TABLE 1 DETAILED INVERTEBRATE BACKGROUND																						
A	B	C	F	D	E	F			G			H					J		K	L		
	Genus/Species in NE MN in Ecoregions 50n,50p(northern),50t	Appalachian Unmined *	Cu-Ni Study (CN088) ****	Pigeon River **	DNR Upper St Louis 2005 ***	USFS Reeley Creek ******		USFS	USFS Filson Creek ******			USFS August Creek ******			Little Isabella ******		Nina Creek ******		USEPA (KY) SC 5% loss common to Mn	Pollution Tolerance Hardness (mg/l)/Sulfate (mg/l)/pH Cu-Nickel Study (CN018)*****		
					mile 139.6-19	2011	2012	2013	2011	2012	2013	2011	2012	2013	2008	2011	2012	2013	(uS/cm) ^	hardness	sulfate	pH
EPHEMEROPTERA (Mayflies)	GENUS																					
Leptophlebiidae					2	26	28	14	38	29	1	8	14	4	3		21	2				
	Leptophlebia	x	x	x	114														251			
	Tricorythodes sp.																					
	Choroterpes sp.		x																	114-117	24.6-25.1	8.8
	Paraleptophlebia sp.	x	x	x												1			463			
	P.debilis		x																			
	P.guttata	x	x																	705	450	7.9
	P.mollis		x																			
	P.praepedita	x	x																	87	26.5	7.2
	P.volitans	x	x																	21	3.6	6.6
Baetiscidae																						
	Baetisica sp.				129																	
	B.carolina		x																			
	B.lacustris		x																			
Baetidae																						
	Acerpenna sp.	x					1		2	4									~649			
	Baetis sp.	x	x	x	66						1								>1,395	16-1000	<10-5700	5.6-8.5
	B.brunneicolor		x			1			1													
	B.flavistriga		x																			
	B. hageni		x																			
	B.intercalaris		x																			
	B.levitans		x																			
	B.phyllis		x																			
	B.pygmaeus		x																			
	B.vagans		x																			
	Iswaeon sp.														1							
	Labiobaetis propinquus								1													
	Paracloedes sp.	x		x	60																	
	Pseudocloeon sp.		x	x																20-260	3.-235	6.6-8.4
	P.anoka		x																			
	P. carolina		x																			
	P.cingulataum		x																			
	P.dubium		x																			
	P.parvulum		x																			
	Cloeon sp.		x	x																		
	Centroptilum sp.		x	x		2	3			1												
	Callibaetis sp.		x	x																		
	Callibaetis ferrugineus			x																		
	Baetisca sp.				129																	
	Heterocloen curiosis		x																			
Ephemeridae							1															
	Ephemera sp.	x	x	x	21										2				696			
	E. simulans		x	x																		
	Hexagenia sp.		x	x	16															70-233	34.9-45.2	6.2-7.9
	H. limbata																					
	H.bilineata		x																			
	Litobrancha recurvata		x																			
Ephemerellidae					8		1							1								
	Seratella deficiens	x		x			9												535 (genera)			
	Eurylophella sp.	x				8	9	14	1	38					6	8		12	490			
	E. funeralis												1									
	Attenella sp.	x		x	1														~698			
	Ephemerella sp.	x																5	299			
	E. attenuata		x																			
	E. aestiva			x																		
	E.bicolor		x								9									322	313	7.2

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					mile 139.6-19	2011	2012	2013	2011	2012	2013	2011	2012	2013	2008	2011	2012	2013	(uS/cm) ^	hardness	sulfate	pH
	E.deficiens		x																		13- 124	7.2
	E.invaria		x										49	25	7		6					
	E.minimella		x																			
	E.needhami		x																			
	E.rotunda		x																			
	E.serrata		x																			
	E.simplex		x																	15	2.7	6.9
	E.sordida		x																			
	E.subvaria		x																			
	E.temporalis		x														24			6-216	2-135	6.8-8.4
	Teloganopsis deficiens														4							
Isonychiidae																						
	Isonychia sp.	x		x						1					3				1,180			
Caenidae																						
	Brachyercus sp.		x																			
	Caenis sp.	x	x	x	4		2										2		>3,923	6-705	<1-450	5.4-8.5
	C.Diminuta gr.					7	36	1		3		23	1	1	52	77	74	8				
Siphloneuridae																						
	Siphlonurus sp.		x	x	7																	
	S. alternans		x alternatus	x																		
	S.isonychia sp.		x																			
	Hydropsyche sp.		x				8				13	4	5							13	43	6.9
	H.betteni										20	2	5			1	5	2				
Tricorythidae																						
	Tricorxthodes sp.		x	x																6-705	1.3-450	5.4-8.5
Heptageniidae					4				10			1			1							
	Leucrocuta sp.	x											3						424			
	L. hebe			x																		
	Rhithrogena sp.		x	x																		
	Eneorus vitrea			x																		
	Heptagenia sp.	x	x flavescens	x															326			
	H. pulla			x																		
	H. hebe		x																			
	Maccaffertium sp.	x				2	3	11	7	7	6	3	2	2	5	1	10	1	~1,035			
	M. vicarium						1		7					1			1					
	Stenonema sp.				3														>745(genera)			
	S.candidum.	x	x	x																		
	S. exiguum		x	x	1																	
	S.modestum			x																		
	S.vicarium			x	86												1					
	S.exiquum			x	1																	
	S. terminatum		x		26																	
	S.rubrum		x																			
	S.quinquespinum		x																			
	S.smithae		x																			
	S.tripunctatum		x																	60-800	418-370	7.2-8.4
	Epeorus sp.	x	x																307			
	Stenacron sp.	x			16		2		1	3									~782			
	S. interpuctatum		x																	13-705	<1-450	5.6-8.4
	S. minnetonka		x																			
	S.femoratum		x																			
	S. fuscum		x																			
	S. fuscum rivulicolum		x																			
	S. candidum		x																			
	S.annexum		x																			
	S.integrum		x																			
	S.pulchellum		x																	7-233	<1-72.8	5.8-8.4
	Nixe sp.	x										2							319			

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					mile 139.6-19	2011	2012	2013	2011	2012	2013	2011	2012	2013	2008	2011	2012	2013	(uS/cm) ^	hardness	sulfate	pH	
	Arthroplea bipunctata		x																				
	Stenacron candidum		x																				
Metretopodidae	Siphloplecton interlineatum		x																				
Polymitacyidae																							
	Ephoron sp.																						
	E. leukon		x																				
PLECOPTERA (stoneflies)																							
Nemouridae																							
	Amphinemura delosa	x	x																>812 (genera)				
	A. linda		x																				
	Prostoia completa		x																				
	Shipsa rotunda		x																				
	Podmosta macdunnoughi		x																				
Lectridae																							
	Leuctra sp.	x											1						>2,087 (genera)				
	L. ferruginea		x																				
Capniidae										1			3		5		1						
	Allocapina minima	x	x																542 (genera)				
	A. pygmaea		x																				
	Capnia manitoba		x																				
	Paracapinia sp.	x												3					334 (genera)				
	P. angulata		x																				
	P. opis		x																				
Perlidae												4	1			5	1						
	Isogenoides sp.		x																				
	Isoperia bilineata	x	x																460 (genera)				
	I. frisoni?			x																			
	I. dicala		x																				
	I.lata		x																				
	I. Illies		x																				
	I. orata		x																				
	I.signata		x																				
	I. slossonae		x																				
	I. transmarina		x																				
	Acroneuria sp.	x	x abnormis	x									2		2				>2,630				
	A. lycorias		x	x				2		1 rare		1	2	1		1	1						
	A. abnormis			x																			
	A.carolinensis												1										
	A. internata?		x	x																			
	Agetinia.sp.																						
	Paragnetina sp.	x		x															2,087				
	Paragnetina media							1				1	p	2									
	Perlesta sp.	x		x															3,314				
	Isoperia sp.																						
Pteronarcyidae																							
	Pteronarcys sp.	x	x				2												~634				
	P. dorsata?			x																			
Taeniopterygidae							4																
	Strophopterx fasciata		x																				
	Taeniopteryx sp.	x					2	9	11	4	12		1		12		9	15	260				
	T.burski		x																				
	T. rivlis sp.		x																	70-82	45.1-45.2	6.0-6.8	
Chloroperlidae																							
	Alloperla? sp.	x		x															246				
	Hastaperla sp.			x																			
Perlodidae													1					1					

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					mile 139.6-19	2011	2012	2013	2011	2012	2013	2011	2012	2013	2008	2011	2012	2013	(uS/cm) ^	hardness	sulfate	pH
	Acroneuria abnormis		x	x sp.																		
	A.internata		x	x																		
	A.lycorias		x	x																		
	Neoperla clymene		x																			
	Paragenetina media		x																			
	Perlesta placida	x	x																3,314(genera)			
	Perlinella drymo		x																			
	Phasganophora capitata		x																			
	Isoperia sp.	x	x bilineata	x															460			
	Isogenoides sp.		x																			
	I.dicala		x																			
	I.frisoni		x																			
	I.lata		x																			
	I. signata		x																			
	I. slossonae		x																			
	I. transmarina		x																			
	I. Illies		x																			
	I. orata		x																			
	Agetinia.sp.																					
TRICHOPTERA (caddisflies)																						
Glossosomatidae																						
	Glossosma sp.	x	x	x											2				>1,652			
	Agapetus sp.		x																365	66	25	7.3
Philopotamidae																						
	Chimarra sp.					36	1	1	36	2	8	13	35	22	9	4	2	9	>3,972			
	C. socia	x		x																		
	C. atterima			x	1															15-19	7.6-7.7	6.8
	C. obscura		x	x																124-600	14.2-510	7.6-8.3
	C. socia		x		31															4-800	7.3-25	6.3-8.7
	C. feria		x																	23	3.2	7.1
	Dolophilodes distinctus	x	x																863 (genera)			
Psychomyiidae																						
	Psychomyia flavida	x	x	x	1			1				1			11		3	3	>1,131 (genera)			
	Lype diversa		x								6									87	26.5	7.2
Lepidostomatidae																						
	Lepidostoma sp.	x	x	x								3	5	10	8	1			~121	6-66	2.5-25	6.4-7.3
Leptoceridae										4							1					
	Ceraclea sp.			x		1	2		1								1					
	C.ancylus		x																			
	C.annulicornis	column H	x																			
	C. diluta		x																			
	C.maculata		x																			
	C.misca		x																			
	C.neffi		x																			
	C.resurgens		x																			
	Triaenodes sp.									5										66-287	25-251	6.7-7.3
	T.injusta		x																	21-800	3.5-46	6.6-8.8
	T.marginta		x																			
	T. tarda		x																			
	Setodes sp.																					
	Mystacides sp.				1	14	1	2				7				2						
	M.sepulchralis		x																			
	Nectopsyche sp				1																	
	N.candida		x																			
	Oecetis sp.				1		1															
	O.avara		x				1															
	O. Furva Gr.					2						1				10						
	O.cinerascens		x																			

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					mile 139.6-19	2011	2012	2013	2011	2012	2013	2011	2012	2013	2008	2011	2012	2013	(uS/cm) ^	hardness	sulfate	pH
	O.testacea										4	1	2					1				
Rhyacophilidae																						
	Rhyacophila fuscula	x		x															>1,890 (genera)			
	R.vibox		x													1						
Limnephilidae					2	1	1	15	1	18	12		1	1			1	5				
	Pycnonsyche sp.	x		x	3														295	4-705	2.4-750	6-8.8
	P.suttifer		x																			
	P.scabripennis		x																			
	Glyphopsyche sp.			x																		
	G.goera sp.		x																			
	Hydatophylax argus		x					3		1	1											
	Limnephilus sp.		x								3	1	2	1				1		6-164	2.4-24	6.4-8.5
	Nemotaulius hostilis		x						1													
	Neophylx nacatus		x																	66-87	25-26	7.2-7.5
	Anabolia bimaculata		x																			
	G.irrorata		x																			
	Platycentropus sp.		x																	66	25	7.3
	P. seudostenophylax sp.		x																			
	Anabolia sp.			x																		
Polycentropodidae									2					1	3							
	Neureclipsis sp.		x	x	67								2							8-800	<1-72.8	5.5-8.5
	Paranyctionphylax sp.				8																	
	Polycentropus sp.	x		x	44	1			1	2									>4,713			
	P. flavus			x																		
	Phylocentropus sp.			x																		
	P.placidus		x																			
	P.centralis		x																			
	P.cinereus		x																			
	P.interruptus		x																			
	P.remotus		x																			
	Nyctiophylax sp.								1													
	N. moestus		x																			
	N.vestitus		x																			
Odontoceridae																						
	Psilotreta indecisa			x																		
Hydropsychidae					6	3		20	3		4	1		14			11					
	Cheumatopsyche sp.	x	x	x		3	14	13	3	2	2	2	3	4	32		1	2	>9,180			
	Ceratopsyche sp.	x			6	3							11						>6,468			
	C.bronta														28							
	C. slossonae				2		1						2		3							
	C.sparma																16	1				
	Pycnopsyche sp.																			4-705	2.4-450	6.0-8.8
	Hydropsyche sp.	x		x	27			20	7	6			5					10	>7,010			
	H. morosa			x																		
	H. slossone		x	x ?											3							
	H. bronta			x											28							
	H. sparna			x										10								
	H. alhedra			x																		
	H. betteni		x	x				10	7	1		2	5	2						154-2100	56.2-313	5.9-8.5
	H. walkeri??			x																		
	H.cuanis		x																	114-117	2.2-44	6.8-8.8
	H.orris		x																	12-233	2.2-44	6.8-7.9
	H.simulans		x																	9-117	0.6-25.1	6.2-8.8
	Macronema zebratum		x																			
	Stactobiella sp.		x																			
	Potamyia flava															1						
Hydroptilidae																						
	Agraylea sp.		x																			

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					mile 139.6-19	2011	2012	2013	2011	2012	2013	2011	2012	2013	2008	2011	2012	2013	(uS/cm) ^	hardness	sulfate	pH
	Hydroptila sp.	x	x	x		5						3			4	2	1	1	>11,227			
	Oxyethira sp.		x	x			6			10	4				8	2	3					
	Ochrotrichia sp.	x	x																>2,791			
	Ithytrichia sp.		x																			
	I.clavat			x																		
	Mayatrichia ayama		x																			
	Neotrichia sp.		x																			
Brachycentridae																						
	Brachycentrus numerosus		x	x	24																	
	B.americanus		x																			
	Micrasema sp.		x												12	1		1				
	M. rickeri												3				1					
	M.Rusticum Gr.													1								
Phryganeidae								1														
	Agrypina improba		x																			
	Banksiola crotchi		x																			
	Phryganea cinerea		x																			
	Ptilostomis sp.		x		1			2												70-287	26.5-251	3.3-7.4
Pteronarcyidae																						
	Pteronarcys (sp. Dorsata?)			x																		
Chloroperlidae																						
	Alloperla? sp.			x																		
	Hastaperla sp.			x																		
Brachycentridae																						
	Numerosus sp.																					
Sericostomatidae																						
	Agarodes sp.				2																	
	A.distinctum		x													2						
	A.distinctus																2	2				
Molannidae	Molanna sp.									1	4											
	M. blenda		x																			
	M.tryphenna		x																			
	M.uniophila		x																			
Helicopsyche																						
	Helicopsyche borealis		x							2	1				3							
Uenoidae																						
	Neophylax sp.	x												2					316			
ODONATA (Dragonflies)																						
Aeshnidae																						
	Aeshna			x	2					1	1			1				1				
	A. umbrosa		x			1			1													
	Boyeria sp.	x			25						2								>7,340			
	B. grafiana			x																		
	B. vinosa		x	x		2	1		1	3	2			1	2		1	1				
	Basiaeschna sp.			x																		
	B. janata		x		9																	
Macromiidae															1	1						
	Macromia sp.				26																	
	M. illinoiensis		x	x																		
	Didmops transversa		x																			
Corduliidae							3															
	Neurocordulia sp				1					1												
	N.yamaskanensis		x																			
	Somatochlora sp.			x																		
	S.linearis		x																			
	S.minor		x																			
	S.Williamsoni		x																			
	Epitheca princeps		x																			

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					mile 139.6-19	2011	2012	2013	2011	2012	2013	2011	2012	2013	2008	2011	2012	2013	(uS/cm) ^	hardness	sulfate	pH
Coenagrionidae					15					3												
	Argia sp.				1																	
	A. apicalis		x																			
	Enallagma sp.		x																			
	Ischnura/Anomalagrion sp.		x																			
Cordulegastridae																						
	Cordulegaster maculatus	x	x										1						>1,436 (genera)			
	C. maculata																					
Gomphidae			x		12	5	1				1	2			2	3	3	2				
	Dromogomphus spinosus		x																			
	Hagenius sp.																					
	H.brevistylus		x	x	12	3																
	Hylogomphus bervis		x																			
	Gomphus sp.				7						1											
	G. spicatus			x																		
	Ophiogomphus sp.				16																	
	O.aspersus		x																			
	O.colubrinus													1rare								
	Phanogomphus sp.				14																	
	Styogomphus sp.	x			6														>6,468			
	S. albistylus		x																			
	Optioservus sp.			x			10	26	73	36	28	31	18	1	13	8	3			87-800	13-46	7.2-8.2
	O. anomalus			x																		
Calopterygidae											1				1	9	1	2				
	Calopteryx sp.		x	x	26						1	1	3									
	C. aequabilis						1			4			2	1			3					
Lestidae																						
	Lestes sp.			x																		
Libellulidae					2																	
	Perithemis sp.				1																	
	Enallagma sp.			x																		
Zygoptera																						
	Calopterygidae sp.										3				1							
COLEOPTERA (beetles)																						
Elmidae												8	1									
	Stenelmis sp.	x	2	x	5	2	3	30	22	5	3	88	10	2	2	10	3	1	>9,790			
	S. crenata			x																11-705	<1-450	5.5-8.8
	Optioservus sp.	x		x	4		10												>9,790			
	O. fastiditus			x																114-800	14.2-46.1	8-8.8
	Dubiraphia sp.	x		x	2	2	21	11							23	3			>7,370			
	Macronychus sp.	x		x	7							3							>1,890			
	M. glabtrtus											1	2			1	10	5				
Dryopidae																						
	Holichus sp.			x																		
Gyrinidae										1												
	Gyrinus sp.				11					4	3											
	Dineutus sp.				4																	
Dytiscidae					2												1					
	Coptotomus sp.			x																		
	Laccophilus sp.									1												
	Liodessus sp.									8	2											
Hydrophilidae																						
	Sperchopsis tesselatus			x																		
Chrysomelidae																						
	Donacia sp.			x																		
MEGALOPTERA																						
Corydalidae														4		5		3				
	Nigronia	x										1	3		1	2			>9,790			

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	Genus/Species in NE MN in Ecoregions 50n,50p(northern),50t	Appalachian Unmined *	Cu-Ni Study (CN088) ****	Pigeon River **	DNR Upper St Louis 2005 ***	USFS Reeley Creek ******		USFS	USFS Filson Creek ******			USFS August Creek ******			Little Isabella ******	Nina Creek ******			USEPA (KY) SC 5% loss common to Mn	Pollution Tolerance Hardness (mg/l)/Sulfate (mg/l)/pH Cu-Nickel Study (CN018)*****		
					mile 139.6-19	2011	2012	2013	2011	2012	2013	2011	2012	2013	2008	2011	2012	2013	(uS/cm) ^	hardness	sulfate	pH
	N. serricornis		x																				
	Chauliodes rastricornis		x																				
Sialidae																							
	Sialis sp.	x	x	x				1		1	2						1		>11,227				
Corydalidae																							
	Nigronia serricornis	x		x															>9,790				
NEUROPTERA (net winged)																							
Sisyridae	Climacia sp.		x																				
	Sisyra sp.		x			2																	
HEMIPTERA (true bugs)																							
Veliidae																							
	Rhagovelia obesa	x	x																>2,030 (genera)				
Corixidae					32			3						1									
	Sigara sp.				13																		
	Palmacorixa sp.			x																			
	Hesperocorixa sp.				62		1								2								
Hydrometridae																							
	Hydrometra sp.		x																				
Notonectidae																							
	Buenoa sp.		x	x																			
	Notonecta sp.				4																		
	N. lunata		x																				
Naucoridae																							
	Pelocoris sp.		x																				
Nepidae																							
	Rantra sp.		x		7		1 rare																
Mesoveliidae																							
	Mesovelia sp.		x																				
Gerridae					1																		
	Gerris sp.			x																			
	G. remigis		x																				
	Metrobates sp.				2																		
	M hesperius		x																				
	Reumatobates rileyi		x																				
Belostomatidae																							
	Belostoma sp.		x	x	14																		
	B. flumineum (rare)									1				1	1	1		1					
	Lethocerus sp.		x																				
Pleidae																							
	Plea striola		x																				
DIPTERA (true flies)																							
Athericidae																							
	Atherix sp.																		>11,646				
	A.variegata	x	x		18																		
Tabainidae																							
	Chrysops sp.	x	x																>11,646				
Prodiamesinae																							
	Monodiamesa sp.			x																			
Empididae																							
	Phoridae sp.		x																				
	Roederiodes sp.							1						4									
	Neoplasta sp.							1						2									
	Hemerodromia sp.	x					4	34	6		14	21	5				7	68	>9,790				
Syrphidae																							
	Helophilus		x																				
Tanypodinae																							
	Ablabesmyia sp.			x	7																		

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	Genus/Species in NE MN in Ecoregions 50n,50p(northern),50t	Appalachian Unmined *	Cu-Ni Study (CN088) ****	Pigeon River **	DNR Upper St Louis 2005 ***	USFS Reeley Creek ******		USFS	USFS Filson Creek ******			USFS August Creek ******			Little Isabella ******	Nina Creek ******			USEPA (KY) SC 5% loss common to Mn	Pollution Tolerance Hardness (mg/l)/Sulfate (mg/l)/pH Cu-Nickel Study (CN018)*****		
					mile 139.6-19	2011	2012	2013	2011	2012	2013	2011	2012	2013	2008	2011	2012	2013	(uS/cm) ^	hardness	sulfate	pH
	A. mallochi			x																		
	Ablabesmyia sp					5		1								9	2					
	Clinotanypus sp.			x	4																	
	Coelottanypus sp.																					
	Larsia sp.						1							3								
	Nilotanypus sp.																					
	Natarsia sp.																1					
	Pentaneura sp.																					
	Psectrotanypus sp.																					
	Conchapeliopia sp.				24																	
	Labrundinia sp.			x		1																
	Procladius sp.			x	18	3	10	1	2	1		2						1				
	Tanypus sp.																					
	Thienemannimyia complex				26		10		5		39			32	9		10					
	Zavrelimyia sp.			x																		
Culicidae	Ades commuis		x																			
	Anopheles punctipennis	x	x																>2,768 (genera)			
Orthocladiinae							3		1			1					1					
	Brillia sp.		x	x		1			1				1	3				4				
	Cardiocladius sp.		x																			
	coryneura sp.		x		1																	
	Cricotopus sp.		x	x	10	1	1						2	2		5		3		82-5000	25-135	6.3-8.8
	C. bicinctus group			x									4									
	C. tremulus group			x																		
	Diplocladius sp.		x																			
	D. cultriger											1										
	Eukiefferiella sp.		x	x														2		82-110	25-45	6-8.7
	E. gracei group			x																		
	E. devonica group			x																		
	Epicocladius sp.		x		1																	
	Lopescladius sp.			x																		
	Heterotrissocladius sp.		x										1									
	Nanocladius sp.			x	11		2															
	N. narvulus group			x																		
	Parametreocnemus sp.		x	x					2		15											
	Psectrocladius sp.		x	x			1															
	Synorthocladius sp.			x																		
	Tvetenia sp.				3																	
	T. discoloripes group			x										1								
	Thienemanniella sp.		x		3																	
	Trissocladius sp.		x																			
	Parakiefferiella sp.						3		5	1	11	1		2				5				
	Orthocladius sp.		x		1			3					1	19	4							
	Psectrocladius sp.				4																	
	Rheocricotopus sp.		x		6									2				2				
	Smittia sp.		x																			
	Xylotopus sp.				1						5			1								
Chironomidae					54																	
	Chironomini sp.		x			3			1													
	Chironomus sp.	x			1											1	1		>11,646	18-1600	0.7-370	3-8.4
	Cladotanytarsus sp.	x				20	4			3		1							>11,646			
	Cryptochironomus sp.	x	x	x		10	2	9	1			7				2	1		>3,489			
	Cryptotendipes sp.					1																
	Demicryptochironomus sp.	x		x							1								322			
	Dicrotendipes sp.	x	x		2	1	1					2							>11,646	15-2100	0.6120-0.4	6.3-8.4
	Endochironomus sp.		x	x	1															7.0-9000	2.4-480	6.4-8
	Micropsectra sp.	x		x		17	18		6	4	5				1			1	>6,468			
	Microtendipes sp.	x			8	88	5	2	2	21	9	4	4		3	7	18		>3,489			

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	Genus/Species in NE MN in Ecoregions 50n,50p(northern),50t	Appalachian Unmined *	Cu-Ni Study (CN088) ****	Pigeon River **	DNR Upper St Louis 2005 ***	USFS Reeley Creek ******		USFS	USFS Filson Creek ******			USFS August Creek ******			Little Isabella ******	Nina Creek ******			USEPA (KY) SC 5% loss common to Mn	Pollution Tolerance Hardness (mg/l)/Sulfate (mg/l)/pH Cu-Nickel Study (CN018)*****		
					mile 139.6-19	2011	2012	2013	2011	2012	2013	2011	2012	2013	2008	2011	2012	2013	(uS/cm) ^	hardness	sulfate	pH
	M.pedallus group																					
	Paratendipes sp.		x	x		26										1						
	Paralauterborniella? sp.			x																		
	P.nigrohalterale												2	1								
	Phaenospectra sp.	x	x		17	8	4		3		1	1				9			~2,332			
	Polypedilum sp.	x	x	x		17	14	3	5		1	2	38	9					>4,884	Jun-00	<1-315	3.8-8.8
	P. fallax group			x																		
	P. convictum group			x																		
	Stenochironomus sp.		x	x		1		5	1		6					2	2	4				
	Stictochironomus sp.		x	x				2														
	Stempellinella sp.	x				3			3								2		>927			
	Stempellina sp.	x					1					1							644			
	Tribelos sp		x	x		1	4	1		6	1					25	3	7				
	Einfeldia sp.																					
	Glyptotendipes sp.		x																	21-900	3.2-480	6.6-8.5
	Micropsectra sp.	x	x			17			6										>6,468			
	Parachironomus sp.		x																			
	Rheotanytarsus sp.	x	x	x	1		9	12		1	4	1	3	45	7		3		>3,489			
	Ablabesmyia	x				x													>11,646			
	Xenochironomus sp.		x																			
	Xylotopus par								1		5											
	X.xenolabis								1								1					
	Nilothauma sp.		x			5				3	2					3		1				
	Nanocladius sp.								1													
	Pseudochiromus sp.	x	x			3	2												>11,646			
	Paracladopelma sp.		x																			
	Lauterborniella sp.		x																			
	L.agrayloides						1								2	4	2	1				
	Zavrelia sp.	x	x																413	6	2.5	6.4
	Stegopterna?? sp.		x																			
	Thienemannimyia Gr.					14	10	16	5	14		37	29			10		20	>6,468			
	Parametriocnemus sp.	x					13		2				8	14		13	4	11				
	Trissopelopia ogemawi												9		1							
	Pagastiella sp.							1		3												
	Paramerina sp.									3												
	Parametriocnemus sp.	x								2									>4,713			
	Paratanytarsus sp.	x					2			4	3								>3,489			
	Limnophyes sp.	x						1											>5,120			
	Lauterborniella agrayloides														2		2					
	Psectrocladius sp.						1															
	Tanytarsus sp.	x	x	x		8	7	1	7	5	2		1			1	3		>9,180			
Tanytarsini								2														
	Cladotanytarsus sp.			x																		
Tabanidae																						
	Chrysops sp.	x			12														>11,646			
Empididae																						
	Hemerodromia sp.	x		x			4	34	6		14	21	5	19		3	7		>9,790			
Ceratopogonidae											1				1							
	Bezzia / Palpomyia	x								2	1								380			
	Probezzia sp.		x	x								3										
	Palpomyia sp.		x																			
	Ceratopogoninae sp.					1		1	3	2	1		1	10	1	1	1	4				
	Serromyia sp.											1										
	Mallochohelea sp.											3										
	Neoplasta sp.							1														
Tipulidae													1									
	Antocha sp.	x	x											1	5				>6,468			
	Dicranota sp.	x	x																>7,010			

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					mile 139.6-19	2011	2012	2013	2011	2012	2013	2011	2012	2013	2008	2011	2012	2013	(uS/cm) ^	hardness	sulfate	pH
	Helius sp.		x					1														
	Hexatoma sp.	x	x																>9,790			
	Limonia sp.	x	x																>5,057			
	Peicia sp.		x																			
	Pedicia sp.		x																			
	Hemerodromyia sp.		x																			
	Limnophila? sp.	x																	~1,503			
	Pseudolimnophila sp.	x	x											1					>1,357			
	Tipula sp.	x	x		7														>1,979			
Simuliidae (Black Flies)																						
	Stegopterna?? sp.			x																		
	Hexatoma sp.		x																			
	Prosimulium sp.	x	x																~531			
	Limnophila? sp.		x																			
	Cnephia sp.		x																			
	Simulium sp.	x	x		30		1	10	1		15			21				4	>6,468			
	S. pictipes		x	x																		
	S. jenningsi??			x																		
	Eusimulium eurmandiculum		x																			
	Byssodon ruggelsi		x																			
Streatiomyiidae																						
	Odontomyia sp.																					
Athericidae																						
	Atherix varieqata		x																			
Blephariceridae																						
	Blepharicera.tenuipes		x																			
	S. jenningsi??		x																			
Diamesinae																						
	Atherix varieqata		x																			
	Blepharicera sp.		x																			
	Potthastia? sp.		x															2				
	Diamesa sp.		x											2								
Podonominae																						
	Lasiodiamesa sp.		x																			
Ptychopteridae	Bittacomorpha sp.															1						
Limoniidae	Pilaria sp.											1										

Coding: x in Columns C - D means the species or genus is present; a number in Columns E - J is the count of individuals.

References:

**A Field-Based Aquatic Life Benchmark for Conductivity in Central Appalachian Streams*, U.S. EPA, Office of Research and Development, NCEA, USEPA Cincinnti OH 45268, EPA/600/R 10/023F, Table D-1.

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******* USDA, U.S. FOREST SERVICE SUPERIOR NATIONAL FORES, Unpublished STORET Data (benthic invertebrates)