Appendix D1: Quantitative macroinvertebrate data for streams undermined and sampled during the 3rd assessment period and re-sampled by the University

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Bailey Mine

Stream Name: UNT to Wharton Run, 32507

Stream NHD#:

Sample Date: 4/16/2013

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: 1 or X2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): G. Noble, A. Hale, K. Garmire

Comments:

Starting Lat/Long: 39.90799°/ -80.51289°

Ending Lat/Long: 39.90848°/ -80.51389°

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats

	Number of jabs
Cobble / Gravel Substrate	2
Snag	2
Coarse Particulate Organic Matter	2
Submerged Aquatic Vegetation	2
Sand / Fine Sediment	2

Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus)

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi	Family: Voltine Status (M) Multi, (U) uni, (S) semi	Genus:	Functional Feeding Group	Pollution Tolerance Value	Sub. 1 - 4		Sub. ___		Sub. _____		Sub. _____	
					F	G	F	G	F	G	F	G
Ephemeroptera	Ameletidae	Ameletus	CG	0		35						
Ephemeroptera	Siphlonuridae	Siphlonurus	CG	7		15						
Plecoptera	Nemouridae	Podmosta	SH	2		1						
Plecoptera	Nemouridae	Amphinemura	SH	3		8						
Plecoptera	Perlodidae	Isoperla	PR	2		38						
Plecoptera	Capniidae	Allocapnia	SH	3		1						
Trichoptera	Rhyacophilidae	Rhyacophila	PR	1		3						
Trichoptera	Uenoidae	Neophylax	SC	3		18						
Trichoptera	Limnephilidae	Ironoquia	SH	3		13						
Trichoptera	Lepidostomatidae	Lepidostoma	SH	1		1						
Coleoptera	Psephenidae	Ectopria	SC	5		2						
Diptera	Tabanidae	Tabanus	PR	5		1						
Diptera	Tipulidae	Pilaria	PR	7		7						
Diptera	Chironomidae		CG	6	22							
Diptera	Ceratpogonidae		PR	6	2							
Bivalvia	Sphaeriidae		FC	8	3							
Odonata	Cordulegastridae	Cordulegaster	PR	3		1						
Megaloptera	Corydalidae	Nigronia	PR	1		1						
Oligochaeta	Oligochaeta		CG	10	1							
Decapoda	Cambaridae		CR	6	3							
Gastropoda	Physidae		SC	8	1							
		Total Number of Individuals:			32	145						

Lab sub-sample 1-4 (200 +/- 20%)
(Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Bailey Mine Stream Name: UNT to Wharton Run

Stream ID#: 32507 Segment ID:

Sampler(s): A. Hale, J. Phillips, C. Fisher (sample 1); G. Noble, A. Hale, K. Garmire (sample 2) Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date: 4/26/2009

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	15	49.2	49.2
Trichoptera Richness	4	38.1	38.1
Percent EPT Richness	66.7	108.3	100.0
Intolerant Taxa Richness	9	56.3	56.3
FC + PR Taxa Richness	5	37.0	37.0
		Total Biological Score 1 (Mean of adjusted values):	56.1

Score 2 - Sample Date: 4/16/2013

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	21	68.9	68.9
Trichoptera Richness	4	38.1	38.1
Percent EPT Richness	47.6	77.3	77.2
Intolerant Taxa Richness	11	68.8	68.8
FC + PR Taxa Richness	8	59.3	59.3
		Total Biological Score 2 (Mean of adjusted values):	62.4

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *10.7 %

2.) Mean Total Biological Score (Average of Score 1 and Score 2): 59.3

* If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Bailey Mine

Stream Name: UNT to Dunkard Fork, 32532

Stream NHD#:

Sample Date: 4/23/13

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: 1 or X2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): T. Hann, A. Hale

Comments:

Starting Lat/Long: 39.899957°/ -80.492992°

Ending Lat/Long: 39.899157°/ -80.493253°

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats

	Number of jabs
Cobble / Gravel Substrate	2
Snag	2
Coarse Particulate Organic Matter	2
Submerged Aquatic Vegetation	2
Sand / Fine Sediment	2

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi	Family: Voltine Status (M) Multi, (U) uni, (S) semi	Genus:	Functional Feeding Group	Pollution Tolerance Value	Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus)							
					Sub. 1 - 4		Sub. ___		Sub. _____		Sub. _____	
					F	G	F	G	F	G	F	G
Ephemeroptera	Ephemerellidae	Ephemerella	CG	1		2						
Ephemeroptera	Ephemerellidae	Eurylophella	SC	4		8						
Ephemeroptera	Ameletidae	Ameletus	CG	0		32						
Plecoptera	Perlodidae	Cultus	PR	2		1						
Plecoptera	Nemouridae	Amphinemura	SH	3		98						
Plecoptera	Perlodidae	Isoperla	PR	2		3						
Plecoptera	Perlodidae	Clioperla	PR	2		1						
Plecoptera	Perlidae	Unidentified	PR	3		1						
Trichoptera	Rhyacophilidae	Rhyacophila	PR	1		6						
Coleoptera	Elmidae	Optioservus	FC	4		1						
Coleoptera	Elmidae	Stenelmis	SC	5		2						
Diptera	Empididae	Clinocera	PR	6		9						
Diptera	Chironomidae		CG	6	13							
Diptera	Simuliidae	Prosimulium	FC	5		6						
Diptera	Simuliidae	Simulium	FC	6		4						
Bivalvia	Sphaeriidae		FC	8	1							
Gastropoda	Physidae		SC	8	2							
Oligochaeta	Oligochaeta		CG	10	2							
		Total Number of Individuals:			18	174						

Lab sub-sample 1-4 (200 +/- 20%)
(Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Bailey Mine Stream Name: UNT to Dunkard Fork

Stream ID#: 32532 Segment ID:

Sampler(s): A. Hale, J. Phillips, C. Fisher, A. Glassmire (sample 1); T. Hann, A. Hale (sample 2) Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date: 5/5/2009

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	24	78.7	78.7
Trichoptera Richness	5	47.6	47.6
Percent EPT Richness	66.7	108.3	100.0
Intolerant Taxa Richness	14	87.5	87.5
FC + PR Taxa Richness	7	51.9	51.9
		Total Biological Score 1 (Mean of adjusted values):	73.1

Score 2 - Sample Date: 4/16/2013

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	18	59.0	59.0
Trichoptera Richness	1	9.5	9.5
Percent EPT Richness	50	81.17	81.2
Intolerant Taxa Richness	10	62.5	62.5
FC + PR Taxa Richness	10	74.1	74.1
		Total Biological Score 2 (Mean of adjusted values):	57.3

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *24.4 %

2.) Mean Total Biological Score (Average of Score 1 and Score 2): 65.2

* If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Enlow Fork Mine

Stream Name: UNT to Templeton Fork, 32740

Stream NHD#:

Sample Date: 5/9/2013

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: 1 or X2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): A. Hale, G. Noble, K. Piper, L. Kiefer

Comments:

Starting Lat/Long: 40.05283°/ -80.389657°

Ending Lat/Long: 40.053718°/ -80.389913°

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats

	Number of jabs
Cobble / Gravel Substrate	3
Snag	1
Coarse Particulate Organic Matter	2
Submerged Aquatic Vegetation	2
Sand / Fine Sediment	2

Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus)

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi	Family: Voltine Status (M) Multi, (U) uni, (S) semi	Genus:	Functional Feeding Group	Pollution Tolerance Value	Sub. 1 - 4		Sub. ___		Sub. ___		Sub. ___	
					F	G	F	G	F	G	F	G
Ephemeroptera	Ameletidae	Ameletus	CG	0		10						
Ephemeroptera	Baetidae	Baetis	CG	6		18						
Ephemeroptera	Baetidae	Centroptilium	CG	2		1						
Ephemeroptera	Siphlonuridae	Siphlonurus	CG	7		1						
Ephemeroptera	Ephemerellidae	Eurylophella	SC	4		1						
Plecoptera	Chloroperlidae	Haploperla	PR	0		1						
Plecoptera	Nemouridae	Amphinemura	SH	3		28						
Plecoptera	Perlodidae	Isoperla	PR	2		36						
Plecoptera	Perlidae	Perlesta	PR	4		3						
Plecoptera	Leuctridae	Leuctra	SH	0		2						
Trichoptera	Rhyacophilidae	Rhyacophila	PR	1		3						
Trichoptera	Hydropsychidae	Diplectrona	FC	0		4						
Trichoptera	Hydroptilidae	Ochrotrichia	SC	4		2						
Trichoptera	Glossomatidae	Agapetus	SC	0		2						
Trichoptera	Uenoidae	Neophylax	SC	3		1						
Coleoptera	Elmidae	Optioservus	SC	4		1						
Coleoptera	Elmidae	Stenelmis	SC	5		1						
Coleoptera	Psephenidae	Psephenus	SC	4		1						
Diptera	Tipulidae	Tipula	SH	4		1						
Diptera	Tipulidae	Hexatoma	PR	2		2						
Diptera	Tipulidae	Pseudolimnophila	PR	2		3						
Diptera	Ephydridae		PI	6		2						
Diptera	Ceratopogonidae		PR	6	8							
Diptera	Chironomidae		CG	6	53							
Decapoda	Cambaridae		CG	6	3							
Oligochaeta			CG	10	6							
		Total Number of Individuals:			70	122						

Lab sub-sample 1-4 (200 +/- 20%) (Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Enlow Fork Mine Stream Name: UNT to Templeton Fork

Stream ID#: 32740 Segment ID:

Sampler(s): A. Hale, S. Tonsor, J. Phillips (sample 1); A. Hale, G. Noble, K. Piper, L. Kiefer (sample 2) Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date: 5/29/2009

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	16	52.5	52.5
Trichoptera Richness	4	38.1	38.1
Percent EPT Richness	68.8	111.7	100.0
Intolerant Taxa Richness	12	75.0	75.0
FC + PR Taxa Richness	4	29.6	29.6
		Total Biological Score 1 (Mean of adjusted values):	59.0

Score 2 - Sample Date: 5/9/2013

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	26	85.2	85.2
Trichoptera Richness	5	47.6	47.6
Percent EPT Richness	57.7	93.7	93.7
Intolerant Taxa Richness	18	112.5	100.0
FC + PR Taxa Richness	8	59.3	59.3
		Total Biological Score 2 (Mean of adjusted values):	77.2

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *26.6 %

2.) Mean Total Biological Score (Average of Score 1 and Score 2): 68.1

* If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Cumberland Mine

Stream Name: Dyers Fork, 41261, DF STA 2

Stream NHD#:

Sample Date: 5/7/2013

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: 1 or X2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): A. Hale, G. Noble, K. Piper, L. Kiefer

Comments:

Starting Lat/Long: 39.829797, -80.122747

Ending Lat/Long: 39.830363, -80.123902

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats

	Number of jabs
Cobble / Gravel Substrate	4
Snag	0
Coarse Particulate Organic Matter	0
Submerged Aquatic Vegetation	4
Sand / Fine Sediment	2

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi	Family: Voltine Status (M) Multi, (U) uni, (S) semi	Genus:	Functional Feeding Group	Pollution Tolerance Value	Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus) Sub. 1 - 4 F	Sub. 1 - 4 G	Sub. ___ F	Sub. ___ G	Sub. ___ F	Sub. ___ G	Sub. ___ F	Sub. ___ G
Ephemeroptera	Caenidae	Caenis	CG	7		1						
Ephemeroptera	Baetidae	Baetis	CG	6		1						
Plecoptera	Perlodidae	Isoperla	PR	2		2						
Plecoptera	Perlidae	Perlesta	PR	4		6						
Trichoptera	Hydroptilidae	Ochrotrichia	SC	4		43						
Coleoptera	Elmidae	Dubiraphia	SC	6		3						
Coleoptera	Elmidae	Stenelmis	SC	5		23						
Coleoptera	Elmidae	Optioservus	SC	4		1						
Diptera	Ceratopogonidae		PR	6	1							
Diptera	Chironomidae		CG	6	139							
Bivalvia	Sphaeriidae		FC	6	1							
Oligochaeta	Oligochaeta		CG	10	4							
Total Number of Individuals:					145	80						

Lab sub-sample 1-4 (200 +/- 20%)
(Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Cumberland Mine Stream Name: Dyers Fork

Stream ID#: 41261 Segment ID: DF STA 2

Sampler(s): A. Hale, S. Tonsor, J. Phillips (sample 1); A. Hale, G. Noble, K. Piper, L. Kiefer (sample 2) Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date: 5/12/2009

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	21	68.9	68.9
Trichoptera Richness	2	19.0	19.0
Percent EPT Richness	28.6	46.4	46.4
Intolerant Taxa Richness	9	56.3	56.3
FC + PR Taxa Richness	7	51.9	51.9
		Total Biological Score 1 (Mean of adjusted values):	48.5

Score 2 - Sample Date: 5/7/2013

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	12	39.3	39.3
Trichoptera Richness	1	9.5	9.5
Percent EPT Richness	41.7	67.6	67.6
Intolerant Taxa Richness	4	25.0	25.0
FC + PR Taxa Richness	3	22.2	22.2
		Total Biological Score 2 (Mean of adjusted values):	32.7

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *38.7 %

2.) Mean Total Biological Score (Average of Score 1 and Score 2): 40.6

*If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Cumberland Mine

Stream Name: Dutch Run, 41246, DR STA 5

Stream NHD#:

Sample Date: 5/1/2013

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: 1 or X2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): A.Hale, K.Piper, G.Noble, S. Iannacchione

Comments:

Starting Lat/Long: 39.817813°/ -80.089375°

Ending Lat/Long: 39.818703°/ -80.089533°

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats

	Number of jabs
Cobble / Gravel Substrate	3
Snag	3
Coarse Particulate Organic Matter	0
Submerged Aquatic Vegetation	2
Sand / Fine Sediment	2

Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus)

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi	Family: Voltine Status (M) Multi, (U) uni, (S) semi	Genus:	Functional Feeding Group	Pollution Tolerance Value	Sub. 1 - 4		Sub. ___		Sub. ___		Sub. ___	
					F	G	F	G	F	G	F	G
Ephemeroptera	Leptophlebidae		CG	4	1							
Plecoptera	Nemouridae	Amphinemura	SH	3		4						
Plecoptera	Perlidae	Perlesta	PR	4		16						
Plecoptera	Perlodidae	Isoperla	PR	2		17						
Trichoptera	Hydroptilidae	Ochrotrichia	SC	4		22						
Coleoptera	Elmidae	Stenelmis	SC	5		3						
Diptera	Ephydridae		PI	6		2						
Diptera	Tipulidae	Molophilus	SH	4		1						
Diptera	Ceratopogonidae		PR	6	3							
Diptera	Chironomidae		CG	6	104							
Oligochaeta	Oligochaeta		CG	10	4							
Total Number of Individuals:					112	65						

Lab sub-sample 1-4 (200 +/- 20%)
(Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Cumberland Mine Stream Name: Dutch Run

Stream ID#: 41246 Segment ID: DR STA 5

Sampler(s): S. Tonsor, J. Phillips (sample 1); A. Hale, G. Noble, K. Piper, S. Iannacchione (sample 2) Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date: 5/15/2009

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	20	65.6	65.6
Trichoptera Richness	1	9.5	9.5
Percent EPT Richness	30	48.7	48.7
Intolerant Taxa Richness	7	43.8	43.8
FC + PR Taxa Richness	7	51.9	51.9
		Total Biological Score 1 (Mean of adjusted values):	43.9

Score 2 - Sample Date: 5/1/2013

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	11	36.1	36.1
Trichoptera Richness	1	9.5	9.5
Percent EPT Richness	45.5	73.9	73.9
Intolerant Taxa Richness	6	37.5	37.5
FC + PR Taxa Richness	3	22.2	22.2
		Total Biological Score 2 (Mean of adjusted values):	35.8

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *20.2 %

2.) Mean Total Biological Score (Average of Score 1 and Score 2): 39.9

* If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.

Appendix D2: Quantitative macroinvertebrate data for streams undermined during the 4th assessment period and sampled by the University

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Bailey Mine

Stream Name: Strawn Hollow, 32547- BSW39

Stream NHD#:

Sample Date: 4/18/2013

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: X1 or 2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): A. Hale, K. Garmire

Comments:

Starting Lat/Long: 39.8653°/ -80.48559°

Ending Lat/Long: 39.86501°/ -80.48651°

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats

	Number of jabs
Cobble / Gravel Substrate	2
Snag	2
Coarse Particulate Organic Matter	2
Submerged Aquatic Vegetation	2
Sand / Fine Sediment	2

Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus)

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi	Family: Voltine Status (M) Multi, (U) uni, (S) semi	Genus:	Functional Feeding Group	Pollution Tolerance Value	Sub. 1 - 4		Sub. ___		Sub. ___		Sub. ___	
					F	G	F	G	F	G	F	G
Ephemeroptera	Ameletidae	Ameletus	CG	0		51						
Ephemeroptera	Baetidae	Baetis	CG	6		1						
Plecoptera	Nemouridae	Amphinemura	SH	3		25						
Plecoptera	Perlodidae	Isoperla	PR	2		23						
Plecoptera	Perlodidae	Diploperla	PR	2		3						
Plecoptera	Perlodidae	Clioperla	PR	2		6						
Plecoptera	Perlidae	Attaneuria	PR	3		1						
Trichoptera	Limnephilidae	Ironoquia	SH	3		2						
Trichoptera	Uenoidae	Neophylax	SC	3		6						
Trichoptera	Rhyacophilidae	Rhyacophila	PR	1		1						
Coleoptera	Psephenidae	Ectopria	SC	5		1						
Coleoptera	Elmidae	Dubiraphia	SC	6		1						
Diptera	Tipulidae	Hexatoma	PR	2		2						
Diptera	Tipulidae	Molophilus	SH	4		1						
Diptera	Tipulidae	Limonia	SH	6		1						
Diptera	Simulidae	Prosimulium	FC	5		4						
Diptera	Tabanidae	Chrysops	PI	7		2						
Diptera	Chironomidae		CG	6	35							
Oligochaeta	Oligochaeta		CG	10	1							
		Total Number of Individuals:			36	131						

Lab sub-sample 1-4 (200 +/- 20%)
(Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Bailey Mine Stream Name: Strawn Hollow

Stream ID#: 32547 Segment ID: BSW39

Sampler(s): A. Hale, K. Garmire Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date: 4/18/2013

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	19	62.3	62.3
Trichoptera Richness	3	28.6	28.6
Percent EPT Richness	52.6	85.4	85.4
Intolerant Taxa Richness	11	68.8	68.8
FC + PR Taxa Richness	7	51.9	51.9
		Total Biological Score 1 (Mean of adjusted values):	59.4

Score 2 - Sample Date:

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness		**30.5**	
Trichoptera Richness		**10.5**	
Percent EPT Richness		**61.6**	
Intolerant Taxa Richness		**16.0**	
FC + PR Taxa Richness		**13.5**	
		Total Biological Score 2 (Mean of adjusted values):	

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *_____%

2.) Mean Total Biological Score (Average of Score 1 and Score 2): _____

* If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Blacksville #2

Stream Name: Blockhouse Run, 41812, BSW23

Stream NHD#:

Sample Date: 4/25/13

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: X1 or 2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): A. Hale, K. Garmire

Comments:

Starting Lat/Long: 39.77347°/ -80.34307°

Ending Lat/Long: 39.77438°/ -80.34301°

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats

	Number of jabs
Cobble / Gravel Substrate	2
Snag	2
Coarse Particulate Organic Matter	2
Submerged Aquatic Vegetation	2
Sand / Fine Sediment	2

Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus)

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi	Family: Voltine Status (M) Multi, (U) uni, (S) semi	Genus:	Functional Feeding Group	Pollution Tolerance Value	Sub. 1 - 6		Sub. ___		Sub. ___		Sub. ___	
					F	G	F	G	F	G	F	G
Ephemeroptera	Caenidae	Caenis	CG	7		4						
Ephemeroptera	Baetidae	Acentrella	SC	4		1						
Plecoptera	Perlidae		PR	3		1						
Plecoptera	Perlodidae	Isoperla	PR	2		10						
Plecoptera	Nemouridae	Amphinemura	SH	3		1						
Trichoptera	Uenoidae	Neophylax	SC	3		1						
Trichoptera	Limnephilidae	Anabolia	SH	5		1						
Trichoptera	Hydroptilidae	Ochrotrichia	SC	4		1						
Amphipoda	Hyalellidae	Hyallela	CG	8		1						
Coleoptera	Elmidae	Optioservus	SC	4		1						
Coleoptera	Elmidae	Dubiraphia	SC	6		3						
Coleoptera	Elmidae	Stenelmis	SC	5		2						
Odonata	Calopterygidae	Calopteryx	PR	6		1						
Diptera	Chironomidae		CG	6	183							
Bivalvia	Sphaeriidae		FC	8	2							
Oligochaeta	Oligocheata		CG	10	4							
Total Number of Individuals:					189	28						

Lab sub-sample 1-4 (200 +/- 20%)
(Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Blacksville #2 Stream Name: Blockhouse Run

Stream ID#: 41812 Segment ID: BSW23

Sampler(s): A. Hale, K. Garmire Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date:

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	16	52.5	52.5
Trichoptera Richness	3	28.6	28.6
Percent EPT Richness	50	81.2	81.2
Intolerant Taxa Richness	7	43.8	43.8
FC + PR Taxa Richness	4	29.6	29.6
		Total Biological Score 1 (Mean of adjusted values):	47.1

Score 2 - Sample Date:

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness		**30.5**	
Trichoptera Richness		**10.5**	
Percent EPT Richness		**61.6**	
Intolerant Taxa Richness		**16.0**	
FC + PR Taxa Richness		**13.5**	
		Total Biological Score 2 (Mean of adjusted values):	

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *_____%

2.) Mean Total Biological Score (Average of Score 1 and Score 2): _____

* If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Blacksville #2

Stream Name: Roberts Run, 41813, BSW22

Stream NHD#:

Sample Date: 4/25/2013

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: X1 or 2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): A. Hale, K. Garmire

Comments:

Starting Lat/Long: 39.77194°/ -80.36198°

Ending Lat/Long: 39.77248°/ -80.36292°

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats

	Number of jabs
Cobble / Gravel Substrate	3
Snag	2
Coarse Particulate Organic Matter	2
Submerged Aquatic Vegetation	0
Sand / Fine Sediment	3

Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus)

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi	Family: Voltine Status (M) Multi, (U) uni, (S) semi	Genus:	Functional Feeding Group	Pollution Tolerance Value	Sub. 1 - 4 F	Sub. 1 - 4 G	Sub. ___ F	Sub. ___ G	Sub. ___ F	Sub. ___ G	Sub. ___ F	Sub. ___ G
Ephemeroptera	Ameletidae	Ameletus	CG	0		2						
Ephemeroptera	Baetidae	Baetis	CG	6		3						
Ephemeroptera	Baetidae	Diphetor	CG	6		2						
Ephemeroptera	Baetidae	Acentrella	SC	4		2						
Ephemeroptera	Ephemerellidae	Ephemerella	CG	1		5						
Ephemeroptera	Ephemerellidae	Eurylophella	SC	4		3						
Plecoptera	Chloroperlidae	Sweltsa	PR	0		1						
Plecoptera	Perlodidae	Diploperla	PR	2		3						
Plecoptera	Perlodidae	Isoperla	PR	2		49						
Plecoptera	Leuctridae	Leuctra	SH	0		3						
Plecoptera	Nemouridae	Amphinemura	SH	3		31						
Trichoptera	Hydropsychidae	Diplectrona	FC	0		2						
Trichoptera	Lepidostomatidae	Lepidostoma	SH	1		1						
Trichoptera	Limnephilidae	Pychnopsyche	SH	4		3						
Trichoptera	Rhyacophilidae	Rhyacophila	PR	1		1						
Trichoptera	Uenoidae	Neophylax	SC	3		2						
Megaloptera	Sialidae	Sialis	PR	6		2						
Coleoptera	Elmidae	Optioservus	SC	4		1						
Coleoptera	Psephenidae	Ectopria	SC	5		1						
Diptera	Stratiomyidae	Caloparyphus	CG	8		1						
Diptera	Tabanidae	Chrysops	PI	7		2						
Diptera	Tipulidae	Pseudolimnophila	PR	2		2						
Diptera	Tipulidae	Pilaria	PR	7		1						
Diptera	Tipulidae	Tipula	SH	4		4						
Diptera	Chironomidae		CG	6	57							
Decapoda	Cambaridae		CG	6	1							
		Total Number of Individuals:			58	127						

Lab sub-sample 1-4 (200 +/- 20%)
(Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Blacksville #2 Stream Name: Roberts Run

Stream ID#: 41813 Segment ID: BSW22

Sampler(s): A.Hale, K. Garmire Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date: 4/25/13

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	26	85.2	85.2
Trichoptera Richness	5	47.6	47.6
Percent EPT Richness	61.5	99.8	99.8
Intolerant Taxa Richness	17	106.3	100.0
FC + PR Taxa Richness	8	59.3	59.3
		Total Biological Score 1 (Mean of adjusted values):	78.4

Score 2 - Sample Date:

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness		**30.5**	
Trichoptera Richness		**10.5**	
Percent EPT Richness		**61.6**	
Intolerant Taxa Richness		**16.0**	
FC + PR Taxa Richness		**13.5**	
		Total Biological Score 2 (Mean of adjusted values):	

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *_____%

2.) Mean Total Biological Score (Average of Score 1 and Score 2): _____

* If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Cumberland Mine

Stream Name: Dyers Fork, 41261, DF STA 1

Stream NHD#:

Sample Date: 5/3/2013

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: X1 or 2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): A. Hale, S. Iannacchione, G. Noble, K. Piper

Comments: Pasture surrounds stream

Starting Lat/Long: 39.82233°/ -80.11618°

Ending Lat/Long: 39.82252°/ -80.11699°

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats

	Number of jabs
Cobble / Gravel Substrate	3
Snag	3
Coarse Particulate Organic Matter	0
Submerged Aquatic Vegetation	2
Sand / Fine Sediment	2

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi	Family: Voltine Status (M) Multi, (U) uni, (S) semi	Genus:	Functional Feeding Group	Pollution Tolerance Value	Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus)							
					Sub. 1 - 4		Sub. ___		Sub. ___		Sub. ___	
					F	G	F	G	F	G	F	G
Ephemeroptera	Caenidae	Caenis	CG	7		1						
Ephemeroptera	Siphlonuridae	Siphlonurus	CG	7		1						
Ephemeroptera	Heptageniidae	Stenonema	SC	3		1						
Plecoptera	Perlidae	Perlesta	PR	4		5						
Plecoptera	Perlodidae	Isoperla	PR	2		17						
Coleoptera	Elmidae	Stenelmis	SC	5		2						
Coleoptera	Elmidae	Dubiraphia	SC	6		3						
Diptera	Culcidae	Anopheles	FC	8		1						
Diptera	Chironimidae		CG	6	118							
Diptera	Ceratopogoniidae		PR	6	1							
Bivalvia	Sphaeriidae		FC	8	1							
Oligochaeta	Oligochaeta		CG	10	26							
Total Number of Individuals:					146	31						

Lab sub-sample 1-4 (200 +/- 20%)
(Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Cumberland Mine Stream Name: Dyers Fork

Stream ID#: 41261 Segment ID: DF STA 1

Sampler(s): A. Hale, G. Noble, K. Piper, S. Iannacchione Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date: 5/3/2013

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	12	39.3	39.3
Trichoptera Richness	0	0	0
Percent EPT Richness	41.7	67.7	67.7
Intolerant Taxa Richness	3	18.8	18.8
FC + PR Taxa Richness	5	37.0	37.0
		Total Biological Score 1 (Mean of adjusted values):	32.6

Score 2 - Sample Date:

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness		**30.5**	
Trichoptera Richness		**10.5**	
Percent EPT Richness		**61.6**	
Intolerant Taxa Richness		**16.0**	
FC + PR Taxa Richness		**13.5**	
		Total Biological Score 2 (Mean of adjusted values):	

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *_____%

2.) Mean Total Biological Score (Average of Score 1 and Score 2): _____

* If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Cumberland Mine

Stream Name: Dyers Fork, 41261, DF STA 21

Stream NHD#:

Sample Date: 5/3/2013

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: X1 or 2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): A. Hale, S. Iannacchione, G. Noble, K. Piper

Comments:

Starting Lat/Long: 39.81441°/ -80.0991°

Ending Lat/Long: 39.814903°/ -80.100013°

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats

	Number of jabs
Cobble / Gravel Substrate	3
Snag	1
Coarse Particulate Organic Matter	2
Submerged Aquatic Vegetation	2
Sand / Fine Sediment	2

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi		Family: Voltine Status (M) Multi, (U) uni, (S) semi		Genus:		Functional Feeding Group	Pollution Tolerance Value	Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus)							
								Sub. 1 - 8		Sub. ___		Sub. ___		Sub. ___	
								F	G	F	G	F	G	F	G
Ephemeroptera		Baetidae		Acentrella		SC	4		1						
Plecoptera		Capniidae		Allocapnia		SH	3		2						
Plecoptera		Nemouridae		Amphinemura		SH	3		2						
Plecoptera		Perlidae		Perlesta		PR	4		20						
Plecoptera		Perlodidae		Isoperla		PR	2		6						
Trichoptera		Hydroptilidae		Ochrotrichia		SC	4		1						
Coleoptera		Elmidae		Dubiraphia		SC	6		4						
Coleoptera		Elmidae		Optioservus		SC	4		1						
Coleoptera		Elmidae		Stenelmis		SC	5		43						
Diptera		Ceratopogonidae				PR	6	8							
Diptera		Chironomidae				CG	6	56							
Gastropoda		Physidae				SC	8	1							
Oligochaeta		Oligochaeta				CG	10	10							
Total Number of Individuals:								75	80						

Lab sub-sample 1-4 (200 +/- 20%)
(Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Cumberland Mine Stream Name: Dyers Fork

Stream ID#: 41261 Segment ID: DF STA 21

Sampler(s): A. Hale, S. Iannacchione, G. Noble, K. Piper Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date:

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	13	42.6	42.6
Trichoptera Richness	1	9.5	9.5
Percent EPT Richness	46.1	74.8	74.8
Intolerant Taxa Richness	7	43.8	43.8
FC + PR Taxa Richness	3	22.2	22.2
		Total Biological Score 1 (Mean of adjusted values):	38.6

Score 2 - Sample Date:

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness		**30.5**	
Trichoptera Richness		**10.5**	
Percent EPT Richness		**61.6**	
Intolerant Taxa Richness		**16.0**	
FC + PR Taxa Richness		**13.5**	
		Total Biological Score 2 (Mean of adjusted values):	

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *_____%

2.) Mean Total Biological Score (Average of Score 1 and Score 2): _____

* If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Cumberland Mine

Stream Name: Maple Run, 40607, MR4

Stream NHD#:

Sample Date: 4/30/2013

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: X1 or 2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): A. Hale, G. Noble, K. Piper

Comments:

Starting Lat/Long: 39.82333°/ -80.23994°

Ending Lat/Long: 39.82257°/ -80.2405°

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats

	Number of jabs
Cobble / Gravel Substrate	3
Snag	2
Coarse Particulate Organic Matter	1
Submerged Aquatic Vegetation	2
Sand / Fine Sediment	2

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi	Family: Voltine Status (M) Multi, (U) uni, (S) semi	Genus:	Functional Feeding Group	Pollution Tolerance Value	Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus)							
					Sub. 1 - 4		Sub. ___		Sub. ___		Sub. ___	
					F	G	F	G	F	G	F	G
Ephemeroptera	Ameletidae	Ameletus	CG	0		22						
Ephemeroptera	Baetidae	Acentrella	SC	4		1						
Ephemeroptera	Siphlonuridae	Siphlonurus	CG	7		3						
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	CG	1		1						
Plecoptera	Perlodidae	Isoperla	PR	2		137						
Plecoptera	Leuctridae	Leuctra	SH	0		1						
Plecoptera	Nemouridae	Amphinemura	SH	3		6						
Plecoptera	Perlidae	Perlesta	PR	4		1						
Trichoptera	Limnephilidae	Anabolia	SH	5		1						
Trichoptera	Rhyacophilidae	Rhyacophila	PR	1		3						
Coleoptera	Elmidae	Stenelmis	SC	5		1						
Diptera	Tabanidae	Chrysops	PI	7		1						
Diptera	Ceratopogonidae		PR	6	1							
Diptera	Chironomidae		CG	6	37							
Oligochaeta			CG	10	11							
Total Number of Individuals:					49	178						

Lab sub-sample 1-4 (200 +/- 20%)
(Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Cumberland Mine Stream Name: Maple Run

Stream ID#: 40607 Segment ID: MR 4

Sampler(s): A. Hale, G. Noble, K. Piper Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date: 4/30/2013

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	15	49.2	49.2
Trichoptera Richness	2	19.0	19.0
Percent EPT Richness	66.7	108.3	100.0
Intolerant Taxa Richness	8	50.0	50.0
FC + PR Taxa Richness	4	29.6	29.6
		Total Biological Score 1 (Mean of adjusted values):	49.6

Score 2 - Sample Date:

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness		**30.5**	
Trichoptera Richness		**10.5**	
Percent EPT Richness		**61.6**	
Intolerant Taxa Richness		**16.0**	
FC + PR Taxa Richness		**13.5**	
		Total Biological Score 2 (Mean of adjusted values):	

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *_____%

2.) Mean Total Biological Score (Average of Score 1 and Score 2): _____

* If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Cumberland Mine

Stream Name: Maple Run, 40607, MR5

Stream NHD#:

Sample Date: 4/30/2013

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: X1 or 2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): G. Noble, K. Piper, A. Hale

Comments:

Starting Lat/Long: 39.81926°/ -80.24236°

Ending Lat/Long: 39.81831°/ -80.2427°

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats

	Number of jabs
Cobble / Gravel Substrate	4
Snag	1
Coarse Particulate Organic Matter	0
Submerged Aquatic Vegetation	3
Sand / Fine Sediment	2

Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus)

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi	Family: Voltine Status (M) Multi, (U) uni, (S) semi	Genus:	Functional Feeding Group	Pollution Tolerance Value	Sub. 1 - 4		Sub. ___		Sub. ___		Sub. ___	
					F	G	F	G	F	G	F	G
Ephemeroptera	Ameletidae	Ameletus	CG	0		131						
Ephemeroptera	Ephemerellidae	Ephemerella	CG	1		3						
Ephemeroptera	Siphlonuridae	Siphlonurus	CG	7		15						
Plecoptera	Nemouridae	Amphinemura	SH	3		2						
Plecoptera	Perlodidae	Isoperla	PR	2		45						
Trichoptera	Limnephilidae	Anabolia	SH	5		1						
Trichoptera	Uenoidae	Neophylax	SC	3		1						
Diptera	Tipulidae	Tipula	SH	4		2						
Diptera	Chironomidae		CG	6	2							
Oligochaeta	Oligochaeta		CG	10	1							
Total Number of Individuals:					3	200						

Lab sub-sample 1-4 (200 +/- 20%)
(Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Cumberland Mine Stream Name: Maple Run

Stream ID#: 40607 Segment ID: MR5

Sampler(s): G. Noble, K. Piper, A. Hale Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date: 4-30-2013

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	10	32.8	32.8
Trichoptera Richness	2	19.0	19.0
Percent EPT Richness	70	113.6	100.0
Intolerant Taxa Richness	6	37.5	37.5
FC + PR Taxa Richness	1	7.4	7.4
		Total Biological Score 1 (Mean of adjusted values):	39.3

Score 2 - Sample Date:

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness		**30.5**	
Trichoptera Richness		**10.5**	
Percent EPT Richness		**61.6**	
Intolerant Taxa Richness		**16.0**	
FC + PR Taxa Richness		**13.5**	
		Total Biological Score 2 (Mean of adjusted values):	

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *_____%

2.) Mean Total Biological Score (Average of Score 1 and Score 2): _____

* If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Cumberland Mine

Stream Name: UNT to Maple Run, 40608, MR T12

Stream NHD#:

Sample Date: 3/8/2013

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: X1 or 2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): G. Noble, L. Powell, T. Hann, K. Garmire, A. Hale

Comments:

Starting Lat/Long: 39.8199°/ -80.24544°

Ending Lat/Long: 39.81978°/ -80.2466°

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats

	Number of jabs
Cobble / Gravel Substrate	3
Snag	3
Coarse Particulate Organic Matter	2
Submerged Aquatic Vegetation	0
Sand / Fine Sediment	2

Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus)

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi	Family: Voltine Status (M) Multi, (U) uni, (S) semi	Genus:	Functional Feeding Group	Pollution Tolerance Value	Sub. 1 - 4		Sub. ___		Sub. ___		Sub. ___	
					F	G	F	G	F	G	F	G
Ephemeroptera	Ameletidae	Ameletus	CG	0		40						
Ephemeroptera	Heptageniidae	Stenonema	SC	3		1						
Ephemeroptera	Ephemerellidae	Ephemerella	CG	1		1						
Ephemeroptera	Ephemerellidae	Eurylophella	SC	4		1						
Plecoptera	Perlodidae	Isoperla	PR	2		22						
Plecoptera	Nemouridae	Amphinemura	SH	3		4						
Plecoptera	Nemouridae	Podmosta	SH	2		21						
Plecoptera	Capniidae	Allocapnia	SH	3		7						
Trichoptera	Rhyacophilidae	Ryacophila	PR	1		2						
Trichoptera	Uenoidae	Neophylax	SC	3		12						
Diptera	Dixidae	Dixa	CG	1		1						
Diptera	Simuliidae	Prosimulium	FC	5		2						
Diptera	Tipulidae	Tipula	SH	4		3						
Diptera	Tipulidae	Hexatoma	PR	2		1						
Diptera	Tipulidae	Molophilus	SH	4		2						
Diptera	Simulidae	Stegopterna	FC	6		16						
Diptera	Chironomidae		CG	6	32							
Diptera	Ceratopogonidae		PR	6	4							
Oligochaeta	Oligochaeta		CG	10	3							
		Total Number of Individuals:			39	136						

Lab sub-sample 1-4 (200 +/- 20%)
(Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Cumberland Mine Stream Name: UNT to Maple Run

Stream ID#: 40608 Segment ID: MR T12

Sampler(s): G. Noble, L. Powell, T. Hann, K. Garmire, A. Hale Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date: 3/8/2013

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	19	62.3	62.3
Trichoptera Richness	2	19.0	19.0
Percent EPT Richness	52.6	85.4	85.4
Intolerant Taxa Richness	14	87.5	87.5
FC + PR Taxa Richness	6	44.4	44.4
		Total Biological Score 1 (Mean of adjusted values):	59.7

Score 2 - Sample Date:

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness		**30.5**	
Trichoptera Richness		**10.5**	
Percent EPT Richness		**61.6**	
Intolerant Taxa Richness		**16.0**	
FC + PR Taxa Richness		**13.5**	
		Total Biological Score 2 (Mean of adjusted values):	

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *_____%

2.) Mean Total Biological Score (Average of Score 1 and Score 2): _____

* If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Enlow Fork Mine

Stream Name: Templeton Fork, 32708, BSW19

Stream NHD#:

Sample Date: 5/9/2013

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: X1 or 2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): A. Hale, G. Noble, K. Piper, L. Kiefer

Comments:

Starting Lat/Long: 40.06039°/ -80.37785°

Ending Lat/Long: 40.06106°/ -80.37704°

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats

	Number of jabs
Cobble / Gravel Substrate	4
Snag	0
Coarse Particulate Organic Matter	0
Submerged Aquatic Vegetation	4
Sand / Fine Sediment	2

Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus)

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi	Family: Voltine Status (M) Multi, (U) uni, (S) semi	Genus:	Functional Feeding Group	Pollution Tolerance Value	Sub. 1 - 4		Sub. ___		Sub. ___		Sub. ___	
					F	G	F	G	F	G	F	G
Ephemeroptera	Baetidae	Baetis	CG	6		2						
Ephemeroptera	Caenidae	Caenis	CG	7		6						
Plecoptera	Nemouridae	Amphinemura	SH	3		2						
Plecoptera	Perlidae	Perlesta	PR	4		16						
Plecoptera	Perlodidae	Isoperla	PR	2		2						
Trichoptera	Hydropsychidae	Hydropsyche	FC	5		3						
Odonata	Calopterygidae	Calopteryx	PR	6		1						
Coleoptera	Elmidae	Dubiraphia	SC	6		1						
Coleoptera	Elmidae	Stenelmis	SC	5		4						
Coleoptera	Elmidae	Optioservus	SC	4		1						
Diptera	Empididae	Hemerodromia	PR	6		1						
Diptera	Tipulidae	Hexatoma	PR	2		1						
Diptera	Ceratopogonidae		PR	6	2							
Diptera	Chironomidae		CG	6	183							
Gastropoda	Physidae		SC	8	1							
Total Number of Individuals:					186	40						

Lab sub-sample 1-4 (200 +/- 20%)
(Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Enlow Fork Mine Stream Name: Templeton Fork

Stream ID#: 32708 Segment ID: BSW19

Sampler(s): A. Hale, G. Noble, K. Piper, L. Kiefer Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date: 5/9/2013

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	15	49.2	49.2
Trichoptera Richness	1	9.5	9.5
Percent EPT Richness	40.0	64.9	64.9
Intolerant Taxa Richness	5	31.3	31.3
FC + PR Taxa Richness	7	51.9	51.9
		Total Biological Score 1 (Mean of adjusted values):	41.3

Score 2 - Sample Date:

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness		**30.5**	
Trichoptera Richness		**10.5**	
Percent EPT Richness		**61.6**	
Intolerant Taxa Richness		**16.0**	
FC + PR Taxa Richness		**13.5**	
		Total Biological Score 2 (Mean of adjusted values):	

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *_____%

2.) Mean Total Biological Score (Average of Score 1 and Score 2): _____

* If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Enlow Fork Mine

Stream Name: Crafts Creek, 40938, BSW20

Stream NHD#:

Sample Date: 4/5/2013

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: X1 or 2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): G. Noble, A. Hale, T. Hann, L. Powell

Comments:

Starting Lat/Long: 40.05588°/ -80.33527°

Ending Lat/Long: 40.05523°/ -80.33606°

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats

	Number of jabs
Cobble / Gravel Substrate	2
Snag	2
Coarse Particulate Organic Matter	2
Submerged Aquatic Vegetation	2
Sand / Fine Sediment	2

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi	Family: Voltine Status (M) Multi, (U) uni, (S) semi	Genus:	Functional Feeding Group	Pollution Tolerance Value	Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus) Sub. 1 - 4 F	Sub. 1 - 4 G	Sub. ____ F	Sub. ____ G	Sub. ____ F	Sub. ____ G	Sub. ____ F	Sub. ____ G
Plecoptera	Nemouridae	Amphinemura	SH	3		1						
Plecoptera	Perlodidae	Isoperla	PR	2		7						
Trichoptera	Uenoidae	Neophylax	SC	3		2						
Trichoptera	Rhyacophilidae	Rhyacophila	PR	1		1						
Isopoda	Asellidae	Caecidotea	CG	6		2						
Coleoptera	Elmidae	Stenelmis	SC	5		3						
Diptera	Tabanidae	Chrysops	PI	7		2						
Diptera	Tipulidae	Pilaria	PR	7		1						
Diptera	Ceratopogonidae		PR	6	15							
Diptera	Chronomidae		CG	6	102							
Bivalvia	Sphaeriidae		FC	8	20							
Gastropoda	Physidae		SC	8	2							
Gastropoda	Planorbidae		SC	6	1							
Oligochaeta	Oligochaeta		CG	10	1							
Total Number of Individuals:					141	19						

Lab sub-sample 1-4 (200 +/- 20%)
(Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Enlow Fork Mine Stream Name: Crafts Creek

Stream ID#: 40938 Segment ID: BSW20

Sampler(s): G. Noble, A. Hale, T. Hann, L. Powell Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date: 4/5/2013

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	14	45.9	45.9
Trichoptera Richness	2	19.0	19.0
Percent EPT Richness	28.6	46.4	46.4
Intolerant Taxa Richness	4	25.0	25.0
FC + PR Taxa Richness	5	37.0	37.0
		Total Biological Score 1 (Mean of adjusted values):	34.7

Score 2 - Sample Date:

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness		**30.5**	
Trichoptera Richness		**10.5**	
Percent EPT Richness		**61.6**	
Intolerant Taxa Richness		**16.0**	
FC + PR Taxa Richness		**13.5**	
		Total Biological Score 2 (Mean of adjusted values):	

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *_____%

2.) Mean Total Biological Score (Average of Score 1 and Score 2): _____

* If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Enlow Fork Mine

Stream Name: UNT to Crafts Creek, 40941, BSW24

Stream NHD#:

Sample Date: 4/5/2013

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: X1 or 2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): A. Hale, G. Noble, T. Hann, L. Powell

Comments:

Starting Lat/Long: 40.058445°/ -80.334175°

Ending Lat/Long: 40.059292°/ -80.334442°

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats	
	Number of jabs
Cobble / Gravel Substrate	2
Snag	3
Coarse Particulate Organic Matter	0
Submerged Aquatic Vegetation	2
Sand / Fine Sediment	3

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi	Family: Voltine Status (M) Multi, (U) uni, (S) semi	Genus:	Functional Feeding Group	Pollution Tolerance Value	Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus)							
					Sub. 1 - 4		Sub. ___		Sub. ___		Sub. ___	
					F	G	F	G	F	G	F	G
Plecoptera	Nemouridae	Amphinemura	SH	3		3						
Trichoptera	Uenoidae	Neophylax	SC	3		2						
Trichoptera	Limnephilidae	Limnephilus	SH	3		1						
Trichoptera	Lepidostomatidae	Lepidostoma	SH	1		1						
Trichoptera	Rhyacophilidae	Rhyacophilia	PR	1		4						
Amphipoda	Crangonyctidae	Crangonyx	CG	4		112						
Diptera	Tipulidae	Molophilus	SH	4		2						
Diptera	Tipulidae	Pseudolimnophila	PR	2		1						
Diptera	Simulidae	Stegopterna	FC	6		8						
Diptera	Tabanidae	Tabanus	PR	5		1						
Diptera	Tabanidae	Chrysops	PI	7		1						
Diptera	Ceratopogonidae		PR	6	5							
Diptera	Chironomidae		CG	6	9							
Bivalvia	Sphaeriidae		FC	8	12							
Insecta	Collembola		CG	9	2							
Decapoda	Cambaridae		CG	6	1							
Oligochaeta	Oligochaeta		CG	10	5							
		Total Number of Individuals:			34	136						

Lab sub-sample 1-4 (200 +/- 20%)
(Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Enlow Fork Mine Stream Name: UNT to Crafts Creek

Stream ID#: 40941 Segment ID: BSW24

Sampler(s): A. Hale, G. Noble, T. Hann, L. Powell Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date: 4/5/2013

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	17	55.7	55.7
Trichoptera Richness	4	38.1	38.1
Percent EPT Richness	29.4	47.7	47.7
Intolerant Taxa Richness	8	50.0	50.0
FC + PR Taxa Richness	6	44.4	44.0
		Total Biological Score 1 (Mean of adjusted values):	47.2

Score 2 - Sample Date:

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness		**30.5**	
Trichoptera Richness		**10.5**	
Percent EPT Richness		**61.6**	
Intolerant Taxa Richness		**16.0**	
FC + PR Taxa Richness		**13.5**	
		Total Biological Score 2 (Mean of adjusted values):	

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *_____%

2.) Mean Total Biological Score (Average of Score 1 and Score 2): _____

* If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Enlow Fork Mine

Stream Name: UNT to Crafts Creek, 40944, BSW13

Stream NHD#:

Sample Date: 3/29/2013

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: X1 or 2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): T. Hann, G. Noble, A. Hale, K. Garmire

Comments:

Starting Lat/Long: 40.056469°/ -80.355087°

Ending Lat/Long: 40.05727°/ -80.355423°

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats

	Number of jabs
Cobble / Gravel Substrate	2
Snag	2
Coarse Particulate Organic Matter	2
Submerged Aquatic Vegetation	2
Sand / Fine Sediment	2

Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus)

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi	Family: Voltine Status (M) Multi, (U) uni, (S) semi	Genus:	Functional Feeding Group	Pollution Tolerance Value	Sub. 1 – 7		Sub. ____		Sub. ____		Sub. ____	
					F	G	F	G	F	G	F	G
Ephemeroptera	Ameletidae	Ameletus	CG	0		14						
Plecoptera	Capniidae	Allocapnia	SH	3		2						
Plecoptera	Nemouridae	Amphinemura	SH	3		30						
Plecoptera	Nemouridae	Nemoura	SH	1		1						
Plecoptera	Perlodidae	Isoperla	PR	2		31						
Trichoptera	Limnephilidae	Ironoquia	SH	3		3						
Trichoptera	Rhyacophilidae	Rhyacophila	PR	1		1						
Trichoptera	Uenoidae	Neophylax	SC	3		2						
Amphipoda	Crangonyctidae	Crangonyx	CG	4		12						
Diptera	Simulidae	Prosimulium	FC	5		15						
Diptera	Simulidae	Stegopterna	FC	6		5						
Diptera	Tabanidae	Tabanus	PR	5		1						
Diptera	Tabanidae	Chrysops	PI	7		7						
Diptera	Tipulidae	Molophilus	SH	4		2						
Diptera	Tipulidae	Tipula	SH	4		2						
Diptera	Ceratopogonidae		PR	6	2							
Diptera	Chironomidae		CG	6	46							
Bivalvia	Sphaeriidae		FC	8	2							
Decapoda	Cambaridae		CG	6	1							
Oligochaeta	Oligochaeta		CG	10	10							
		Total Number of Individuals:			61	128						

Lab sub-sample 1-4 (200 +/- 20%)
(Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Enlow Fork Mine Stream Name: UNT to Crafts Creek

Stream ID#: 40944 Segment ID: BSW13

Sampler(s): T. Hann, G. Noble, A. Hale, K. Garmire Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date: 3/29/2013

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	20	65.6	65.6
Trichoptera Richness	3	28.6	28.6
Percent EPT Richness	40	64.9	64.9
Intolerant Taxa Richness	11	68.8	68.8
FC + PR Taxa Richness	7	51.9	51.9
		Total Biological Score 1 (Mean of adjusted values):	55.9

Score 2 - Sample Date:

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness			
Trichoptera Richness			
Percent EPT Richness			
Intolerant Taxa Richness			
FC + PR Taxa Richness			
		Total Biological Score 2 (Mean of adjusted values):	

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *_____%

2.) Mean Total Biological Score (Average of Score 1 and Score 2): _____

* If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Emerald Mine

Stream Name: Mount Phoebe Run, 41268, MP STA 1

Stream NHD#:

Sample Date: 11/8/2013

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: X1 or 2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): A. Hale, L. Kiefer

Comments:

Starting Lat/Long: 39.84277°/ -80.12548°

Ending Lat/Long: 39.84368°/ -80.12538°

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats

	Number of jabs
Cobble / Gravel Substrate	1
Snag	3
Coarse Particulate Organic Matter	1
Submerged Aquatic Vegetation	2
Sand / Fine Sediment	3

Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus)

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi	Family: Voltine Status (M) Multi, (U) uni, (S) semi	Genus:	Functional Feeding Group	Pollution Tolerance Value	Sub. 1 - 4		Sub. ___		Sub. ___		Sub. ___	
					F	G	F	G	F	G	F	G
Ephemeroptera	Baetidae	Baetis	CG	6		3						
Plecoptera	Capniidae	Allocapnia	SH	3		1						
Trichoptera	Hydropsychidae	Cheumatopsyche	FC	6		12						
Trichoptera	Hydropsychidae	Hydropsyche	FC	5		4						
Coleoptera	Elmidae	Dubiraphia	SC	6		2						
Coleoptera	Elmidae	Optioservus	SC	4		1						
Coleoptera	Elmidae	Stenelmis	SC	5		8						
Odonata	Calopterygidae	Calopteryx	PR	6		1						
Diptera	Tipulidae	Tipula	SH	4		3						
Diptera	Tabanidae	Chrysops	PI	7		1						
Diptera	Chironomidae		CG	6	179							
Diptera	Ceratopogonidae		PR	6	6							
Gastropoda	Physidae		SC	8	1							
Oligochaeta	Oligochaeta		CG	10	3							
Total Number of Individuals:					189	36						

Lab sub-sample 1-4 (200 +/- 20%)
(Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Emerald Mine Stream Name: Mount Phoebe Run

Stream ID#: 41268 Segment ID: MP STA 1

Sampler(s): A. Hale, L. Kiefer Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date: 11/8/2013

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	14	45.9	45.9
Trichoptera Richness	2	19.0	19.0
Percent EPT Richness	28.6	46.4	46.4
Intolerant Taxa Richness	3	18.8	18.8
FC + PR Taxa Richness	4	29.6	29.6
		Total Biological Score 1 (Mean of adjusted values):	32.0

Score 2 - Sample Date:

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness		**30.5**	
Trichoptera Richness		**10.5**	
Percent EPT Richness		**61.6**	
Intolerant Taxa Richness		**16.0**	
FC + PR Taxa Richness		**13.5**	
		Total Biological Score 2 (Mean of adjusted values):	

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *_____%

2.) Mean Total Biological Score (Average of Score 1 and Score 2): _____

* If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.

FORM 8.8C: QUANTITATIVE MULTI-HABITAT BIOASSESSMENT OF DIVERSE COMMUNITY

Mine Name: Emerald Mine

Stream Name: Muddy Creek, 41014, MC B2

Stream NHD#:

Sample Date: 11/15/2013

Pre-Mining Sampling Survey: 1 or 2 (check one)

Post-Mining Sampling Survey: X1 or 2 (check one)

Length of Sampled Reach: 100 meters

Sampler(s): L. Kiefer, S. Tonsor, A. Hale

Comments:

Starting Lat/Long: 39.87832°/ -80.09304°

Ending Lat/Long: 39.877965°/ -80.09382°

Composite of 10 jabs from 10 sampling locations that effectively represents the observed habitats	
	Number of jabs
Cobble / Gravel Substrate	0
Snag	2
Coarse Particulate Organic Matter	2
Submerged Aquatic Vegetation	3
Sand / Fine Sediment	3

Class or Order: Voltine Status (M) Multi, (U) uni, (S) semi		Family: Voltine Status (M) Multi, (U) uni, (S) semi		Genus:		Functional Feeding Group	Pollution Tolerance Value	Enter the number of individuals for each Genus identified in lab. (F = Family / G = Genus)							
								Sub. 1 – 4		Sub. ___		Sub. ___		Sub. ___	
								F	G	F	G	F	G	F	G
Ephemeroptera		Baetidae		Callibaetis		CG	9		5						
Trichoptera		Phryganeidae		Ptilostomis		SH	5		4						
Trichoptera		Limnephilidae		Limnephilus		SH	3		1						
Coleoptera		Elmidae		Dubiraphia		SC	6		1						
Coleoptera		Elmidae		Optioservus		SC	4		1						
Odonata		Coenagrionidae		Argia		PR	6		1						
Megaloptera		Sialidae		Sialis		PR	6		1						
Diptera		Tipulidae		Hexatoma		PR	2		1						
Diptera		Tabanidae		Chrysops		PI	7		1						
Diptera		Ceratopogonidae				PR	6	1							
Diptera		Chironomidae				CG	6	124							
Bivalvia		Sphaeriidae				FC	8	6							
Gastropoda		Lymnaidae				SC	7	5							
Oligochaeta		Oligochaeta				CG	10	59							
Total Number of Individuals:								195	16						

Lab sub-sample 1-4 (200 +/- 20%)
(Continue to sub-sample if numbers are <160 or >240.)

FORM 8.8D: BIOMETRIC AND TOTAL BIOLOGICAL SCORE SUMMARY

Mine Name: Emerald Mine Stream Name: Muddy Creek

Stream ID#: 41014 Segment ID: MC B2

Sampler(s): L. Kiefer, S. Tonsor, A. Hale Length of Sampled Reach: 100 meters

☐ Pre-Mining ☒ Post-Mining

Score 1 - Sample Date: 11/15/2013

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness	14	45.9	45.9
Trichoptera Richness	2	19.0	19.0
Percent EPT Richness	21.4	34.7	34.7
Intolerant Taxa Richness	3	18.8	18.8
FC + PR Taxa Richness	5	37.0	37.0
		Total Biological Score 1 (Mean of adjusted values):	31.1

Score 2 - Sample Date:

Biological Metric	Observed Value	Normalized Score (observed value / 95th percentile value) * 100	Adjusted Value
Taxa Richness		**30.5**	
Trichoptera Richness		**10.5**	
Percent EPT Richness		**61.6**	
Intolerant Taxa Richness		**16.0**	
FC + PR Taxa Richness		**13.5**	
		Total Biological Score 2 (Mean of adjusted values):	

1.) Quality Assurance Check (% difference between Score 1 and Score 2): *_____%

2.) Mean Total Biological Score (Average of Score 1 and Score 2): _____

* If percentage difference is greater than 16%, reach should be re-sampled to obtain additional set of metrics.