	19
		Coarse	16 - 22	8
		Coarse	22 - 32	8
		Very Coarse	32 - 45	6
		Very Coarse	45 - 64	4
		Small	64 - 90	4
		Small	90 - 128	1
		Large	128 - 180	2
		Large	180 - 256	1
		Small	256 - 362	
.22 - .31	Cobble	Small	362 - 512	
		Medium	512 - 1024	
		Large-Vry Large	1024 - 2048	3
		Bedrock		



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	4/16/08
Time:	9:00
Investigator:	JK MW

Project Name/Area:	Foundation
Sample Identifier:	HAR T14B
Heavy Rain In Past 7 Days?	N

Mainstem:		Tributary:	x
-----------	--	------------	---

Use Classification:	
Diverse	x
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	70%
Cropland	
Pasture	
Other	30%
% Canopy Cover	20

Physiochemical Data	
StreamWidth (Feet)	5
Stream Depth (Inches)	3
pH	7.75
Temp. (°C)	5.2
Conductivity (uohms)	197.7
D.O. (mg/L)	20.4
Velocity (ft/sec)	0.2
% CPOM	
% FPOM	

% Morphology Types:	
Riffle	30%
Pool	40%
Run	30%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	5%
Cobble	64-256 mm (2.5"-10")	20%
Gravel	2-64 mm (.1"-2.5")	50%
Sand	.06-2 mm (gritty)	15%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:		Score
1. Epifanual Substrate/Available Cover		17
2. Pool Substrate Characterization		10
3. Pool Variability		10
4. Sediment Deposition		18
5. Channel Flow Status		15
6. Channel Alteration		18
7. Channel Sinuosity		7
8. Bank Stability		
	LB	5
	RB	6
9. Vegetative Protection		
	LB	6
	RB	6
10. Riparian Vegetative Zone Width		
	LB	1
	RB	6
Max. Score = 200	Total	125
Total/200*100=	Habitat Score	63%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	10	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	
CPOM			

Notes: wetted 3 ft



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	10/20/08
Time:	3:00 PM
Investigator:	MW,SG

Project Name/Area:	Foundation
Sample Identifier:	HAR T14b - DRY
Heavy Rain In Past 7 Days?	NO

Mainstem:		Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	10%
Abd. Mining	
Commercial / Industrial	10%
Old Fields	
Forest	80%
Cropland	
Pasture	
Other	
% Canopy Cover	30

Physiochemical Data	
StreamWidth (Feet)	N/A
Stream Depth (Inches)	"
Wetted Width (Ft)	"
pH	"
Temp. (°C)	"
Conductivity (uohms)	"
D.O. (mg/L)	"
Velocity (ft/sec)	"
% CPOM	"
% FPOM	"

% Morphology Types:	
Riffle	"
Pool	"
Run	"

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	25%
Gravel	2-64 mm (.1"-2.5")	50%
Sand	.06-2 mm (gritty)	15%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	

Habitat Assessment Parameters:		Score
1. Epifanual Substrate/Available Cover		0
2. Pool Substrate Characterization		0
3. Pool Variability		0
4. Sediment Deposition		14
5. Channel Flow Status		0
6. Channel Alteration		20
7. Channel Sinuosity		5
8. Bank Stability		
	LB	4
	RB	4
9. Vegetative Protection		
	LB	10
	RB	6
10. Riparian Vegetative Zone Width		
	LB	10
	RB	7
Max. Score = 200	Total	80
Total/200*100=	Habitat Score	40%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	N/A	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	
CPOM			

Notes:



Appendix B- Stream Habitat Field Sketch Form

Date: 3/5/09
Time: 3:05pm
Investigator: SL, RP

Project Name/Area: Foundation
Sample Identifier: HAR T14b

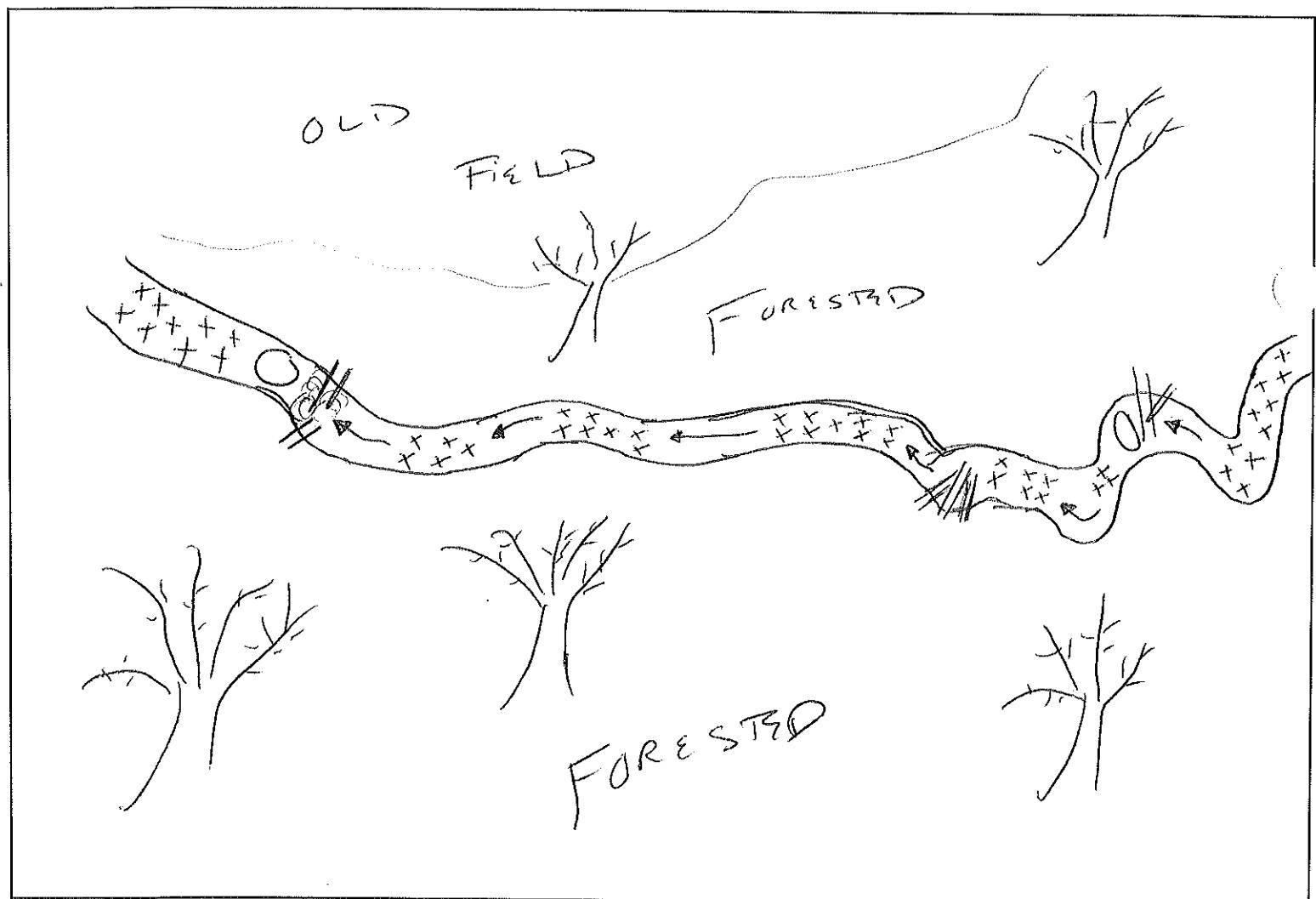
LEGEND

Riffle = X
Pool = 0
Run = →
Snag = —

Investigator Signature

Investigator Signature

Indicate direction of flow with an arrow





Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	3/5/09
Time:	3:05 PM
Investigator:	SB, RP

Mainstem:	Tributary:
-----------	------------

Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	Ø
Abd. Mining	Ø
Commercial / Industrial	Ø
Old Fields	10
Forest	90
Cropland	Ø
Pasture	Ø
Other	Ø
% Canopy Cover	50

Physiochemical Data	
Stream Width (Feet)	3.0
Wetted Width (Inches)	3.0
Stream Depth (Inches)	4.0
pH	7.67
Temp. (°C)	1.2
Conductivity (uohms)	166.4
D.O. (mg/L)	15.0
Velocity (ft/sec)	0.50
% CPOM	Ø
% FPOM	Ø

% Morphology Types:	
Riffle	85
Pool	5
Run	10

Project Name/Area:	Foundation
Sample Identifier:	HAR T14 6
Heavy Rain In Past 7 Days?	N

Substrate Type:	Diameter	% Composition
Bedrock		Ø
Boulder	<256 mm(10")	Ø 10
Cobble	64-256 mm (2.5"-10")	35
Gravel	2-64 mm (.1"-2.5")	Ø 40
Sand	.06-2 mm (gritty)	10
Silt	.004-.06 mm	5
Clay	<.004 mm (slick)	Ø

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	16
2. Pool Substrate Characterization	11
3. Pool Variability	10
4. Sediment Deposition	15
5. Channel Flow Status	Ø 14
6. Channel Alteration	20
7. Channel Sinuosity	10
8. Bank Stability	
LB	4
RB	6
9. Vegetative Protection	
LB	9
RB	7
10. Riparian Vegetative Zone Width	
LB	10
RB	9
Max Score = 200	Total
Total/200*100=	Habitat Score

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.	Talley must equal 10
Cobble/gravel	1X 1	Submerged Aquatic Vegetation
Snag	11	Sand/Fine Sediment
CPOM		11

Notes:

• Stream located in mostly forested area
 • *Veneridae, amelitidae, simulidae* observed

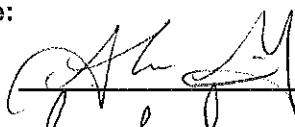
• Multiflora rose upstream on L-B
 • Hawthorn + Red maple present

Inches		Pebble Count		
		Particle	Millimeters	
	Sand	Silt/clay	0.062	///
		Very Fine	0.062 - 0.13	///
		Fine	0.13 - 0.25	///
		Medium	.25 - .50	///
		Coarse	.50 - 1.0	//
		Very Coarse	1.0 - 2.0	//
.04 - .08	Gravel	Very Fine	2.0 - 4.0	///
.08 - .16		Fine	4.0 - 6.0	THH //
.16 - .22		Fine	6.0 - 8.0	HLL //
.22 - .31		Medium	8.0 - 11.0	/X//
.31 - .44		Medium	11.0 - 16.0	///
.44 - .63		Coarse	16 - 22	
.63 - .89		Coarse	22 - 32	
.89-1.3		Very Coarse	32 - 45	///
1.3 - 1.8		Very Coarse	45 - 64	X// X// //
1.8 - 2.5	Cobble	Small	64 - 90	X// X// X//
2.5 - 3.5		Small	90 - 128	X// X// //
3.5 - 5.0		Large	128 - 180	///
5.0 - 7.1		Large	180 - 256	
7.1 - 10.1	Boulder	Small	256 - 362	
10.1 - 14.3		Small	362 - 512	
14.3 - 20		Medium	512 - 1024	
20 - 40		Large-Vry Large	1024 - 2048	
40 - 80		Bedrock		

Sample Name:

0

Investigator Signature



HAR T146

Investigator Signature

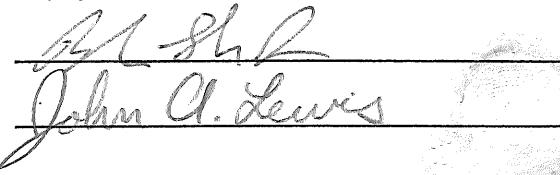


Appendix B- Stream Habitat Field Sketch Form

Date: 2-5-10
Time: 9:00
Investigator: BL JL

Project Name/Area: Foundation
Sample Identifier: Har T14B

Investigator Signature:


John C. Lewis

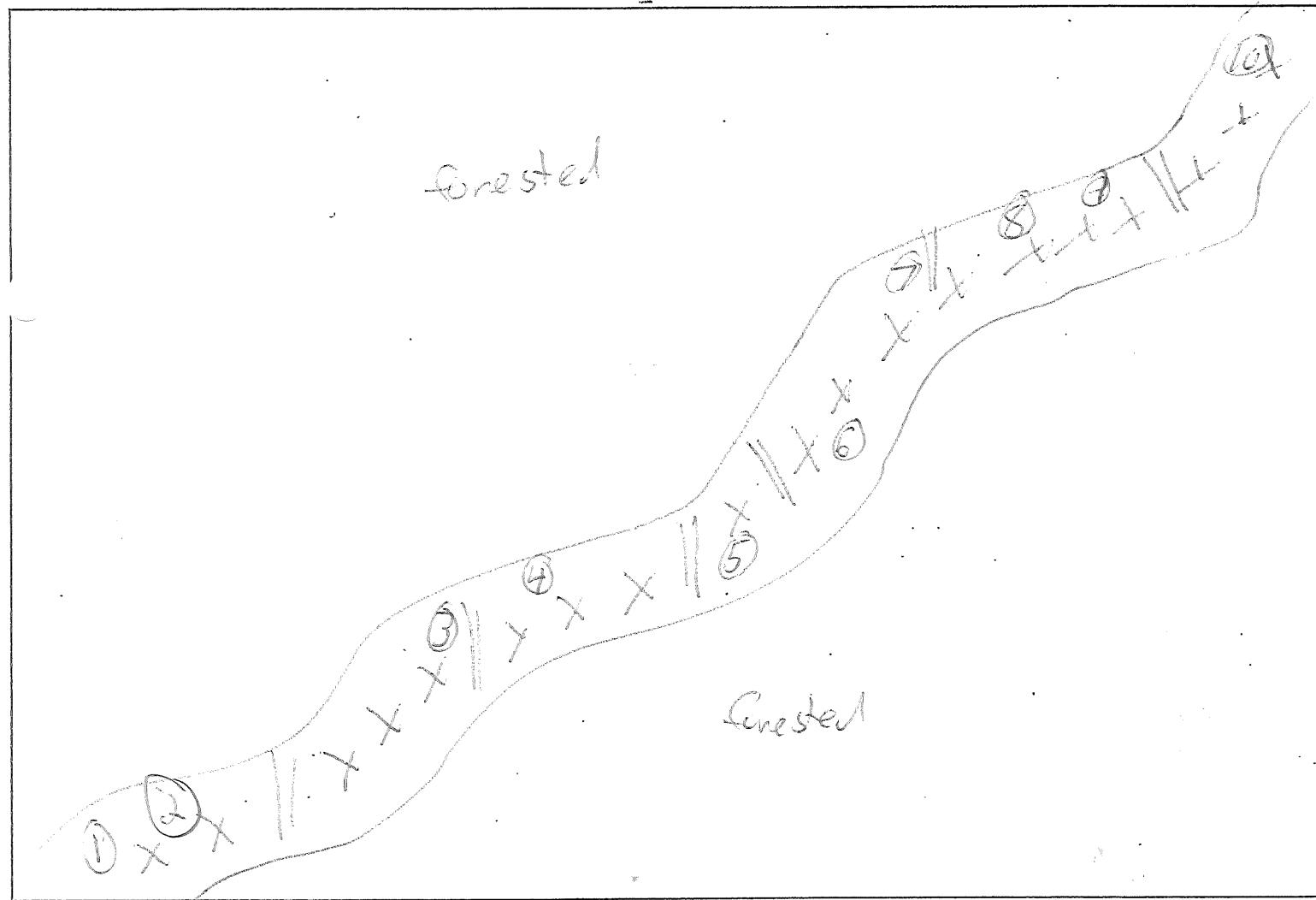
LEGEND

Riffle = X
Pool = 0
Run = →
Snag = —

Investigator Signature:

Investigator Signature:

Indicate direction of flow with an arrow



1 SFS	6 SGV
2 CO	7 CO Snag
3 Snag	8 CG
4 CPm	9 CG
5 CG	10 SFS



Appendix B- High Gradient Stream Sampling Field Delineation Form

Use Classification	
First Use	
Variable	
Diverse	X

Tributary:

Mainstem:

Project Name/Area:	Foundation
Sample Identifier:	Hcr T4B
Date:	2-5-10
Time:	9:00
Investigator(s):	DL, JL
Latitude:	39° 50' 20.015" N
Longitude:	80° 16' 41.933" W

Land Use (%)	
Residential	0
Abandoned Mining	0
Active Mining/Surface Activities	0
Commercial/Industrial	0
Old Fields/Old Pasture	0
Forest	0
Cropland	0
Pasture	0
Other (explain below in notes)	0

Precipitation in last 7 days? Y N

Substrate Type	Diameter	% Composition
Bedrock		0
Boulder	>256mm (10")	1
Cobble	64-256mm (2.5"-10")	14
Gravel	2-64mm (0.1"-2.5")	50
Sand	0.06-2mm (gritty)	20
Silt	.004-0.06mm	15
Clay	<0.004mm (slick)	0

Physiochemical Data	
Stream Width (feet)	3.6
Wetted Stream Width (feet)	2.4
Stream Depth (feet)	0.09
pH	7.75
Temperature (°C)	1.7
Conductivity (uohms)	164.1
D.O.(mg/L)	14.3
Velocity (ft/sec.)	0.50
%CPOM	15
%FPOM	0

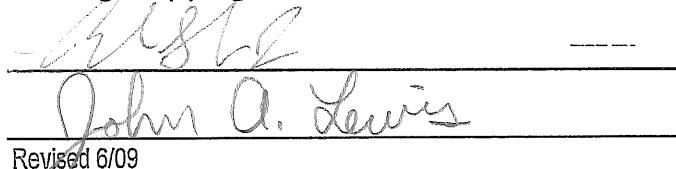
Habitat Assessment Parameters		Score
1. Instream Cover (fish)		12
2. Epifaunal Substrate (riffle quality)		18
3. Embeddedness		12
4. Velocity/Depth Regimes		14
5. Channel Alteration		14
6. Sediment Deposition		12
7. Frequency of Riffles		18
8. Channel Flow Status		14
9. Condition of Banks (both banks combined)		18
10. Bank Veg. Protection (both banks combined)		16
11. Grazing/Other Disruptive Pressure		20
12. Riparian Veg. Zone Width (both banks combined)		17
Total Score (maximum=240)		182
Total / 240 x 100 = Habitat Score		76%

% Morphology Types	
Riffle	100
Pool	0
Run	0

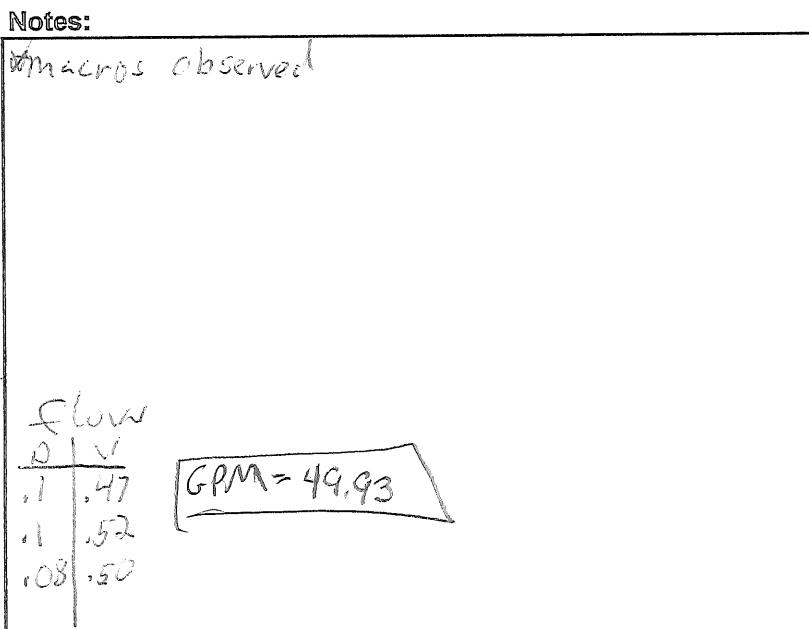
Habitat Sampled ¹	Number of kicks
Cobble/Gravel	111
Snag	11
CPOM	1
SAV	1
Sand/Fine Sediment	11

¹The 10 kicks are to be divided evenly between the different habitat types. If one or more habitats are missing, divide remaining kicks evenly between existing habitat types.

Investigator(s) Signature:


John A. Lewis

Revised 6/09



HHTTM

Inches	Pebble Size	Pebble Count		
		Particle	Millimeters	
.04 - .08	Very Small	Silt/clay	0.062	HHTT/1111
		Very Fine	0.062 - 0.13	111
		Fine	0.13 - 0.25	11
		Medium	.25 - .50	11
		Coarse	.50 - 1.0	HHT1
		Very Coarse	1.0 - 2.0	HHT
0.8 - .16	Small	Very Fine	2.0 - 4.0	HHTHHT
.16 - .22		Fine	4.0 - 6.0	111111
.22 - .31		Fine	6.0 - 8.0	111
.31 - .44		Medium	8.0 - 11.0	111111
.44 - .63		Medium	11.0 - 16.0	111111
.63 - .89		Coarse	16 - 22	1111
.89-1.3	Large	Coarse	22 - 32	1111
1.3 - 1.8		Very Coarse	32 - 45	1
1.8 - 2.5		Very Coarse	45 - 64	HHT1
2.5 - 3.5		Small	64 - 90	111111
3.5 - 5.0		Small	90 - 128	1
5.0 - 7.1		Large	128 - 180	11
7.1 - 10.1		Large	180 - 256	
10.1 - 14.3	Very Large	Small	256 - 362	
14.3 - 20		Small	362 - 512	1
20 - 40		Medium	512 - 1024	
40 - 80		Large-Vry Large	1024 - 2048	
		Bedrock		

Sample Name: Mar 714B

0

0

Investigator Signature

RLS

Investigator Signature

John A. Lewis



Appendix B- Stream Habitat Field Sketch Form

Date: 2/24/10
 Time: 9:20 AM
 Investigator: SJ, GL

Project Name/Area: Foundation (CRD #1)
 Sample Identifier: HAR 714b

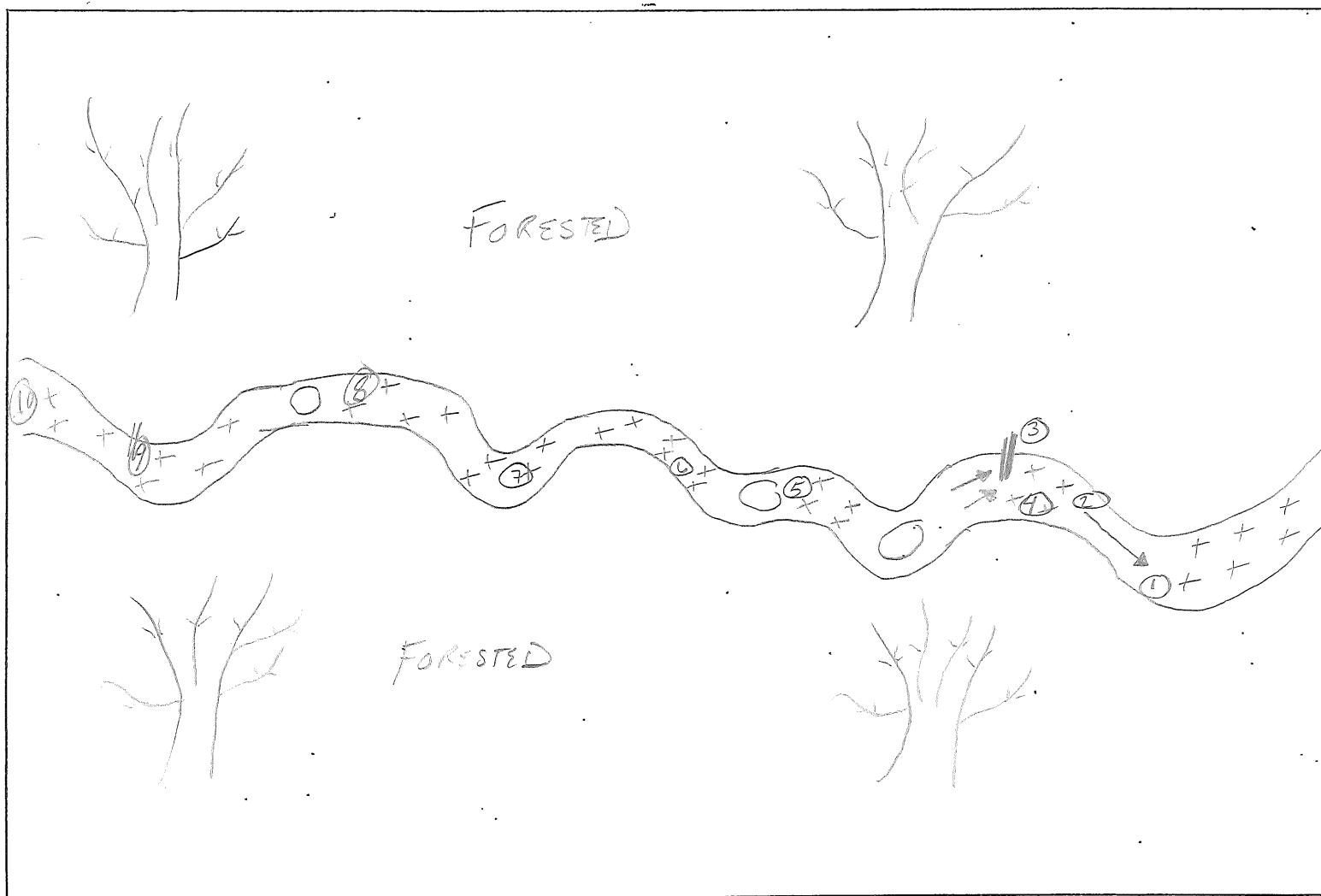
Investigator Signature: 

Investigator Signature: 

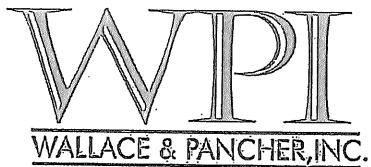
LEGEND

Riffle = X
Pool = O
Run = →
Snag = —

Indicate direction of flow with an arrow



- | | |
|----------|----------|
| (1) CPOM | (6) SFS |
| (2) SFS | (7) C/G |
| (3) SNAG | (8) C/G |
| (9) C/G | (9) Snag |
| (5) C/G | (10) SFS |



Appendix B- High Gradient Stream Sampling Field Delineation Form

Use Classification	
First Use	
Variable	
Diverse	X

Tributary:

Mainstem:

Project Name/Area:	Foundation (Rd #1)
Sample Identifier:	HAR T4b
Date:	2/24/10
Time:	9:30 AM

Investigator(s): SG, BI

Latitude:	39° 57' 20.39" N
Longitude:	80° 16' 41.94" W

Land Use (%)	
Residential	Ø
Abandoned Mining	Ø
Active Mining/Surface Activities	Ø
Commercial/Industrial	Ø
Old Fields/Old Pasture	Ø
Forest	100
Cropland	Ø
Pasture	Ø
Other (explain below in notes)	Ø
Canopy Cover (%)	70%

Precipitation in last 7 days? Y N

Substrate Type	Diameter	% Composition
Bedrock		Ø
Boulder	>256mm (10")	5
Cobble	64-256mm (2.5"-10")	30
Gravel	2-64mm (0.1"-2.5")	35
Sand	0.06-2mm (gritty)	20
Silt	.004-0.06mm	10
Clay	<0.004mm (slick)	Ø

Physiochemical Data	
Stream Width (feet)	2.3
Wetted Stream Width (feet)	2.3
Stream Depth (feet)	0.15
pH	7.47
Temperature (°C)	3.1
Conductivity (µS)	159.0
D.O.(mg/L)	13.5
Velocity (ft/sec.)	0.84
%CPOM	10
%FPOM	Ø

Habitat Assessment Parameters	
1. Instream Cover (fish)	8
2. Epifaunal Substrate (riffle quality)	16
3. Embeddedness	9
4. Velocity/Depth Regimes	6
5. Channel Alteration	19
6. Sediment Deposition	10
7. Frequency of Riffles	17
8. Channel Flow Status	15
9. Condition of Banks (both banks combined)	3
10. Bank Veg. Protection (both banks combined)	17
11. Grazing/Other Disruptive Pressure	19
12. Riparian Veg. Zone Width (both banks combined)	19
Total Score (maximum=240)	160
Total / 240 x 100 = Habitat Score	67%

Notes:

- Reach located in FORESTED AREA
- Both banks have high erosion
- macro obs.
- Some sand bars pres. in areas

Habitat Sampled ¹	Number of kicks
Cobble/Gravel	1111 4
Snag	11 2
CPOM	1 1
SAV	0
Sand/Fine Sediment	111 3

¹The 10 kicks are to be divided evenly between the different habitat types. If one or more habitats are missing, divide remaining kicks evenly between existing habitat types.

Investigator(s) Signature:

DIV
19 .54
18 .49
14 1.37
DV
11.95

Flow = 127.52 gpm

HAR T14

Inches		Pebble Count Particle	Millimeters
.04 - .08	Sand	Silt/clay	0.062
		Very Fine	0.062 - 0.13
		Fine	0.13 - 0.25
		Medium	.25 - .50
		Coarse	.50 - 1.0
		Very Coarse	1.0 - 2.0
0.8 - .16	Gravel	Very Fine	2.0 - 4.0
		Fine	4.0 - 6.0
		Fine	6.0 - 8.0
		Medium	8.0 - 11.0
		Medium	11.0 - 16.0
		Coarse	16 - 22
		Coarse	22 - 32
		Very Coarse	32 - 45
		Very Coarse	45 - 64
2.5 - 3.5	Cobbles	Small	64 - 90
		Small	90 - 128
		Large	128 - 180
		Large	180 - 256
10.1 - 14.3	Boulders	Small	256 - 362
		Small	362 - 512
		Medium	512 - 1024
		Large-Vry Large	1024 - 2048
		Bedrock	

Sample Name: HAR T14b

Investigator Signature



Investigator Signature





Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	4/10/07
Time:	15:00
Investigator:	JDS, MRW

Project Name/Area:	Foundation Mine
Sample Identifier:	WR 6
Heavy Rain In Past 7 Days?	Yes

Mainstem:		Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	100%
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	
Cropland	
Pasture	
Other	
% Canopy Cover	95

Physiochemical Data	
StreamWidth (Feet)	1
Stream Depth (Inches)	2
pH	7.82
Temp. (°C)	11.9
Conductivity (uohms)	153
D.O. (mg/L)	2.84
Velocity (ft/sec)	0.37
% CPOM	0
% FPOM	0

% Morphology Types:	
Riffle	100%
Pool	0%
Run	0%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	0%
Gravel	2-64 mm (.1"-2.5")	20%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	30%
Clay	<.004 mm (slick)	30%

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	9
2. Pool Substrate Characterization	6
3. Pool Variability	6
4. Sediment Deposition	11
5. Channel Flow Status	7
6. Channel Alteration	16
7. Channel Sinuosity	4
8. Bank Stability	
LB	2
RB	2
9. Vegetative Protection	
LB	4
RB	4
10. Riparian Vegetative Zone Width	
LB	0
RB	0
Max. Score = 200	Total
Total/200*100=	Habitat Score
	36%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	10	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	
CPOM			

Notes:

		Pebble Count		
Inches		Particle	Millimeters	
.04 - .08	Sand	Silt/clay	0.062	8
		Very Fine	0.062 - 0.13	7
		Fine	0.13 - 0.25	
		Medium	.25 - .50	
		Coarse	.50 - 1.0	3
		Very Coarse	1.0 - 2.0	11
		Very Fine	2.0 - 4.0	8
		Fine	4.0 - 6.0	14
		Fine	6.0 - 8.0	8
		Medium	8.0 - 11.0	16
.16 - .22	Gravel	Medium	11.0 - 16.0	8
		Coarse	16 - 22	12
		Coarse	22 - 32	2
		Very Coarse	32 - 45	1
		Very Coarse	45 - 64	2
		Small	64 - 90	
		Small	90 - 128	
		Large	128 - 180	
		Large	180 - 256	
		Small	256 - 362	
.22 - .31	Cobble	Small	362 - 512	
		Medium	512 - 1024	
		Large-Vry Large	1024 - 2048	
		Bedrock		
.31 - .44	Boulder			



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	5/29/07
Time:	5:40
Investigator:	JDS, DRL

Project Name/Area:	Foundation Mine
Sample Identifier:	WR 6
Heavy Rain In Past 7 Days?	No

Mainstem:		Tributary:	X
-----------	--	------------	---

Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	100%
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	
Cropland	
Pasture	
Other	
% Canopy Cover	20

Physiochemical Data	
StreamWidth (Feet)	3
Stream Depth (Inches)	2
pH	7.42
Temp. (°C)	25.2
Conductivity (uohms)	252
D.O. (mg/L)	5.46
Velocity (ft/sec)	0.25
% CPOM	5
% FPOM	20

% Morphology Types:	
Riffle	20%
Pool	0%
Run	80%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	0%
Gravel	2-64 mm (.1"-2.5")	50%
Sand	.06-2 mm (gritty)	0%
Silt	.004-.06 mm	50%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	5
2. Pool Substrate Characterization	6
3. Pool Variability	1
4. Sediment Deposition	10
5. Channel Flow Status	11
6. Channel Alteration	8
7. Channel Sinuosity	7
8. Bank Stability	
LB	4
RB	4
9. Vegetative Protection	
LB	8
RB	8
10. Riparian Vegetative Zone Width	
LB	0
RB	0
Max. Score = 200	Total
Total/200*100=	Habitat Score
	36%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	4	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	6
CPOM			

Notes:

		Pebble Count		
Inches		Particle	Millimeters	
.04 - .08	Sand	Silt/clay	0.062	
		Very Fine	0.062 - 0.13	
		Fine	0.13 - 0.25	
		Medium	.25 - .50	
		Coarse	.50 - 1.0	8
		Very Coarse	1.0 - 2.0	
0.8 - .16		Very Fine	2.0 - 4.0	7
.16 - .22		Fine	4.0 - 6.0	14
.22 - .31		Fine	6.0 - 8.0	5
.31 - .44		Medium	8.0 - 11.0	22
.44 - .63	Gravel	Medium	11.0 - 16.0	17
.63 - .89		Coarse	16 - 22	17
.89-1.3		Coarse	22 - 32	7
1.3 - 1.8		Very Coarse	32 - 45	3
1.8 - 2.5		Very Coarse	45 - 64	
2.5 - 3.5	Cobble	Small	64 - 90	
3.5 - 5.0		Small	90 - 128	
5.0 - 7.1		Large	128 - 180	
7.1 - 10.1		Large	180 - 256	
10.1 - 14.3	Boulder	Small	256 - 362	
14.3 - 20		Small	362 - 512	
20 - 40		Medium	512 - 1024	
40 - 80		Large-Vry Large	1024 - 2048	
		Bedrock		



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	11.6.07
Time:	10:50
Investigator:	LMD, JDK

Project Name/Area:	Foundation
Sample Identifier:	WR 6
Heavy Rain In Past 7 Days?	no

Mainstem:		Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	40%
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	
Cropland	
Pasture	50%
Other	10%
% Canopy Cover	15

Physiochemical Data	
StreamWidth (Feet)	3
Stream Depth (Inches)	1
pH	7.77
Temp. (°C)	7
Conductivity (uohms)	225
D.O. (mg/L)	12
Velocity (ft/sec)	
% CPOM	15
% FPOM	

% Morphology Types:	
Riffle	75%
Pool	15%
Run	10%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	0%
Gravel	2-64 mm (.1"-2.5")	47%
Sand	.06-2 mm (gritty)	53%
Silt	.004-.06 mm	0%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	11
2. Pool Substrate Characterization	11
3. Pool Variability	11
4. Sediment Deposition	16
5. Channel Flow Status	10
6. Channel Alteration	13
7. Channel Sinuosity	7
8. Bank Stability	
LB	8
RB	8
9. Vegetative Protection	
LB	5
RB	7
10. Riparian Vegetative Zone Width	
LB	8
RB	0
Max. Score = 200	Total
Total/200*100=	Habitat Score
	58%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	5	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	
CPOM	5		

Notes: bad erosion, lots of mud/soil runoff from pasture with no grass, turkey vulture nesting site near by



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	4/22/08
Time:	1:55 PM
Investigator:	MW LD

Project Name/Area:	Foundation
Sample Identifier:	WR 6
Heavy Rain In Past 7 Days?	N

Mainstem:		Tributary:	x
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Use Classification:	
Diverse	x
Variable	
First Use	

Land Use %	
Residential	60%
Abd. Mining	
Commercial / Industrial	
Old Fields	40%
Forest	
Cropland	
Pasture	
Other	
% Canopy Cover	25

Physiochemical Data	
StreamWidth (Feet)	3.5
Stream Depth (Inches)	1.5
Wetted Width (Ft)	2.5
pH	7.77
Temp. (°C)	12.4
Conductivity (uohms)	180
D.O. (mg/L)	19.9
Velocity (ft/sec)	0.31
% CPOM	
% FPOM	

% Morphology Types:	
Riffle	60%
Pool	15%
Run	35%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	10%
Gravel	2-64 mm (.1"-2.5")	50%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	0%
Clay	<.004 mm (slick)	20%

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	11
2. Pool Substrate Characterization	7
3. Pool Variability	2
4. Sediment Deposition	16
5. Channel Flow Status	15
6. Channel Alteration	16
7. Channel Sinuosity	6
8. Bank Stability	
LB	2
RB	2
9. Vegetative Protection	
LB	0
RB	6
10. Riparian Vegetative Zone Width	
LB	2
RB	5
Total	90
Total/200*100=	Habitat Score
	45%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	10	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	
CPOM			

Notes:



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	10/21/08
Time:	2:30 PM
Investigator:	BL,MW

Project Name/Area:	Foundation
Sample Identifier:	WR 6 - DRY
Heavy Rain In Past 7 Days?	NO

Mainstem:		Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	
Cropland	
Pasture	100%
Other	
% Canopy Cover	

Physiochemical Data	
StreamWidth (Feet)	3
Stream Depth (Inches)	N/A
Wetted Width (Ft)	"
pH	"
Temp. (°C)	"
Conductivity (uohms)	"
D.O. (mg/L)	"
Velocity (ft/sec)	"
% CPOM	"
% FPOM	"

% Morphology Types:	
Riffle	"
Pool	"
Run	"

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	50%
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	10%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	3
2. Pool Substrate Characterization	1
3. Pool Variability	0
4. Sediment Deposition	2
5. Channel Flow Status	0
6. Channel Alteration	10
7. Channel Sinuosity	1
8. Bank Stability	
LB	7
RB	6
9. Vegetative Protection	
LB	6
RB	7
10. Riparian Vegetative Zone Width	
LB	0
RB	0
Total	43
Total/200*100=	22%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	N/A	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	
CPOM			

Notes:



Appendix B- Stream Habitat Field Sketch Form

Date: 3/1/04
Time: 14:55
Investigator: C.R.P.

Project Name/Area: Foothills
Sample Identifier: WR 6

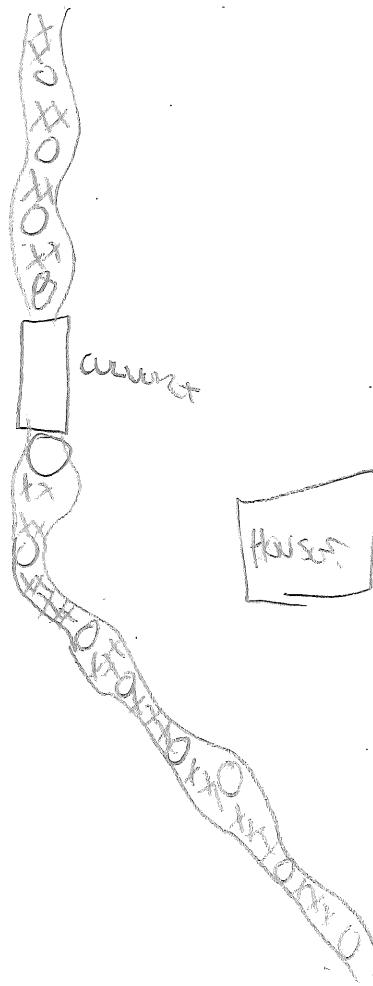
LEGEND

Riffle = X
Pool = O
Run = →
Snag = —

Investigator Signature

Investigator Signature

Indicate direction of flow with an arrow





Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	3/16/09
Time:	1:45
Investigator:	L.S. RP

Mainstem:	Tributary:	X
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Use Classification	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	10
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	30
Cropland	
Pasture	50
Other	
% Canopy Cover	10

Physiochemical Data	
Stream Width (Feet)	4.0
Wetted Width (Inches)	20 FT
Stream Depth (Inches)	10
pH	7.7
Temp. (°C)	8.5
Conductivity (uohms)	175
D.O. (mg/L)	9.69
Velocity (ft/sec)	N/A
% CPOM	10
% FPOM	

% Morphology Types	
Riffle	50
Pool	50
Run	0

Project Name/Area:	FOUNDATION
Sample Identifier:	WR 6
Heavy Rain In Past 7 Days?	N

Substrate Type	Diameter	% Substrate Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	20
Gravel	2-64 mm (.1"-2.5")	10
Sand	.06-2 mm (gritty)	0
Silt	.004-.06 mm	10
Clay	<.004 mm (slick)	10

Habitat Assessment Parameters	Score
1. Epifaunal Substrate/Available Cover	15
2. Pool Substrate Characterization	10
3. Pool Variability	5
4. Sediment Deposition	15
5. Channel Flow Status	6
6. Channel Alteration	18
7. Channel Sinuosity	6
8. Bank Stability	
LB	4
RB	4
9. Vegetative Protection	
LB	1
RB	3
10. Riparian Vegetative Zone Width	
LB	0
RB	1
Max. Score = 200	Total 0
Total/200*100=	Habitat Score 0%

Habitat Sampled	Must be representative of habitat within the 100m sampling locations	Tally must equal 10
Cobble/gravel	11	Submerged Aquatic Vegetation
Snag	1	Sand/Fine Sediment
CPOM	11	

Notes:

- WATER IS TOO LOW FOR VELOCIM, only one bottle collected. (low flow + narrow channel)
- PASTURE SURROUNDS STREAM (Former Pasture).
- OUTHOUSE ON LEFT BANK.
- TRASH IN STREAM

Inches		Pebble Count	Particle	Millimeters
.04 - .08	Sand	Silt/clay	0.062	
		Very Fine	0.062 - 0.13	
		Fine	0.13 - 0.25	
		Medium	.25 - .50	
		Coarse	.50 - 1.0	
		Very Coarse	1.0 - 2.0	
		Very Fine	2.0 - 4.0	
		Fine	4.0 - 6.0	
		Fine	6.0 - 8.0	
		Medium	8.0 - 11.0	
.16 - .22	Gravel	Medium	11.0 - 16.0	
		Coarse	16 - 22	
		Coarse	22 - 32	
		Very Coarse	32 - 45	
		Very Coarse	45 - 64	
		Small	64 - 90	
		Small	90 - 128	
		Large	128 - 180	
		Large	180 - 256	
		Small	256 - 362	
.22 - .31	Cobble	Small	362 - 512	
		Medium	512 - 1024	
		Large-Vry Large	1024 - 2048	
		Bedrock		

Sample Name:

0

Investigator Signature

WRB

Investigator Signature



Appendix B- Stream Habitat Field Sketch Form

Date: 2/23/10
 Time: 9:30 AM
 Investigator: SG, AG

Project Name/Area: Foundation
 Sample Identifier: WR 10

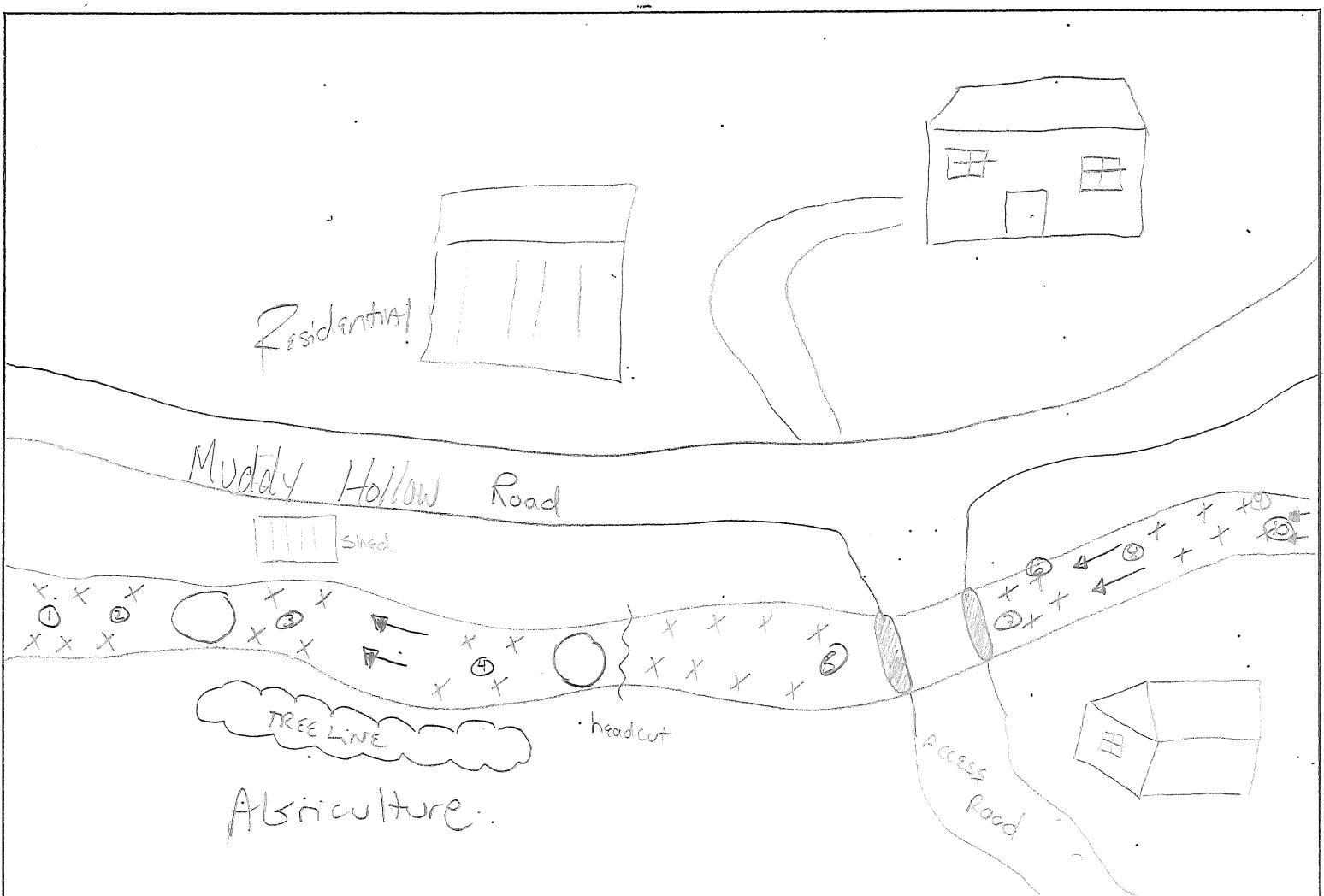
LEGEND

Riffle = X
Pool = 0
Run = →
Snag = —

Indicate direction of flow with an arrow

Investigator Signature

Investigator Signature



① c/5

② c/6

③ c/5

④ SAV

⑤ CPOM

⑥ SAV

⑦ SFS

⑧ SFS

⑨ SAV

⑩ CPOM



Appendix B- High Gradient Stream Sampling Field Delineation Form

Use Classification	
First Use	
Variable	
Diverse	X

Tributary: X Mainstem:

Project Name/Area:	Foundation
Sample Identifier:	B WR 6
Date:	2/23/10
Time:	9:30 AM
Investigator(s):	SG, AB

Latitude:	39° 51' 54.42" N
Longitude:	80° 22' 7.33" W

Land Use (%)	
Residential	45
Abandoned Mining	0
Active Mining/Surface Activities	0
Commercial/Industrial	0
Old Fields/Old Pasture	0
Forest	5
Cropland	0
Pasture	0
Other (explain below in notes)	50
Canopy Cover (%)	10%

Precipitation in last 7 days? Y N

Substrate Type	Diameter	% Composition
Bedrock		0
Boulder	>256mm (10")	0
Cobble	64-256mm (2.5"-10")	15
Gravel	2-64mm (0.1"-2.5")	35
Sand	0.06-2mm (gritty)	20
Silt	.004-0.06mm	25
Clay	<0.004mm (slick)	5

Physiochemical Data	
Stream Width (feet)	23
Wetted Stream Width (feet)	23
Stream Depth (feet)	0.22
pH	7.73
Temperature (°C)	1.6
Conductivity (µS)	186.9
D.O.(mg/L)	13.8
Velocity (ft/sec.)	0.93
%CPOM	5
%FPOM	0

% Morphology Types	
Riffle	70
Pool	20
Run	10

Habitat Assessment Parameters	Score
1. Instream Cover (fish)	8
2. Epifaunal Substrate (riffle quality)	12
3. Embeddedness	9
4. Velocity/Depth Regimes	10
5. Channel Alteration	14
6. Sediment Deposition	11
7. Frequency of Riffles	16
8. Channel Flow Status	17
9. Condition of Banks (both banks combined)	7
10. Bank Veg. Protection (both banks combined)	6
11. Grazing/Other Disruptive Pressure	5
12. Riparian Veg. Zone Width (both banks combined)	2
Total Score (maximum=240)	117
Total / 240 x 100 = Habitat Score	49%

Notes:

Land use: RB Muddy Hollow Rd. Runs parallel to stream
is Residential on other side of rd.
LB: Agriculture w/ Farming equipment storage
barns & access road where stream flows under through culvert
macro obs.: tipulidae, heptageniidae, phryganeidae, chironomidae, spinicauda
Banks are unstable w/ little veg. protection
little riparian press.

¹The 10 kicks are to be divided evenly between the different habitat types. If one or more habitats are missing, divide remaining kicks evenly between existing habitat types.

Investigator(s) Signature:

Adam Shaffer

Page 200.000
2/23/10

Inches		Pebble Count Particle	Millimeters
.04 - .08	Sand	Silt/clay	0.062
		Very Fine	0.062 - 0.13
		Fine	0.13 - 0.25
		Medium	.25 - .50
		Coarse	.50 - 1.0
		Very Coarse	1.0 - 2.0
		Very Fine	2.0 - 4.0
		Fine	4.0 - 6.0
		Fine	6.0 - 8.0
		Medium	8.0 - 11.0
.16 - .22	Gravel	Medium	11.0 - 16.0
		Coarse	16 - 22
		Coarse	22 - 32
		Very Coarse	32 - 45
		Very Coarse	45 - 64
		Small	64 - 90
		Small	90 - 128
		Large	128 - 180
		Large	180 - 256
		Small	256 - 362
10.1 - 14.3	Cobble	Small	362 - 512
		Medium	512 - 1024
		Large-Vry Large	1024 - 2048
		Bedrock	

Sample Name: WR 6

Investigator Signature

Investigator Signature

Appendix B- Stream Habitat Field Sketch Form

Date: 04-05-10
Time: 11:40 AM
Investigator: GM JL

Project Name/Area: Foundation (Round # 1)
Sample Identifier: WR 6

LEGEND	
Riffle = X	
Pool = 0	
Run = →	
Snag = —	

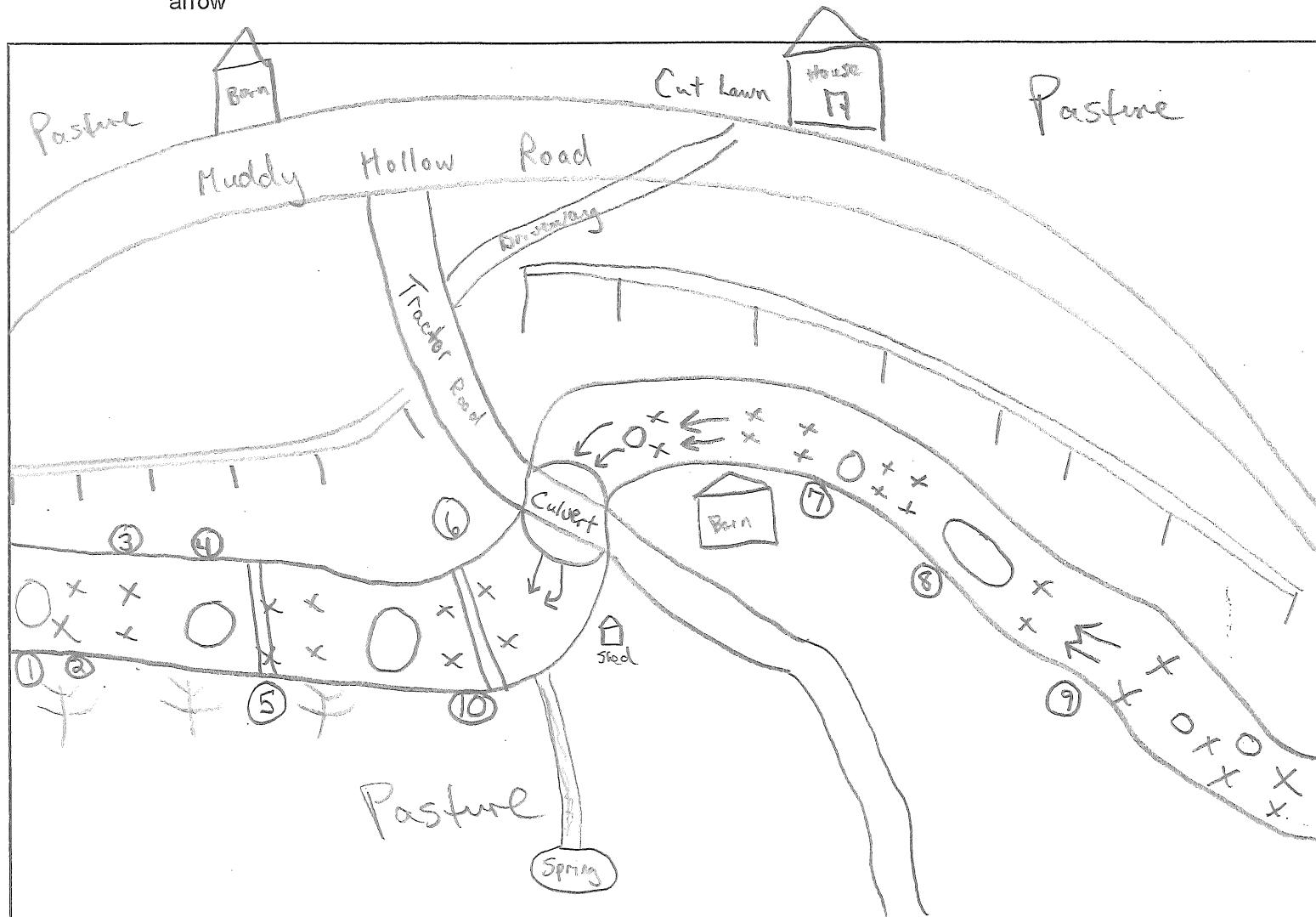
Investigator Signature

Troy M. Myre

Investigator Signature

John Q. Lewis

Indicate direction of flow with an arrow



- ① SFS
- ② CPOM
- ③ C/G
- ④ CPOM
- ⑤ Snag

- ⑥ Snag
- ⑦ SAV
- ⑧ SFS
- ⑨ SAV
- ⑩ C/G



Appendix B- High Gradient Stream Sampling Field Delineation Form

Use Classification	
First Use	
Variable	
Diverse	X

Tributary: X

Mainstem: _____

Project Name/Area:	Foundation (Round #1)
Sample Identifier:	WR 6
Date:	04-05-10
Time:	11:40 AM

Investigator(s): GM JL

Latitude:	39° 51' 54.3" N
Longitude:	80° 33' 7.77" W

Precipitation in last 7 days?

(Y)

N

Land Use (%)	
Residential	40%
Abandoned Mining	0
Active Mining/Surface Activities	0
Commercial/Industrial	0
Old Fields/Old Pasture	0
Forest	0
Cropland	0
Pasture	40%
Other (explain below in notes)	20%
Canopy Cover (%)	10%

Substrate Type	Diameter	% Composition
Bedrock		0
Boulder	>256mm (10")	5
Cobble	64-256mm (2.5"-10")	20
Gravel	2-64mm (0.1"-2.5")	20
Sand	0.06-2mm (gritty)	20
Silt	.004-0.06mm	25
Clay	<0.004mm (slick)	10

Habitat Assessment Parameters		Score
1. Instream Cover (fish)		10
2. Epifaunal Substrate (rifflle quality)		15
3. Embeddedness		11
4. Velocity/Depth Regimes		13
5. Channel Alteration		12
6. Sediment Deposition		8
7. Frequency of Riffles		16
8. Channel Flow Status		11
9. Condition of Banks (both banks combined)		7
10. Bank Veg. Protection (both banks combined)		11
11. Grazing/Other Disruptive Pressure		4
12. Riparian Veg. Zone Width (both banks combined)		4
Total Score (maximum=240)		122
Total / 240 x 100 = Habitat Score		51%

Notes:

Macros Obs.
Anisoptera, chironomidae, Cambaridae, Tipulidae
Phryganeidae

Lower Reach is less disturbed, substrate is more of a mix
Upper Reach Completely in a pasture mostly sand, silt, gravel

Small brushy hillside w/trees lower reach, left bank

Algae in reach

Highly affected by agriculture

Land use * 20% - Muddy Hollow Road and Tractor Road
other

GPM = 31.93

¹The 10 kicks are to be divided evenly between the different habitat types. If one or more habitats are missing, divide remaining kicks evenly between existing habitat types.

Investigator(s) Signature:

Douglas M. Moore

John A. Lewis

4H
4H

Inches		Pebble Count		Millimeters
		Particle	Silt/clay	
.04 - .08	Sand	Silt/clay	0.062	4H 4H 4H II
		Very Fine	0.062 - 0.13	4H
		Fine	0.13 - 0.25	III
		Medium	.25 - .50	4H II
		Coarse	.50 - 1.0	4H I
		Very Coarse	1.0 - 2.0	4H 4H III
0.8 - .16	Gravel	Very Fine	2.0 - 4.0	4H III
		Fine	4.0 - 6.0	4H
		Fine	6.0 - 8.0	III
		Medium	8.0 - 11.0	4H
		Medium	11.0 - 16.0	I
		Coarse	16 - 22	4H
		Coarse	22 - 32	II
		Very Coarse	32 - 45	III
		Very Coarse	45 - 64	I
		Small	64 - 90	4H III
2.5 - 3.5	Cobble	Small	90 - 128	III
		Large	128 - 180	I
		Large	180 - 256	II
		Small	256 - 362	II
3.5 - 5.0	Boulder	Small	362 - 512	
		Medium	512 - 1024	
		Large-Vry Large	1024 - 2048	
		Bedrock		

Sample Name: WR 6

Investigator Signature

Douglas M. Moore

Investigator Signature

John C. Lewis



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	4/10/07
Time:	12:41
Investigator:	JDS, MRW

Project Name/Area:	Foundation Mine
Sample Identifier:	WR 8
Heavy Rain In Past 7 Days?	Yes

Mainstem:		Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	50%
Forest	50%
Cropland	
Pasture	
Other	
% Canopy Cover	20

Physiochemical Data	
StreamWidth (Feet)	6
Stream Depth (Inches)	4
pH	7.96
Temp. (°C)	7.7
Conductivity (uohms)	189.6
D.O. (mg/L)	3.94
Velocity (ft/sec)	1.0
% CPOM	5
% FPOM	5

% Morphology Types:	
Riffle	50%
Pool	10%
Run	40%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	20%
Gravel	2-64 mm (.1"-2.5")	50%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	16
2. Pool Substrate Characterization	12
3. Pool Variability	5
4. Sediment Deposition	14
5. Channel Flow Status	10
6. Channel Alteration	18
7. Channel Sinuosity	7
8. Bank Stability	
LB	5
RB	5
9. Vegetative Protection	
LB	8
RB	8
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score
	64%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	10	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	
CPOM			

Notes:

		Pebble Count		
Inches		Particle	Millimeters	
.04 - .08	Sand	Silt/clay	0.062	10
		Very Fine	0.062 - 0.13	
		Fine	0.13 - 0.25	10
		Medium	.25 - .50	10
		Coarse	.50 - 1.0	
		Very Coarse	1.0 - 2.0	10
		Very Fine	2.0 - 4.0	9
		Fine	4.0 - 6.0	2
		Fine	6.0 - 8.0	
		Medium	8.0 - 11.0	6
.16 - .22	Gravel	Medium	11.0 - 16.0	10
		Medium	16 - 22	8
		Coarse	22 - 32	6
		Coarse	32 - 45	8
		Very Coarse	45 - 64	4
		Small	64 - 90	3
		Small	90 - 128	3
		Large	128 - 180	
		Large	180 - 256	1
		Small	256 - 362	
.22 - .31	Cobble	Small	362 - 512	
		Medium	512 - 1024	
		Large-Vry Large	1024 - 2048	
		Bedrock		
.31 - .44	Boulder			



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	5/30/07
Time:	8:30
Investigator:	JDS, DRL

Project Name/Area:	Foundation Mine
Sample Identifier:	WR 8
Heavy Rain In Past 7 Days?	No

Mainstem:		Tributary:	X
-----------	--	------------	---

Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	100%
Cropland	
Pasture	
Other	
% Canopy Cover	75

Physiochemical Data	
StreamWidth (Feet)	4
Stream Depth (Inches)	4
pH	7.95
Temp. (°C)	14.3
Conductivity (uohms)	174
D.O. (mg/L)	9.20
Velocity (ft/sec)	0.5
% CPOM	10
% FPOM	5

% Morphology Types:	
Riffle	80%
Pool	10%
Run	10%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	10%
Gravel	2-64 mm (.1"-2.5")	70%
Sand	.06-2 mm (gritty)	10%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	15
2. Pool Substrate Characterization	14
3. Pool Variability	9
4. Sediment Deposition	15
5. Channel Flow Status	10
6. Channel Alteration	18
7. Channel Sinuosity	7
8. Bank Stability	
LB	4
RB	4
9. Vegetative Protection	
LB	8
RB	8
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max. Score = 200	Total
Total/200*100=	Habitat Score
	66%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	10	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	
CPOM			

Notes:

		Pebble Count		
Inches		Particle	Millimeters	
.04 - .08	Sand	Silt/clay	0.062	
		Very Fine	0.062 - 0.13	
		Fine	0.13 - 0.25	
		Medium	.25 - .50	
		Coarse	.50 - 1.0	
		Very Coarse	1.0 - 2.0	9
0.8 - .16		Very Fine	2.0 - 4.0	8
.16 - .22		Fine	4.0 - 6.0	23
.22 - .31		Fine	6.0 - 8.0	4
.31 - .44		Medium	8.0 - 11.0	10
.44 - .63	Gravel	Medium	11.0 - 16.0	6
.63 - .89		Coarse	16 - 22	10
.89-1.3		Coarse	22 - 32	7
1.3 - 1.8		Very Coarse	32 - 45	2
1.8 - 2.5		Very Coarse	45 - 64	6
2.5 - 3.5	Cobble	Small	64 - 90	5
3.5 - 5.0		Small	90 - 128	5
5.0 - 7.1		Large	128 - 180	3
7.1 - 10.1		Large	180 - 256	1
10.1 - 14.3	Boulder	Small	256 - 362	1
14.3 - 20		Small	362 - 512	
20 - 40		Medium	512 - 1024	
40 - 80		Large-Vry Large	1024 - 2048	
		Bedrock		



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	11.6.07
Time:	11:30
Investigator:	LMD, JDK

Project Name/Area:	Foundation
Sample Identifier:	WR 8
Heavy Rain In Past 7 Days?	no

Mainstem:	X	Tributary:	
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	20%
Forest	80%
Cropland	
Pasture	
Other	
% Canopy Cover	75

Physiochemical Data	
StreamWidth (Feet)	2
Stream Depth (Inches)	3
pH	7.94
Temp. (°C)	7
Conductivity (uohms)	301
D.O. (mg/L)	12.9
Velocity (ft/sec)	0.1
% CPOM	15
% FPOM	

% Morphology Types:	
Riffle	60%
Pool	25%
Run	15%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	5%
Cobble	64-256 mm (2.5"-10")	30%
Gravel	2-64 mm (.1"-2.5")	35%
Sand	.06-2 mm (gritty)	20%
Silt	.004-.06 mm	10%
Clay	<.004 mm (slick)	0%

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	6
2. Pool Substrate Characterization	10
3. Pool Variability	15
4. Sediment Deposition	18
5. Channel Flow Status	15
6. Channel Alteration	18
7. Channel Sinuosity	5
8. Bank Stability	
LB	5
RB	5
9. Vegetative Protection	
LB	8
RB	8
10. Riparian Vegetative Zone Width	
LB	6
RB	6
Max. Score = 200	Total
Total/200*100=	Habitat Score
	63%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	10	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	
CPOM			

Notes: mixture of tree types

		Pebble Count		
Inches		Particle	Millimeters	
.04 - .08	Sand	Silt/clay	0.062	
		Very Fine	0.062 - 0.13	
		Fine	0.13 - 0.25	
		Medium	.25 - .50	7
		Coarse	.50 - 1.0	7
		Very Coarse	1.0 - 2.0	17
		Very Fine	2.0 - 4.0	20
		Fine	4.0 - 6.0	5
		Fine	6.0 - 8.0	9
		Medium	8.0 - 11.0	6
.16 - .22	Gravel	Medium	11.0 - 16.0	6
		Coarse	16 - 22	4
		Coarse	22 - 32	7
		Very Coarse	32 - 45	4
		Very Coarse	45 - 64	2
		Small	64 - 90	3
		Small	90 - 128	2
		Large	128 - 180	1
		Large	180 - 256	
.22 - .31	Cobble	Small	256 - 362	
		Small	362 - 512	
		Medium	512 - 1024	
		Large-Vry Large	1024 - 2048	
	Boulder	Bedrock		



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	10/21/08
Time:	2:50 AM
Investigator:	BL,MW

Project Name/Area:	Foundation
Sample Identifier:	WR 8 - DRY
Heavy Rain In Past 7 Days?	NO

Mainstem:		Tributary:	X
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Use Classification:	
Diverse	X
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	50%
Forest	50%
Cropland	
Pasture	
Other	
% Canopy Cover	

Physiochemical Data	
StreamWidth (Feet)	3
Stream Depth (Inches)	N/A
Wetted Width (Ft)	"
pH	"
Temp. (°C)	"
Conductivity (uohms)	"
D.O. (mg/L)	"
Velocity (ft/sec)	"
% CPOM	"
% FPOM	"

% Morphology Types:	
Riffle	"
Pool	"
Run	"

Substrate Type:	Diameter	% Composition
Bedrock		
Boulder	<256 mm(10")	
Cobble	64-256 mm (2.5"-10")	15%
Gravel	2-64 mm (.1"-2.5")	30%
Sand	.06-2 mm (gritty)	30%
Silt	.004-.06 mm	25%
Clay	<.004 mm (slick)	

Habitat Assessment Parameters:	Score
1. Epifanual Substrate/Available Cover	3
2. Pool Substrate Characterization	12
3. Pool Variability	1
4. Sediment Deposition	0
5. Channel Flow Status	0
6. Channel Alteration	16
7. Channel Sinuosity	1
8. Bank Stability	
LB	7
RB	7
9. Vegetative Protection	
LB	6
RB	6
10. Riparian Vegetative Zone Width	
LB	6
RB	2
Total	67
Total/200*100=	Habitat Score
	34%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	N/A	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	
CPOM			

Notes:



Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	4/22/08
Time:	12:40 PM
Investigator:	LD MW

Project Name/Area:	Foundation
Sample Identifier:	WR 8
Heavy Rain In Past 7 Days?	N

Mainstem:		Tributary:	x
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Use Classification:	
Diverse	x
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	20%
Forest	80%
Cropland	
Pasture	
Other	
% Canopy Cover	40

Physiochemical Data	
StreamWidth (Feet)	5
Stream Depth (Inches)	4
Wetted Width (Ft)	3
pH	7.74
Temp. (°C)	13.5
Conductivity (uohms)	190.4
D.O. (mg/L)	16.7
Velocity (ft/sec)	0.57
% CPOM	
% FPOM	

% Morphology Types:	
Riffle	60%
Pool	10%
Run	20%

Substrate Type:	Diameter	% Composition
Bedrock		0%
Boulder	<256 mm(10")	0%
Cobble	64-256 mm (2.5"-10")	20%
Gravel	2-64 mm (.1"-2.5")	50%
Sand	.06-2 mm (gritty)	10%
Silt	.004-.06 mm	0%
Clay	<.004 mm (slick)	20%

Habitat Assessment Parameters:	Score
1. Epifaunal Substrate/Available Cover	12
2. Pool Substrate Characterization	9
3. Pool Variability	10
4. Sediment Deposition	15
5. Channel Flow Status	13
6. Channel Alteration	16
7. Channel Sinuosity	7
8. Bank Stability	
LB	2
RB	6
9. Vegetative Protection	
LB	7
RB	7
10. Riparian Vegetative Zone Width	
LB	8
RB	10
Total	122
Total/200*100=	Habitat Score
	61%

Habitat Sampled:	Must be representative of habitat within the 100m sampling locations.		Talley must equal 10
Cobble/gravel	9	Submerged Aquatic Vegetation	
Snag		Sand/Fine Sediment	1
CPOM			

Notes:



Appendix B- Stream Habitat Field Sketch Form

Date: 3/16/09
Time: 3:45
Investigator: G.L. RP

Project Name/Area: Foundation
Sample Identifier: WR 3

LEGEND

Riffle = X
Pool = O
Run = →
Snag = —

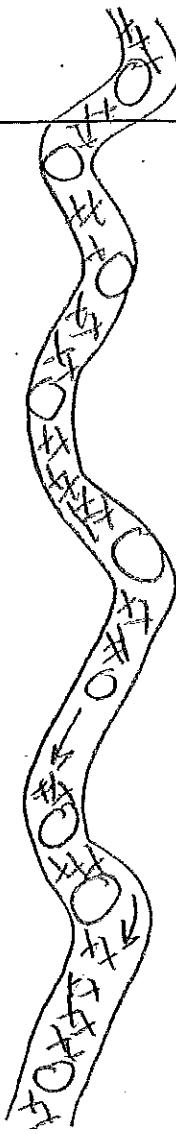
Investigator Signature

Investigator Signature

RP

Ron Panchar

Indicate direction of flow with an arrow





Appendix B- Low Gradient Stream Sampling Field Delineation Form

Date:	3/16/09
Time:	3:45
Investigator:	GL, RP

Mainstem:	<input checked="" type="checkbox"/>	Tributary:	X
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Use Classification	
Diverse	<input checked="" type="checkbox"/>
Variable	
First Use	

Land Use %	
Residential	
Abd. Mining	
Commercial / Industrial	
Old Fields	
Forest	70
Cropland	
Pasture	
ROAD	20
Other	
% Canopy Cover	30

Physiochemical Data	
Stream Width (Feet)	3.0
Wetted Width (Inches)	2.5 FT
Stream Depth (Inches)	2.0
pH	8.23
Temp. (°C)	8.9
Conductivity (uohms)	171
D.O. (mg/L)	12.56
Velocity (ft/sec)	0.41
% CPOM	/6
% FPOM	

% Morphology Types	
Riffle	50
Pool	30
Run	20

Project Name/Area:	Foundation
Sample Identifier:	WTR 8
Heavy Rain In Past 7 Days?	~

Substrate Type	Diameter	Score
Bedrock		
Boulder	<256 mm(10")	10
Cobble	64-256 mm (2.5"-10")	10
Gravel	2-64 mm (.1"-2.5")	40
Sand	.06-2 mm (gritty)	20
Silt	.004-.06 mm	10
Clay	<.004 mm (slick)	10

Habitat Assessment Parameters	Score
1. Epifaunal Substrate/Available Cover	13
2. Pool Substrate Characterization	10
3. Pool Variability	10
4. Sediment Deposition	13
5. Channel Flow Status	9
6. Channel Alteration	20
7. Channel Sinuosity	10
8. Bank Stability	
LB	4
RB	6
9. Vegetative Protection	
LB	5
RB	5
10. Riparian Vegetative Zone Width	
LB	10
RB	10
Max Score = 200	Total = 0
Total/200 * 100 =	Habitat Score = 0%

Habitat Sampled	Must be representative of habitat within the 100m sampling locations	Tally must equal 10	
Cobble/gravel	X 1	Submerged Aquatic Vegetation	0
Snag	0	Sand/Fine Sediment	11
CPOM	11		

Notes:

- ATV TRAIL ALONG STREAM BUT NOT THROUGH IT
- Series of AREA LINES

Inches		Pebble Count		Millimeters
		Particle		
	Sand	Silt/clay	0.062	
		Very Fine	0.062 - 0.13	
		Fine	0.13 - 0.25	
		Medium	.25 - .50	
		Coarse	.50 - 1.0	
		Very Coarse	1.0 - 2.0	
.04 - .08	Gravel	Very Fine	2.0 - 4.0	
.08 - .16		Fine	4.0 - 6.0	
.16 - .22		Fine	6.0 - 8.0	
.22 - .31		Medium	8.0 - 11.0	
.31 - .44		Medium	11.0 - 16.0	
.44 - .63		Coarse	16 - 22	
.63 - .89		Coarse	22 - 32	
.89-1.3		Very Coarse	32 - 45	
1.3 - 1.8		Very Coarse	45 - 64	
1.8 - 2.5				
2.5 - 3.5	Cobble	Small	64 - 90	
3.5 - 5.0		Small	90 - 128	
5.0 - 7.1		Large	128 - 180	
7.1 - 10.1		Large	180 - 256	
10.1 - 14.3	Boulder	Small	256 - 362	
14.3 - 20		Small	362 - 512	
20 - 40		Medium	512 - 1024	
40 - 80		Large-Vry Large	1024 - 2048	
		Bedrock		

Sample Name:

0

WR 8

Investigator Signature

Investigator Signature



H

Appendix B- Stream Habitat Field Sketch Form

Date: 2/23/10
 Time: 12:30 pm
 Investigator: SU, AT

Project Name/Area: Foundation
 Sample Identifier: WR 8

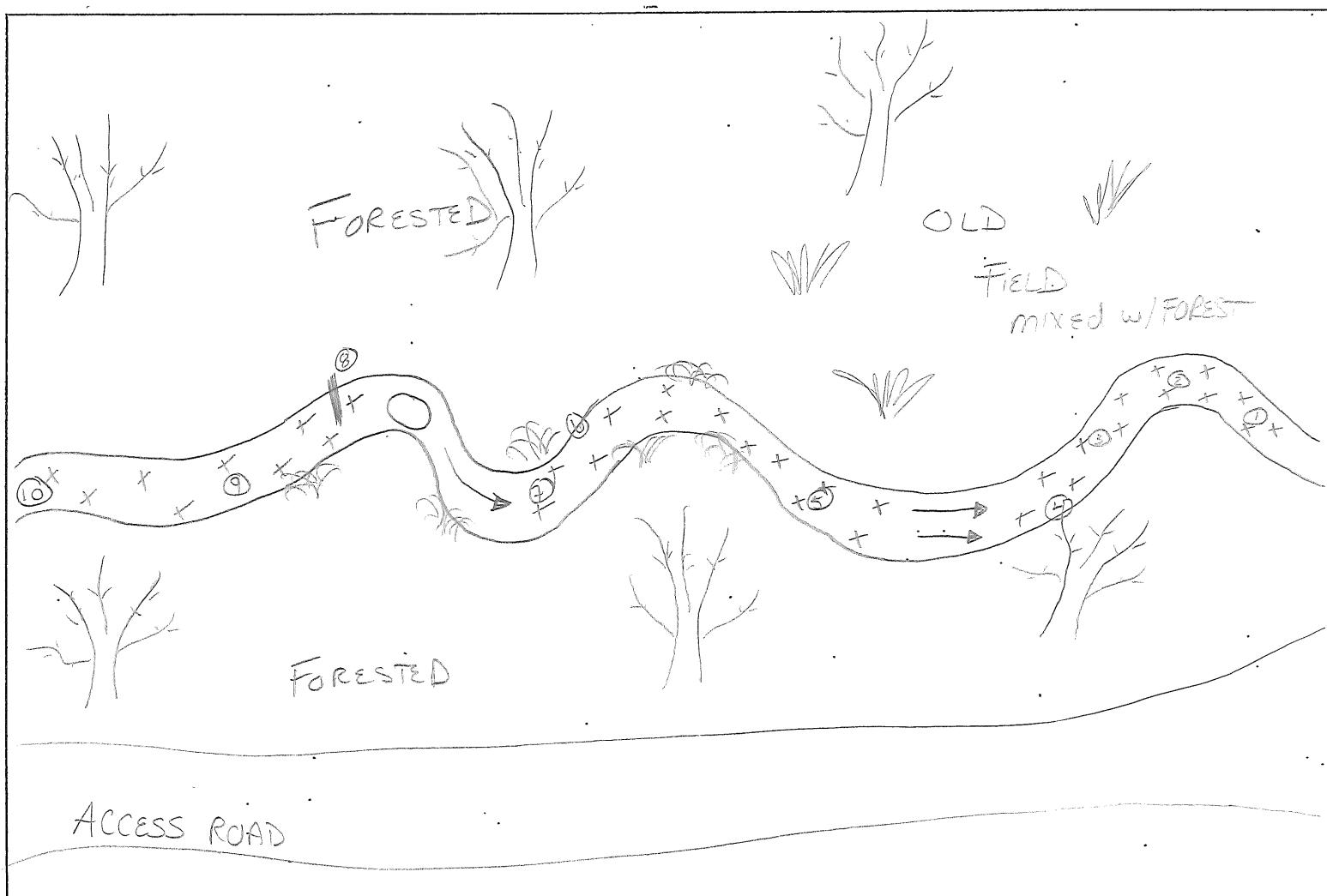
Investigator Signature

Investigator Signature

LEGEND

Riffle = X
Pool = 0
Run = →
Snag = —

Indicate direction of flow with an arrow



- | | |
|-------|--------|
| ① Q/B | ② SAV |
| ③ Q/B | ④ HFS |
| ⑤ Q/B | ⑥ SNAG |
| ⑦ SAV | ⑧ C/B |
| ⑨ C/B | ⑩ SFS |



Appendix B- High Gradient Stream Sampling Field Delineation Form

Use Classification	
First Use	
Variable	
Diverse	X

Tributary:

Mainstem:

Project Name/Area:	Foundation
Sample Identifier:	WR 8
Date:	2/23/10
Time:	12:30PM
Investigator(s):	SJ, AB

Latitude:	39° 51' 38.33" N
Longitude:	80° 21' 55.32" W

Land Use (%)	
Residential	Ø
Abandoned Mining	Ø
Active Mining/Surface Activities	Ø
Commercial/Industrial	Ø
Old Fields/Old Pasture	20
Forest	70
Cropland	Ø
Pasture	Ø
Other (explain below in notes)	10
Canopy Cover (%)	70%

Precipitation in last 7 days?

Y

N

Substrate Type	Diameter	% Composition
Bedrock		Ø
Boulder	>256mm (10")	5
Cobble	64-256mm (2.5"-10")	25
Gravel	2-64mm (0.1"-2.5")	30
Sand	0.06-2mm (gritty)	20
Silt	.004-0.06mm	15
Clay	<0.004mm (slick)	5

Physiochemical Data	
Stream Width (feet)	2.5
Wetted Stream Width (feet)	2.5
Stream Depth (feet)	0.24
pH	7.53
Temperature (°C)	2.9
Conductivity (µS)	118.8
D.O.(mg/L)	13.6
Velocity (ft/sec)	0.69
%CPOM	Ø
%FPOM	Ø

Habitat Assessment Parameters	Score
1. Instream Cover (fish)	10
2. Epifaunal Substrate (riffle quality)	15
3. Embeddedness	11
4. Velocity/Depth Regimes	10
5. Channel Alteration	19
6. Sediment Deposition	14
7. Frequency of Riffles	17
8. Channel Flow Status	16
9. Condition of Banks (both banks combined)	2
10. Bank Veg. Protection (both banks combined)	14
11. Grazing/Other Disruptive Pressure	15
12. Riparian Veg. Zone Width (both banks combined)	13
Total Score (maximum=240)	151.0
Total / 240 x 100 = Habitat Score	65%

% Morphology Types	
Riffle	85
Pool	5
Run	10

Habitat Sampled ¹	Number of kicks
Cobble/Gravel	5
Snag	1
CPOM	Ø
SAV	2
Sand/Fine Sediment	2

¹The 10 kicks are to be divided evenly between the different habitat types. If one or more habitats are missing, divide remaining kicks evenly between existing habitat types.

Investigator(s) Signature:

Notes:

Land USE OTHER: access road runs parallel to stream.

- located in forested w/ some old field @ bottom of reach
- most of reach is riffle hab. w/ abundance of gravel/cobble
- MACRO obs: stipulidae, limnephilidae, perlodidae, zephemerellidae
- banks highly erosive
- stream very sinuous
- LB very low w/ lot of erosion
- adult stoneflies obs
- salamander obs.

DIV 2.86 - GPM: 187.49
28.45
25.75

Inches		Pebble Count Particle	Millimeters
.04 - .08	Sand	Silt/clay	0.062
		Very Fine	0.062 - 0.13
		Fine	0.13 - 0.25
		Medium	.25 - .50
		Coarse	.50 - 1.0
		Very Coarse	1.0 - 2.0
.08 - .16	Gravel	Very Fine	2.0 - 4.0
		Fine	4.0 - 6.0
		Fine	6.0 - 8.0
		Medium	8.0 - 11.0
		Medium	11.0 - 16.0
		Coarse	16 - 22
		Coarse	22 - 32
		Very Coarse	32 - 45
		Very Coarse	45 - 64
.16 - .22	Cobble	Small	64 - 90
		Small	90 - 128
		Large	128 - 180
		Large	180 - 256
.22 - .31	Boulder	Small	256 - 362
		Small	362 - 512
		Medium	512 - 1024
		Large-Vry Large	1024 - 2048
		Bedrock	

Sample Name: WR 3

Investigator Signature

Investigator Signature



Appendix B- Stream Habitat Field Sketch Form

Date: 03 - 30 - 10
Time: 2:10 PM
Investigator: GM NT

Project Name/Area: Foundation Round #1
 Sample Identifier: WR 8

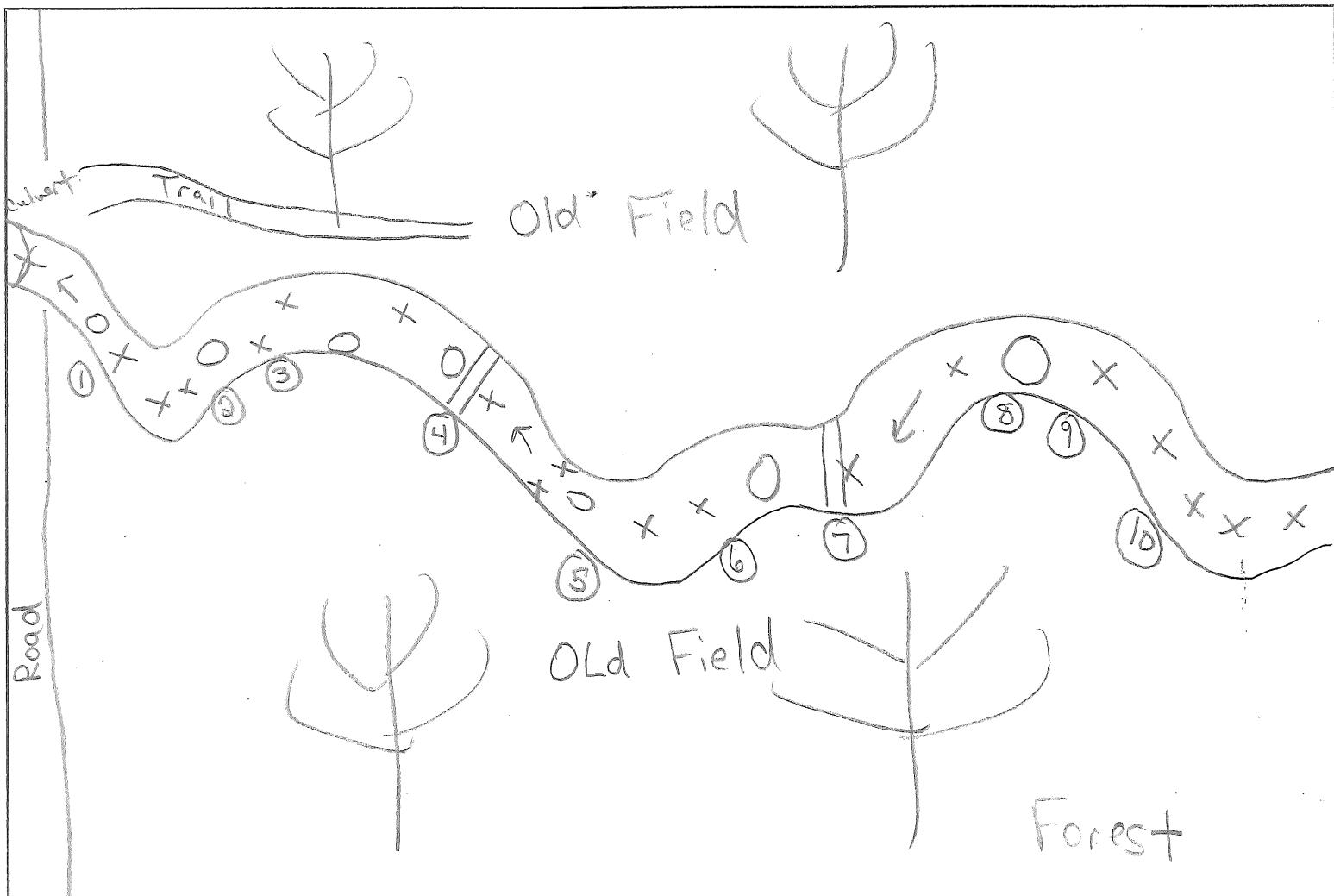
Investigator Signature

Gregory M. Moore
DJ Till.

Investigator Signature

LEGEND	
Riffle = X	
Pool = O	
Run = →	
Snag = —	

Indicate direction of flow with an arrow



1 SAV
 2 SFS
 3 C/G
 4 Snag
 5 SAV

6 C/G
 7 Snag
 8 SFS
 9 CPOM
 10 SAV



Appendix B- High Gradient Stream Sampling Field Delineation Form

Use Classification	
First Use	
Variable	
Diverse	X

Tributary: X

Mainstem: _____

Project Name/Area:	Foundation	Round #:	1
Sample Identifier:	WR 8		
Date:	03-30-10		
Time:	2:10 PM		
Investigator(s):	GM NT		
Latitude:	39° 51' 38.87" N		
Longitude:	80° 21' 54.32" W		

Land Use (%)	
Residential	0
Abandoned Mining	0
Active Mining/Surface Activities	0
Commercial/Industrial	0
Old Fields/Old Pasture	65%
Forest	30%
Cropland	0
Pasture	0
Other (explain below in notes)	5%
Canopy Cover (%)	45%

Precipitation in last 7 days? Y N

Substrate Type	Diameter	% Composition
Bedrock		0
Boulder	>256mm (10")	0
Cobble	64-256mm (2.5"-10")	25
Gravel	2-64mm (0.1"-2.5")	30
Sand	0.06-2mm (gritty)	20
Silt	.004-0.06mm	20
Clay	<0.004mm (slick)	5

Physiochemical Data	
Stream Width (feet)	4.0
Wetted Stream Width (feet)	3.6
Stream Depth (feet)	0.18
pH	7.55
Temperature (°C)	10.2
Conductivity (µS)	154.4
D.O.(mg/L)	11.3
Velocity (ft/sec.)	0.31
%CPOM	5%
%FPOM	0%

Habitat Assessment Parameters	Score
1. Instream Cover (fish)	15
2. Epifaunal Substrate (riffle quality)	16
3. Embeddedness	10
4. Velocity/Depth Regimes	14
5. Channel Alteration	18
6. Sediment Deposition	9
7. Frequency of Riffles	17
8. Channel Flow Status	18
9. Condition of Banks (both banks combined)	4
10. Bank Veg. Protection (both banks combined)	12
11. Grazing/Other Disruptive Pressure	17
12. Riparian Veg. Zone Width (both banks combined)	17
Total Score (maximum=240)	167
Total / 240 x 100 = Habitat Score	70%

% Morphology Types	
Riffle	50%
Pool	30%
Run	20%

Habitat Sampled ¹	Number of kicks
Cobble/Gravel	11 2
Snag	11 2
CPOM	1 1
SAV	11 3
Sand/Fine Sediment	11 2

¹The 10 kicks are to be divided evenly between the different habitat types. If one or more habitats are missing, divide remaining kicks evenly between existing habitat types.

Investigator(s) Signature:

*Gregory M. Moore
RLT/ll*

Notes:

Macros Obs.
 - Perlodidae, Tipulidae, Cambaridae, Heptageniidae
 Rhyacophilidae, Phryganeidae

Salamanders Obs.
 Land Use is a mix of Old Field / Forest
 5% Other - Road
 Signs on erosion
 Undercut banks on the banks

SAV Kick Substituted for a CPOM

GPM = 89.94

Inches		Pebble Count		
		Particle	Millimeters	
.04 - .08	Sand	Silt/clay	0.062	1
		Very Fine	0.062 - 0.13	
		Fine	0.13 - 0.25	
		Medium	.25 - .50	
		Coarse	.50 - 1.0	11
		Very Coarse	1.0 - 2.0	
.08 - .16	Gravel	Very Fine	2.0 - 4.0	
		Fine	4.0 - 6.0	
		Fine	6.0 - 8.0	1
		Medium	8.0 - 11.0	
		Medium	11.0 - 16.0	
		Coarse	16 - 22	11
		Coarse	22 - 32	1
		Very Coarse	32 - 45	
		Very Coarse	45 - 64	
1.3 - 1.8	Cobble	Small	64 - 90	1
		Small	90 - 128	
		Large	128 - 180	
		Large	180 - 256	1
2.5 - 3.5	Boulder	Small	256 - 362	
		Small	362 - 512	
		Medium	512 - 1024	
		Large-Vry Large	1024 - 2048	
		Bedrock		

Sample Name: WR 8 Rd. #1

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Investigator Signature

Gregory M. Moore

Investigator Signature

Dil Telli