

A topographic map of a coastal region, likely the western coast of North America. The map shows a network of streams (blue lines) flowing into a large body of water (light blue) on the left. Elevation is indicated by brown and tan contour lines, with higher elevations (red/pink) in the upper right. A purple line runs horizontally across the upper portion of the map. The text "APPENDIX B" is centered in the middle of the map.

APPENDIX B

Stream Bioassessment Data

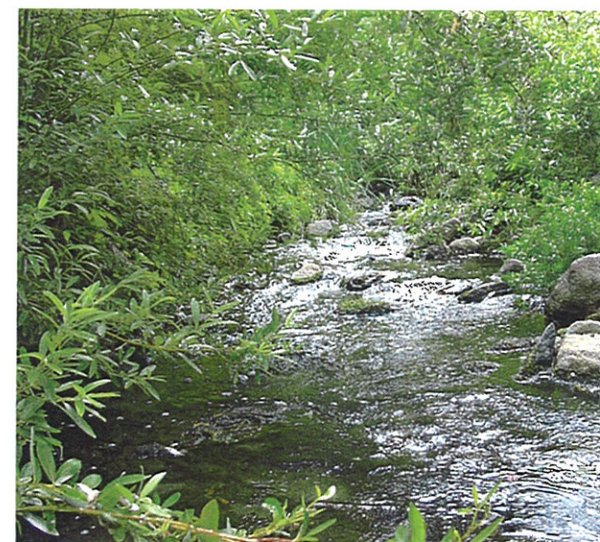
Appendix B-1 Photos



AHC-ECR Agua Hedionda Creek at El Camino Real



AHC-MR Agua Hedionda Creek at Melrose Drive



BVR-CB Buena Vista Creek at College Blvd.



CC-C Campo Creek in Campo



CC-FB Chollas Creek at Federal Blvd.



CCC-805 Carroll Canyon Creek at Highway 805

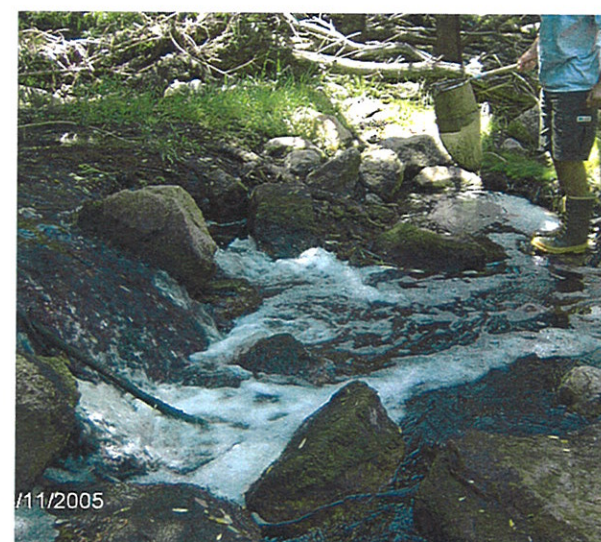
Appendix B-1 Photos



ESC-EF Escondido Creek in Elfin Forest



ESC-HRB Escondido Creek at Harmony Grove Bridge



GVC-WB Green Valley Creek at West Bernardo Drive



LPC-CCR Los Penasquitos Creek at Cobblestone Creek Road



MB-RC Rose Creek below Highway 52



REF-DC Doane Creek reference site

Appendix B-1 Photos



REF-DLC3 Upper De Luz Creek reference site



10/10/2005

REF-SC2 Upper Sandia Creek reference site



03/03/2005

REF-WC Wilson Creek reference site



SD-DDH San Dieguito Creek along Del Dios Highway



SDR-1 San Diego River near Morena Blvd.



07/17/2005

SDR-MT San Diego River in Mission Trails Park

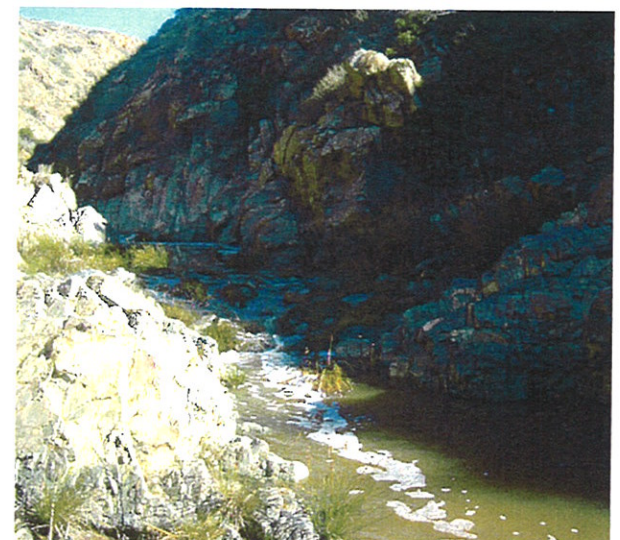
Appendix B-1 Photos



SLRR-BR San Luis Rey River at Benet Road



SLRR-MR San Luis Rey River at Mission Road



SMC-LCCC San Marcos Creek above La Costa Country Club



SMR-WGR Santa Margarita River at Willow Glen Road



SR-94 Sweetwater River at Highway 94



SR-WS Sweetwater River at Bonita Road

Appendix B-1 Photos



stilt at Santa Margarita



TC-TCNP Tecolote Creek in Tecolote Creek Natural Park

Appendix B.2-1: Taxonomic Listing of Benthic Macroinvertebrates Collected October 2004.

(TV = Tolerance Value: range is 0-10; 0 is intolerant to impairment, 10 is highly tolerant to impairment. FFG = Functional Feeding Group: c=collector, cf=collector-filterer, cg=collector-gatherer, mh=macrophyte herbivore, om=omnivore, p=predator, pa=parasite, ph=piercer herbivore, sc=scrapper, sh=shredder.)

[illegible]

REF-DLC3			REF-SC2			SD-DDH			SDR-1			SDR-MT		
1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
			1 0	0 1	0 0									
0	0	2	1 1	0 0	1 0									
5 2	1 0	16 1	0 10	1 23	0 6									
9	27	24	30	35	70									
			4	0	10									
1	1	0										0	8	1
						0	0	1	4	2	1	0 14	6 4	3 5
1	0	0				0	0	5				57	13	17
9	7	4	2	9	4	50	40	153	12	15	11	41	29	50
0 1	1 1	0 0												
						1	0	0	4	0	1	2	9	9
0	2	1	1 1	4 0	1 0							5	17	0
9	35	8	23	16	20	135	135	26	124	59	71			
2	3	0	9	1	0							0	0	1
3	0	1										0	0	1
			0	1	0				2	0	0			
												3	2	4
			0	1	0	0	1	0				1	1	3
			0	1	0									

[illegible]

Appendix B.2-1: Taxonomic Listing of Benthic Macroinvertebrates Collected October 2004.

	TV	FFG	SLRR-MR			SMC-LCCC			SMR-WGR			MB-RC			BVR-CB			CC-FB			REF-DC			SLRR-BR			SR-WS			TC-TCNP			SMR-CP		
			1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
PHYLUM ARTHROPODA																																			
	Insecta																																		
		Ephemeroptera																																	
		Baetidae																																	
		Baetis sp	5	cg	12	41	17	155	53	12	13	14	136		73	57	87				2	2	7			2	0	0			63	72	35		
		Dipheter hageni	5	cg																	2	7	0												
		Fallceon quilleri	4	cg				43	33	67	6	9	0		87	140	41	1	4	0										17	12	21			
		Caenidae																																	
		Caenis sp	7	cg																															
		Heptageniidae	4	sc																	4	0	0												
		Ironodes sp	3	sc																	11	30	15												
		Leptoxyphidae																																	
		Tricorythodes sp	4	cg																										5	0	1			
		Leptophlebiae																																	
		Paraleptophlebia sp	4	cg																	2	19	1												
		Odonata																																	
		Aeshnidae																																	
		Aeschnidae	5	p														0	0	1				1	0	0									
		Anax sp	8	p																				1	0	0									
		Anisoptera		p																															
		Calopterygidae																																	
		Hetaerina americana	6	p						1	1	0		0	1	0														1	0	0			
		Coenagrionidae																																	
		Argia sp	7	p				2	9	5	1	19	4		2	4	0	19	14	38									23	53	42	0	0	1	
		Coenagrionidae	9	p																										0	3	2			
		Ischnura sp	9	p																															
		Libellulidae																																	
		Brechmorhoga mendax	9	p	0	1	0																												
		Libellula sp	9	p																															
		Libellulidae	9	p																									0	0	2				
		Plecoptera																																	
		Capniidae																																	
		Capniidae	1	sh																	43	53	64												
		Chloroperlidae																																	
		Sweltsa	1	p																	11	13	6												
		Nemouridae																																	
		Malenka sp	2	sh																	43	37	4												
		Zapada sp	2	sh																	50	29	13												
		Perlodidae	2	p																	5	0	0												
		Plecoptera																			7	0	13												
		Hemiptera																																	
		Belostomatidae																																	
		Abedus sp	8	p																															
		Belostomatidae	8	p																															
		Odonata																																	
		Coenagrionidae																																	
		Enallagma/Ischnura sp	9	p																															
		Hemiptera																																	
		Corixidae	8	p																															
		Trichocorixa sp	8	p																															
		Trichoptera																																	
		Brachycentridae																																	
		Micrasema sp	1	mh																															
		Helicopsychidae																																	
		Helicopsyche sp	3	sc																															
		Hydropsychidae																																	
		Cheumatopsyche sp	5	cf	0	1	0	29	8	10	79	83	15																	1	0	2			
		Hydropsyche sp	4	cf	1	5	9	1	0	1	115	78	71																	5	1	1			
		Hydroptilidae																																	
		Hydroptila sp	6	ph				1	0	1	0	1	0	0	4	2	10	5	7										12	8	7				
		Ochrotrichia sp	4	ph							3	0	2																						
		Oxyethira sp	3	ph							2	0	0																						
		Lepidostomatidae																																	
		Lepidostoma sp	1	sh																	0	0	4												
		Leptoceridae																																	
		Leptoceridae	4	om																															
		Nectopsyche sp	3	om																															
		Limnephilidae																																	
		Hesperophylax	3	om																	1	5	5												
		Limnephilidae	4	s																	3	0	1												
		Psychomyiidae																																	
		Tinodes sp	2	sc							4	2	2																						
		Rhyacophilidae																																	
		Rhyacophila sp	0	p																	5	5	3												
		Sericostomatidae																																	
		Gumaga sp	3	sh																	9	0	0												
		Lepidoptera																																	
		Nepticulidae																																	
		Nepticula sp	5	sh	0	0	1																												
		Nepticulidae		s																															
		Stigmella sp	5	sh																	1	0	0			1	0	0							

Appendix B.2-1: Taxonomic Listing of Benthic Macroinvertebrates Collected October 2004.

[illegible]

Appendix B.2-1: Taxonomic Listing of Benthic Macroinvertebrates Collected October 2004.

			TV	FFG	SLRR-MR			SMC-LCCC			SMR-WGR			MB-RC			BVR-CB			CC-FB			REF-DC			SLRR-BR			SR-WS			TC-TCNP			SMR-CP		
					1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
		Sperchonidae																																			
		<i>Sperchon sp</i>	8	p	0	1	0				1	5	0								0	1	0										4	0	4		
		Torrenticolidae																																			
		<i>Torrenticola sp</i>	5	p																																	
		<i>Acan</i>	5	p																																	
PHYLUM ARTHROPODA																																					
		Malacostraca																																			
		Amphipoda																																			
		Corophiidae																																			
		<i>Americorophium sp</i>	4	cf																																	
		Crangonyctidae																																			
		<i>Crangonyx sp</i>	4	cg	21	12	163																														
		Hyalellidae																																			
		<i>Hyalella sp</i>	8	cg	157	8	20	11	11	124				1	0	1	0	9	6						2	4	7	3	1	0	113	34	31				
		Decapoda																																			
		Cambaridae	6	sh	1	0	0	1	0	1	0	2	0													2	3	1	0	1	0	0	0	1			
		<i>Procambarus sp</i>	8	sh	4	1	0							0	1	0										0	0	2	7	0	0			2	0	0	
		Decapoda	6	sh	13	1	0				3	0	0	0	1	0	0	2	0							14	55	5				4	5	8			
		Ostracoda																																			
			8	cg	6	0	0							2	0	0				105	73	48					15	0	0	6	10	15	17	23	42		
PHYLUM PLATYHELMINTHES																																					
		Turbellaria	4	p	0	2	0	0	5	2	6	14	2																								
PHYLUM CNIDARIA																																					
		Hydrozoa																																			
		Hydroida																																			
		Hydridae																																			
		<i>Hydra sp</i>	5	p																																	
PHYLUM NEMERTEA																																					
		Enopla																																			
		Hoplonemertea																																			
		Tetrastemmatidae																																			
		<i>Prostoma sp</i>	8	p	1	6	2				1	6	0	0	0	2																					
PHYLUM ANNELIDA																																					

Appendix B.2-2: Taxonomic Listing of Benthic Macroinvertebrates Collected May 2005.

(TV = Tolerance Value: range is 0-10; 0 is intolerant to impairment, 10 is highly tolerant to impairment. FFG = Functional Feeding Group: c=collector, cf=collector-filterer, cg=collector-gatherer, mh=macrophyte herbivore, om=omnivore, p=predator, pa=parasite, ph=piercer herbivore, sc=scrapper, sh=shredder.)

[illegible]

Appendix B.2-2: Taxonomic Listing of Benthic Macroinvertebrates Collected May 2005.

				TV	FFG	SAHC ECR			SAHC MR			SCC C			SCC FB			SREF DC			SSDR 1			SSLRR BR			SSR 94			SSR WS			SCCC 805			SESC EF			SESC HRB			SGVC WB			
						1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3				
			Elmidae																																										
			Microcylloepus sp	2	cg																																								
			Zaitzevia sp	4	sc																																								
			Halipidae																																										
			Peltodytes sp	5	mh																		0	1	0																				
			Hydraenidae																																										
			Hydraena sp	5	p																																								
			Hydrophilidae																																										
			Berosus sp	5	p																																								
			Tropisternus sp	5	p																																								
			Sciirtidae																																										
			Cyphon sp															1	0	3																									
			Diptera																																										
			Ceratopogonida																																										
			Bezzia/Palpomyia	6	p	0	1	1										0	1	0					1	2	0																		
			Stilobezzia sp	6	p													1	0	0																									
			Ceratopogonidae																																										
			Culicoides sp	6	p																							0	2	0															
			Dasyhelea sp	6	cg																																								
			Chironomidae	6	cg	20	50	26	36	27	44	180	210	200	15	35	42	132	178	102	12	14	58	23	36	34	85	30	51	18	32	22	79	84	84	40	11	30	107	98	81	10	15	4	
			Culicidae																																										
			Culex	8	cg													0	0	1																									
			Dixidae																																										
			Dixa sp	2	cg																																								
			Dixella sp	2	cg																																								
			Dolichopodidae	4	p	0	0	1																																					
			Empididae																																										
			Chelifera/Metachela sp	6	p				1	0	0																																		
			Clinocera sp	6	p							0	0	1							0	1	0																						
			Empididae	6	p																																								
			Ephydriidae	6		0	0	1				2	0	0							0	1	0																						
			Muscidae	6	p				1	0	0	2	3	1	3	1	0																												
			Psychodidae																																										
			Maruina lanceolata	2	sc																																								
			Pericoma/Telmatoscopus	4	cg	1	0	4	0	1	0																																		
			Psychoda sp	10	cg																																								
			Simuliidae																																										
			Simulium sp	6	cf	7	3	3	11	22	56	73	29	54	72	37	73	0	14	1	242	229	36	14	47	16	112	190	75	34	137	182	52	108	84	101	253	160	9	11	5	132	179	222	
			Stratiomyidae																																										
			Caloparyphus/Euparyphus	8	cg																																								
			Euparyphus sp	8	cg																																								
			Tipulidae																																										
			Dicranota sp	3	p																																								
			Holorusia hespera	5	sh																																								
			Limonia sp	6	sh																																								
			Ormosia sp	3	cg																																								
			Tipula sp	4	om																																								
PHYLUM CHELICERATA																																													
			Arachnida																																										
			Acari																																										
			Hygrobatidae																																										
			Atractides sp	8	p																																								
			Lebertiidae																																										
			Lebertia sp	8	p																																								
			Sperchonidae																																										
			Sperchon sp	8	p	0	0	1	0	0	1	0	0	1	0	0	1	1	0	0																									
			Torrenticolidae																																										
			Torrenticola sp	5	p																																								
PHYLUM ARTHROPODA																																													
			Malacostraca																																										
			Amphipoda																																										

Appendix B.2-2: Taxonomic Listing of Benthic Macroinvertebrates Collected May 2005.

				TV	FFG	SAHC_ECR			SAHC_MR			SCC_C			SCC_FB			SREF_DC			SSDR_1			SSLRR_BR			SSR_94			SSR_WS			SCCC_805			SESC_EF			SESC_HRB			SGVC_WB			
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
			Tetrastemmatidae																																										
			<i>Prostoma sp</i>	8	p																			0	1	2	3	2	0													1	0	0	
PHYLUM ANNELIDA																																													
			Oligochaeta	5	cg	82	76	121	123	87	120	6	11	21	1	2	14	16	21	20	1	5	31	84	77	129	42	50	91	8	0	0	4	3	0	12	1	1	107	141	186	0	2	3	
PHYLUM MOLLUSCA																																													
			Gastropoda																																										
			Pulmonata																																										
			Ancylidae																																										
			<i>Ferrissia sp</i>	6	sc																0	0	4																						
			<i>Fossaria sp</i>	6	sc							1	0	0																										0	1	0			
			<i>Physa sp</i>	8	sc	0	2	0	3	2	0	22	17	0	10	6	8				1	2	16	2	0	0	4	2	2				1	0	0				5	1	0				
Bivalvia																																													
			Veneroida																																										
			Corbiculidae																																										
			<i>Corbicula fluminea</i>	10	cf																1	1	0																				0	0	1
			Sphaeriidae																																										
			<i>Pisidium sp</i>	8	cf															16	1	0																							
PHYLUM ANTHROPODA																																													
Insecta																																													
			Diptera																																										
			Tipulidae																																										
			<i>Limnophila sp</i>																	1	0	0																							

Appendix B.2-2: Taxonomic Listing of Benthic Macroinvertebrates Collected May 2005.

		TV	FFG	SLPC_CCR			SREF_SC2			SSDR_MT			SSLRR_MR			STC_TCNP			SMB_RC			SSMR_CP			SSMR_WGR			STJ_DM			SSD_DDH			SREF_WC		
				1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
PHYLUM ARTHROPODA																																				
Insecta																																				
Ephemeroptera																																				
Baetidae																																				
Baetis sp		5	cg	43	91	24	110	100	108	64	87	50	111	145	100	2	3	5	72	154	70	65	83	16	170	133	162			76	40	35	30	15	31	
Callibaetis sp		9	cg																																	
Centroptilum/Procleon sp		3	cg																													0	1	0		
Dipheter hageni		5	cg																																	
Falceon quilleri		4	cg	4	1	2	1	0	1	48	35	25	1	1	0				0	6	1	138	65	149	18	13	31			4	1	0				
Heptageniidae																																				
Ironodes sp		3	sc																																	
Leptohyphidae																																				
Tricorythodes sp		4	cg																		3	0	8	0	1	1										
Paraleptophlebia sp		4	cg																																	
Siphonuridae																																				
Siphonurus sp		7	cg																																	
Odonata																																				
Calopterygidae																																				
Hetaerina americana		6	p																		0	1	2													
Coenagrionidae																																				
Argia sp		7	p	1	1	5	9	6	0	0	3	0				0	0	1	0	0	3				0	0	1									
Ischnura sp		9	p																																	
Cordulegastridae																																				
Cordulegaster dorsalis		3	p																	0	1	0														
Plecoptera																																				
Capniidae		1	sh																																	
Chloroperlidae																																				
Haploperla chilnualna sp		1	p																																	
Sweltsa		1	p																																	
Nemouridae																																				
Malenka sp		2	sh				9	10	7																							2	1	0		
Nemouridae		2	sh																																	
Neumoura spiniloba		1	sh																																	
Zapada sp		2	sh				0	0	1																											
Perlodidae																																				
Isoperla sp		2	p																														5	2	0	
Perlodinae		2	p				1	0	0																											
Taeniopterygidae																																				
Taenionema sp		2	om																														0	1	0	
Plecoptera																																	4	6	9	
Hemiptera																																				
Belostomatidae																																				
Abedus sp		8	p				1	0	0																											
Belostomatidae		8	p				3	2	1																											
Odonata																																				
Coenagrionidae																																				
Enallagma/Ischnura sp		9	p																																	
Megaloptera																																				
Corydalidae																																				
Neohermes sp		0	p																														1	5	1	
Trichoptera																																				
Hydropsychidae																																				
Cheumatopsyche sp		5	cf				2	2	0																	0	1	1			2	1	0			
Hydropsyche sp		4	cf	3	2	8	31	78	36				2	0	0						7	10	3	0	1	0										
Parapsyche sp		0	p																																	
Hydroptilidae																																				
Hydroptila sp		6	ph	3	1	0				2	2	2				2	1	0	2	1	0	2	1	3					1	0	0					
Oxyethira sp		3	ph																																	
Lepidostomatidae																																				
Lepidostoma sp		1	sh				1	0	0																											
Limnephilidae																																				
Hesperophylax		3	om																																	
Psychoglypha sp		2	sh																																	
Philopotamidae																																				

[illegible]

Appendix B.2-2: Taxonomic Listing of Benthic Macroinvertebrates Collected May 2005.

				TV	FFG	SLPC_CCR			SREF_SC2			SSDR_MT			SSLRR_MR			STC_TCNP			SMB_RC			SSMR_CP			SSMR_WGR			STJ_DM			SSD_DDH			SREF_WC		
						1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
			Tetraslemmatidae																																			
			Prostoma sp	8	p	0	1	0				0	0	1				0	0	2																		
PHYLUM ANNELIDA																																						
			Oligochaeta	5	cg	3	24	4	28	2	0	11	7	3	14	11	6	0	3	4	55	36	2	1	5	17	10	8	0	2	0	0						
PHYLUM MOLLUSCA																																						
			Gastropoda																																			
			Pulmonata																																			
			Ancylidae																																			
			Ferrissia sp	6	sc																																	
			Fossaria sp	6	sc																																	
			Physa sp	8	sc	0	0	1	0	0	8	2	2	0				4	6	8	0	1	11															
Bivalvia																																						
			Veneroida																																			
			Corbiculidae																																			
			Corbicula fluminea	10	cf	0	0	1							0	1	0																					
			Sphaeriidae																																			
			Pisidium sp	8	cf																																	
PHYLUM ANTHROPODA																																						
Insecta																																						
			Diptera																																			
			Tipulidae																																			
			Limnophila sp																																			

Appendix B.3-1: Ranked Abundance of Benthic Macroinvertebrates Collected October 2004.

Taxon	AHC-ECR	AHC-MR	BVR-CB	CC-C	CCC-805	CC-FB	ESC-EF	ESC-HRB	GVC-WB	LPC-CCR	MB-RC	REF-DC	REF-DLC3	REF-SC2
Simulium sp	6		9		9	21	277		21	19			82	59
Chironomidae	26	28	93	34	16	268	78	50	149	19	3	65	20	15
Hyalella sp	48	269	15	54	8		20	230	33	20	2		6	
Ostracoda	4	16		280	291	226		226	4		2			
Oligochaeta	89	45	1	103	11	5		273	63	52	70	67	12	25
Baetis sp	5	1	217				68		10	21		11	79	45
Hydropsyche sp							155		1	3			160	201
Argia sp	3	158	6	5	25	71	4		60	31			46	99
Fallceon quilleri	11	1	268		19	5	1	7	21	104			3	1
Cheumatopsyche sp	2						224		1				14	73
Turbellaria	28	23		24	131		49	88	35	3			8	4
Physa sp	11	25		32	21	186	1	18	139	5	34		1	1
Prostoma sp	3	66		35	151				30		2		3	
Corbicula fluminea	51	16							3	7				
Micrasema sp													184	153
Hydrotilla sp		1	6		22	22	9	2	37					1
Sphaeriidae				307									3	
Caloparyphus/Euparyphus	1		97		76	63	12	6	4	3		1	5	10
Fossaria sp	5	20		1	1				54	1	186		2	
Dasyhelea sp									2	1	4		1	
Zaitzevia sp													80	135
Cranonyx sp														
Capniidae												160		
Pisidium sp												159		
Decapoda	1	9	2	3			1		6		1			
Sperchon sp	1	8			47		5					1	6	3
Corixidae														
Trichocorixa sp														
Malenka sp												84	3	5
Zapada sp												92		
Ceratopogonidae					1	1				1	17			
Ironodes sp												56		
Atrichopogon	1	4							10	2	1			
Euparyphus sp					21	12		15						
Pericoma/Telmatoscopus		2				3		2				7		1
Ephydriidae		6		2	2						3			
Microcylloepus sp													3	39
Limonia sp		1		1					12	1	2			
Ferrissia sp		38							2					
Oxyethira sp									1					
Sweltsa												30		
Bezzia/Palpomyia				2					1		3		2	
Nemotelus sp	15				1	1				4	1		4	
Procambarus sp		8			1				1		1			
Heterelmis sp													22	1
Cambaridae		4		1					5					
Paraleptophlebia sp												22		
Hydraena sp												21		
Tinodes sp													12	
Petrophila sp							9							1
Plecoptera												20		
Tipula sp		2			2					2	4			1
Muscidae		1			1						6	2		
Planorbella sp														
Libellulidae		1												
Eubrianax edwardsi														14
Lebertia sp				1								12		1
Hydra sp								13						
Rhyacophila sp												13		
Americorophium sp														
Hesperophylax												11		
Lepidostoma sp												4		7
Nectopsyche sp													11	
Chaoborus sp	2													
Diphetor hageni												9		
Gumaga sp												9		

Appendix B.3-1: Ranked Abundance of Benthic Macroinvertebrates Collected October 2004.

Taxon	AHC-ECR	AHC-MR	BVR-CB	CC-C	CCC-805	CC-FB	ESC-EF	ESC-HRB	GVC-WB	LPC-CCR	MB-RC	REF-DC	REF-DLC3	REF-SC2
Marina lanceolata													3	6
Tricorythodes sp													2	
Helobdella sp				6										
Paraponyx sp														1
Tarebia granifera								6						
Brachycera											5			
Coenagrionidae														
Helicopsyche sp													4	1
Hetaerina americana			1										1	
Holorusia hespera												1		1
Nepticula sp	4													
Ochrotrichia sp														
Perlidae												5		
Tipulidae		5												
Atractodes sp					4									
Cyphon sp												4		
Helichus sp													2	2
Heptageniidae												4		
Limnephilidae												4		
Myxosargus sp														
Ptilidae												4		
Anax sp				1									1	
Anisoptera									3					
Chelifera/Metachela sp													1	
Enallagma/Ischnura sp	1				2									
Ischnura sp														
Liodessus sp								3						
Menetus sp										2				
Mideopsis sp												3		
Aeschnidae							1							
Anopheles sp		1												
Culicidae														
Curculionidae											2			
Dicranota sp												2		
Dolichopodidae														
Hemerodromia sp													2	
Lepidoptera											2			
Nepticulidae												1		
Ormosia sp										1	1			
Sciomyzidae				1							1			
Torrenticola sp														2
Abedus sp														1
Acari				1										
Belostomatidae														1
Brechmorhoga mendax														
Caenis sp				1										
Culex														
Diptera												1		
Erpobdella sp								1						
Cymbiodyta												1		
Helophorus sp											1			
Hydrosapha natans								1						
Leptoceridae													1	
Libellula sp								1						
Molophilus sp												1		
Mooreobdella sp														
Narpus sp												1		
Postelichus														1
Psephenus falli				1										
Sanfillipodytes sp												1		
Stigmella sp												1		
Stilobezzia sp												1		
Syrphidae		1												
Tropisternus sp					1									
Uvarus sp					1									
Grand Total	318	760	715	896	865	885	913	942	708	302	354	891	789	911

Appendix B.3-1: Ranked Abundance of Benthic Macroinvertebrates Collected October 2004.

Taxon	SD-DDH	SDR-1	SDR-MT	SLRR-BR	SLRR-MR	SMC-LCCC	SMR-CP	SMR-WGR	SR-WS	TC-TCNP	Grand Total
Simulium sp	296	254			257	55	559	29	416		2369
Chironomidae	243	38	120	1	81	17	83	124	318	149	2038
Hyalella sp	20	124		13	185	146			4	178	1375
Ostracoda	4	23	38	15	6				31	82	1248
Oligochaeta	20	33	55	98	57	8		4	129	13	1233
Baetis sp	16				70	220	170	163	2		1098
Hydropsyche sp	1				15	2	7	264			809
Argia sp	12		66			16	1	24		118	745
Fallceon quilleri	46					143	50	15			695
Cheumatopsyche sp	97		1		1	47	3	177			640
Turbellaria	1	120	4		2	7		22			549
Physa sp		25	39								538
Prostoma sp	8	92	43		9			7			449
Corbicula fluminea	30	103	90	25	5	12		20			362
Micrasema sp											337
Hydroptila sp	93	1	86			2		1		27	310
Sphaeriidae											310
Caloparyphus/Euparyphus			1		1	11	4		1	1	297
Fossaria sp	1		5					4	1		281
Dasyhelea sp	5		87							167	267
Zaitzevia sp											215
Crangonyx sp					196						196
Capniidae											160
Pisidium sp											159
Decapoda			6	74	14			3		17	137
Sperchon sp	1		46		1		8	6			133
Corixidae				118							118
Trichocorixa sp				97							97
Malenka sp											92
Zapada sp											92
Ceratopogonidae			23						1	25	69
Ironodes sp											56
Atrichopogon	1	7	9		1					14	50
Euparyphus sp											48
Pericoma/Telmatoscopus			22	1						7	45
Ephydriidae			20	3				2		6	44
Microcylloepus sp											42
Limonia sp			9							15	41
Ferrissia sp											40
Oxyethira sp	9	21						2			33
Sweltsa											30
Bezzia/Palpomyia			9			1	3			7	28
Nemotelus sp						2					28
Procambarus sp			1	2	5		2		7		28
Heterelmis sp							1				24
Cambaridae				6	1	2		2	1	1	23
Paraleptophlebia sp											22
Hydraena sp											21
Tinodes sp	1							8			21
Petrophila sp								10			20
Plecoptera											20
Tipula sp	1		5				1			1	19
Muscidae	1	5			2						18
Planorbella sp	5	11				2					18
Libellulidae			14							2	17
Eubrianax edwardsi											14
Lebertia sp											14
Hydra sp											13
Rhyacophila sp											13
Americorophium sp		11									11
Hesperophylax											11
Lepidostoma sp											11
Nectopsyche sp											11
Chaoborus sp						8					10
Dipheter hageni											9
Gumaga sp											9

Appendix B.3-1: Ranked Abundance of Benthic Macroinvertebrates Collected October 2004.

Taxon	SD-DDH	SDR-1	SDR-MT	SLRR-BR	SLRR-MR	SMC-LCCC	SMR-CP	SMR-WGR	SR-WS	TC-TCNP	Grand Total
Maruia lanceolata											9
Tricorythodes sp							6				8
Helobdella sp											6
Paraponyx sp								5			6
Tarebia granifera											6
Brachycera											5
Coenagrionidae										5	5
Helicopsyche sp											5
Hetaerina americana							1	2			5
Holorusia hespera		2			1						5
Nepticula sp					1						5
Ochrotrichia sp								5			5
Perlodidae											5
Tipulidae											5
Atractides sp											4
Cyphon sp											4
Helichus sp											4
Heptageniidae											4
Limnephilidae											4
Myxosargus sp			1		2			1			4
Ptilidae											4
Anax sp				1							3
Anisoptera											3
Chelifera/Metachela sp					2						3
Enallagma/Ischnura sp											3
Ischnura sp		3									3
Liodessus sp											3
Menetus sp						1					3
Mideopsis sp											3
Aeschnidae				1							2
Anopheles sp				1							2
Culicidae				2							2
Curculionidae											2
Dicranota sp											2
Dolichopodidae							1			1	2
Hemerodromia sp											2
Lepidoptera											2
Nepticulidae									1		2
Ormosia sp											2
Sciomyzidae											2
Torrenticola sp											2
Abedus sp											1
Acari											1
Belostomatidae											1
Brechmorhoga mendax					1						1
Caenis sp											1
Culex				1							1
Diptera											1
Erpobdella sp											1
Cymbiodyta											1
Helophorus sp											1
Hydroscapha natans											1
Leptoceridae											1
Libellula sp											1
Molophilus sp											1
Mooreobdella sp		1									1
Narpus sp											1
Postelichus											1
Psephenus falli											1
Sanfillipodytes sp											1
Stigmella sp											1
Stilobezzia sp											1
Syrphidae											1
Tropisternus sp											1
Uvarus sp											1
Grand Total	912	874	800	459	916	702	900	900	912	836	18460

Appendix B.3-2: Ranked Abundance of Benthic Macroinvertebrates Collected May 2005.

Taxon	AHC-ECR	AHC-MR	CC-C	CCC-805	CC-FB	ESC-EF	ESC-HRB	GVC-WB	LPC-CCR	MB-RC	REF-DC	REF-SC2	REF-WC
Simulium sp	13	89	156	244	182	514	25	533	558	202	15	98	455
Baetis sp	380	365	40	387	378	286	9	219	158	296	36	318	76
Chironomidae	96	107	590	247	92	81	286	29	116	214	412	233	291
Oligochaeta	279	330	38	7	17	14	434	5	31	93	57	30	
Fallaceon quilleri	70	6		16	177	18	27	17	7	7		2	
Ostracoda	27	10	17	7	28		52	18	11	87	1	4	
Hyalella sp	20	15	3	1	13	1	25	13	17			3	
Hydropsyche sp						3			13			145	
Hydra sp	11	7	14		1						1		
Physa sp	2	5	39	1	24		6		1	12		8	
Nemouridae											136		
Hydroptila sp	7			2	1	2	24	48	4	3			
Zapada sp											83	1	
Malenka sp											39	26	3
Turbellaria	16	1		3		3	24	4	6			2	
Ironodes sp											50		
Argia sp		1			10				7	3		15	
Muscidae		1	6	3	4		2	1					2
Plecoptera											19		19
Sperchon sp	1	1	1	4	1	6					1	3	
Americorophium sp													
Rhyacophila sp											12		22
Cheumatopsyche sp				1		19						4	
Pericoma/Telmatoscopus	5	1			1		2		1				
Isoperla sp											11		7
Pisidium sp											17		
Caloparyphus/Euparyphus					13	1		1					
Paraleptophlebia sp											15		
Hesperophylax											14		
Bezzia/Palomyia	2										1		
Enallagma/Ischnura sp							4						
Prostoma sp								1	1				
Tricorythodes sp													
Amphipod, unid.							2					1	
Dolichopodidae	1			4	2								2
Diphetor hageni											11		
Zaitzevia sp												11	
Dicranota sp											9		
Psychoda sp				1									
Clinocera sp			1								1		6
Decapoda	3	1		1									
Crangonyx sp													
Ephydriidae	1		2				2				1		
Euparyphus sp					5		1						
Neohermes sp													7
Tipula sp								1	4				
Belostomatidae												6	
Capniidae											6		
Culicoides sp													
Corbicula fluminea								1	1				
Procambarus sp							1						
Aqabinus sp					3								1
Chelifera/Metachela sp		1										2	
Cyphon sp											4		
Ferrissia sp													
Gammarus sp													
Limonia sp				1					2				
Peltodytes sp												3	
Tropisternus sp													
Agabus sp											1		2
Haploperla chilnualna sp											3		
Hetaerina americana													
Holorusia hespera					1						1		
Microcyloepus sp												2	
Psychoglypha sp											3		
Dasyhelea sp					1								

Appendix B.3-2: Ranked Abundance of Benthic Macroinvertebrates Collected May 2005.

Taxon	AHC-ECR	AHC-MR	CC-C	CCC-805	CC-FB	ESC-EF	ESC-HRB	GVC-WB	LPC-CCR	MB-RC	REF-DC	REF-SC2	REF-WC
Dixella sp												2	
Empididae						1						1	
Fossaria sp			1				1						
Lebertia sp											2		
Maruina lanceolata												2	
Neumoura spiniloba											2		
Torrenticola sp												2	
Wormaldia sp												1	1
Abedus sp												1	
Atractides sp												1	
Berosus sp							1						
Callibaetis sp			1										
Centroptilum/Procleon sp													1
Cordulegaster dorsalis										1			
Culex					1								
Dixa sp													1
Gumaga sp											1		
Hydraena sp													1
Hydroporinae											1		
Ilybius sp											1		
Ischnura sp	1												
Lepidostoma sp												1	
Limnophila sp											1		
Liodessus sp	1												
Nepticulidae													
Ormosia sp													
Oxyethira sp			1										
Parapsyche sp											1		
Perlodinae												1	
Rhantus sp		1											
Sanfillipodytes sp													1
Siphonurus sp											1		
Stilobezzia sp											1		
Sweltsa											1		
Taenionema sp													1
Grand Total	936	942	910	930	955	949	928	891	938	918	972	929	899

Appendix B.3-2: Ranked Abundance of Benthic Macroinvertebrates Collected May 2005.

Taxon	SD-DDH	SDR-1	SDR-MT	SLRR-BR	SLRR-MR	SMR-CP	SMR-WGR	SR-94	SR-WS	TC-TCNP	TJ-DM	Grand Total
Simulium sp	709	507	543	77	462	225	216	377	353	358		6911
Baetis sp	151	2	201	139	356	164	465	67	21	10		4524
Chironomidae	79	84	48	93	54	117	123	166	72	470	61	4161
Oligochaeta		37	21	290	31	23	18	183	8	7	2	1955
Falceon quilleri	5	2	108	111	2	352	62	107				1096
Ostracoda		6	4	4		1		3		61		620
Hyalella sp	2	102	7	218	19				154	2		615
Hydropsyche sp					2	20	1					184
Hydra sp		122		1				1	1			159
Phylla sp		19	4	2				8		18		149
Nemouridae												136
Hydroptila sp	1		6			6		2	11	3		120
Zapada sp												84
Malenka sp												68
Turbellaria			1		1							61
Ironodes sp												50
Argia sp			3				1			1		41
Muscidae		1	3	1		1	4	1	1	5	2	38
Plecoptera												38
Sperchon sp			1			12	3			2		36
Americorophium sp		34										34
Rhyacophila sp												34
Cheumatopsyche sp	3						2					29
Pericoma/Telmatoscopus						2	1	1		1	6	21
Isoperla sp												18
Pisidium sp												17
Caloparyphus/Euparyphus									1			16
Paraleptophlebia sp												15
Hesperophylax												14
Bezzia/Palpomys						7		3				13
Enallagma/Ischnura sp		9										13
Prostoma sp			1	3				5		2		13
Tricorythodes sp						11	2					13
Amphipod, unid.		1		4					4			12
Dolichopodidae			1			2						12
Diphetor hageni												11
Zaitzevia sp												11
Dicranota sp												9
Psychoda sp											8	9
Clinocera sp												8
Decapoda				2					1			8
Crangonyx sp					7							7
Ephydriidae											1	7
Euparyphus sp										1		7
Neohermes sp												7
Tipula sp			1					1				7
Belostomatidae												6
Capniidae												6
Culicoides sp									2		4	6
Corbicula fluminea		2			1							5
Procambarus sp				2					2			5
Agabus sp												4
Chelifera/Metachela sp					1							4
Cyphon sp												4
Ferrissia sp		4										4
Gammarus sp						4						4
Limonia sp										1		4
Peltodytes sp				1								4
Tropisternus sp						4						4
Agabus sp												3
Haploperla chilnualna sp												3
Hetaerina americana						3						3
Holorusia hespera						1						3
Microcylloepus sp						1						3
Psychoglypha sp												3
Dasyhelea sp							1					2

Appendix B.3-2: Ranked Abundance of Benthic Macroinvertebrates Collected May 2005.

Taxon	SD-DDH	SDR-1	SDR-MT	SLRR-BR	SLRR-MR	SMR-CP	SMR-WGR	SR-94	SR-WS	TC-TCNP	TJ-DM	Grand Total
Dixella sp												2
Empididae												2
Fossaria sp												2
Lebertia sp												2
Maruina lanceolata												2
Neumoura spiniloba												2
Torrenticola sp												2
Wormaldia sp												2
Abedus sp												1
Atractides sp												1
Berosus sp												1
Callibaetis sp												1
Centropilum/Procleon sp												1
Cordulegaster dorsalis												1
Culex												1
Dixa sp												1
Gumaga sp												1
Hydraena sp												1
Hydroporinae												1
Ilybius sp												1
Ischnura sp												1
Lepidostoma sp												1
Limnophila sp												1
Liodessus sp												1
Nepticulidae						1						1
Ormosia sp								1				1
Oxyethira sp												1
Parapsyche sp												1
Perlodinae												1
Rhantus sp												1
Sanfillipodytes sp												1
Siphonurus sp												1
Stilobezzia sp												1
Sweltsa												1
Taenionema sp												1
Grand Total	950	932	953	948	936	957	899	926	910	942	84	21534

Appendix B.4-1: Top Five Most Abundant Taxa of Benthic Macroinvertebrates Collected October 2004.

Station	1 st	2 nd	3 rd	4 th	5 th
AHC-ECR	Oligochaeta 28%	Corbicula fluminea 16%	Hyaella sp 15%	Turbellaria 9%	Chironomidae 8%
AHC-MR	Hyaella sp 36%	Argia sp 21%	Prostoma sp 8%	Oligochaeta 6%	Chironomidae 5%
BVR-CB	Fallceon quilleri 38%	Baetis sp 31%	Caloparyphus/Euparyphus 14%	Chironomidae 12%	Hyaella sp 2%
CC-C	Sphaeriidae 35%	Ostracoda 31%	Oligochaeta 12%	Hyaella sp 8%	Physa sp 4%
CCC-805	Ostracoda 32%	Prostoma sp 17%	Turbellaria 17%	Caloparyphus/Euparyphus 9%	Sperchon sp 7%
CC-FB	Chironomidae 31%	Ostracoda 27%	Physa sp 20%	Caloparyphus/Euparyphus 7%	Argia sp 6%
ESC-EF	Simulium sp 30%	Cheumatopsyche sp 24%	Hydropsyche sp 17%	Chironomidae 9%	Baetis sp 7%
ESC-HRB	Oligochaeta 29%	Hyaella sp 26%	Ostracoda 24%	Turbellaria 9%	Chironomidae 6%
GVC-WB	Chironomidae 22%	Physa sp 19%	Argia sp 9%	Oligochaeta 8%	Fossaria sp 7%
LPC-CCR	Fallceon quilleri 34%	Oligochaeta 17%	Argia sp 10%	Baetis sp 7%	Hyaella sp 7%
MB-RC	Fossaria sp 53%	Oligochaeta 20%	Physa sp 10%	Ceratopogonidae 5%	Muscidae 2%
REF-DC	Capniidae 20%	Pisidium sp 18%	Malenka sp 9%	Zapada sp 8%	Oligochaeta 7%
REF-DLC3	Micrasema sp 22%	Hydropsyche sp 21%	Zaitzevia sp 12%	Baetis sp 11%	Simulium sp 10%
REF-SC2	Hydropsyche sp 22%	Micrasema sp 18%	Zaitzevia sp 14%	Argia sp 11%	Cheumatopsyche sp 8%
SD-DDH	Simulium sp 33%	Chironomidae 25%	Cheumatopsyche sp 11%	Hydroptila sp 11%	Fallceon quilleri 5%
SDR-1	Simulium sp 31%	Turbellaria 14%	Hyaella sp 13%	Corbicula fluminea 11%	Prostoma sp 10%
SDR-MT	Chironomidae 17%	Dasyhelea sp 12%	Hydroptila sp 10%	Corbicula fluminea 10%	Argia sp 8%
SLRR-BR	Corixidae 26%	Oligochaeta 21%	Trichocorixa sp 21%	Decapoda 16%	Corbicula fluminea 5%
SLRR-MR	Simulium sp 30%	Crangonyx sp 21%	Hyaella sp 20%	Chironomidae 9%	Oligochaeta 7%
SMC-LCCC	Baetis sp 30%	Hyaella sp 21%	Fallceon quilleri 20%	Cheumatopsyche sp 8%	Simulium sp 8%
SMR-CP	Simulium sp 62%	Baetis sp 19%	Chironomidae 8%	Fallceon quilleri 6%	Sperchon sp 1%
SMR-WGR	Hydropsyche sp 32%	Cheumatopsyche sp 18%	Baetis sp 17%	Chironomidae 15%	Simulium sp 3%
SR-WS	Simulium sp 43%	Chironomidae 36%	Oligochaeta 15%	Ostracoda 3%	Procambarus sp 1%
TC-TCNP	Hyaella sp 22%	Dasyhelea sp 20%	Chironomidae 19%	Argia sp 14%	Ostracoda 9%

Highly tolerant taxa (TV=8,9,10) are highlighted in red; Highly intolerant taxa (TV=0,1,2) are highlighted in blue

Appendix B.4-2: Top Five Most Abundant Taxa of Benthic Macroinvertebrates Collected May 2005.

Station	1 st	2 nd	3 rd	4 th	5 th
AHC-ECR	Baetis sp 40%	Oligochaeta 31%	Chironomidae 9%	Fallceon quillieri 6%	Ostracoda 4%
AHC-MR	Baetis sp 40%	Oligochaeta 33%	Simulium sp 11%	Chironomidae 11%	Ostracoda 1%
CC-C	Chironomidae 64%	Simulium sp 18%	Baetis sp 5%	Oligochaeta 5%	Physa sp 4%
CCC-805	Baetis sp 43%	Chironomidae 26%	Simulium sp 25%	Fallceon quillieri 2%	Oligochaeta 1%
CC-FB	Baetis sp 40%	Fallceon quillieri 20%	Simulium sp 18%	Chironomidae 8%	Physa sp 3%
ESC-EF	Simulium sp 57%	Baetis sp 28%	Chironomidae 8%	Cheumatopsyche 2%	Fallceon quillieri 2%
ESC-HRB	Oligochaeta 48%	Chironomidae 30%	Ostracoda 6%	Hydroptila sp 3%	Simulium sp 3%
GVC-WB	Simulium sp 62%	Baetis sp 23%	Hydroptila sp 6%	Chironomidae 3%	Ostracoda 2%
LPC-CCR	Simulium sp 59%	Baetis sp 16%	Chironomidae 11%	Oligochaeta 4%	Hyaella sp 2%
MB-RC	Baetis sp 32%	Simulium sp 24%	Chironomidae 22%	Ostracoda 10%	Oligochaeta 10%
REF-DC	Chironomidae 43%	Nemouridae 14%	Zapada sp 8%	Oligochaeta 6%	Ironodes sp 5%
REF-SC2	Baetis sp 32%	Chironomidae 26%	Hydropsyche sp 17%	Simulium sp 10%	Oligochaeta 4%
REF-WC	Simulium sp 54%	Chironomidae 31%	Baetis sp 7%	Rhyacophila sp 2%	Plecoptera 2%
SD-DDH	Simulium sp 75%	Baetis sp 16%	Chironomidae 8%	Fallceon quillieri 1%	Cheumatopsyche sp 1%
SDR-1	Simulium sp 52%	Hydra sp 15%	Chironomidae 10%	Hyaella sp 10%	Oligochaeta 4%
SDR-MT	Simulium sp 57%	Baetis sp 21%	Fallceon quillieri 11%	Chironomidae 6%	Oligochaeta 2%
SLRR-BR	Oligochaeta 31%	Hyaella sp 22%	Baetis sp 14%	Fallceon quillieri 12%	Chironomidae 10%
SLRR-MR	Simulium sp 49%	Baetis sp 40%	Chironomidae 5%	Oligochaeta 3%	Hyaella sp 2%
SMR-CP	Fallceon quillieri 37%	Simulium sp 25%	Baetis sp 16%	Chironomidae 11%	Hydropsyche sp 2%
SMR-WGR	Baetis sp 53%	Simulium sp 22%	Chironomidae 14%	Fallceon quillieri 7%	Oligochaeta 2%
SR-94	Simulium sp 38%	Oligochaeta 20%	Chironomidae 20%	Fallceon quillieri 12%	Baetis sp 7%
SR-WS	Simulium sp 38%	Ostracoda 30%	Hyaella sp 17%	Chironomidae 9%	Baetis sp 2%
TC-TCNP	Chironomidae 51%	Simulium sp 36%	Ostracoda 6%	Physa sp 2%	Baetis sp 1%
TJ-DM	Chironomidae 73%	Psychoda sp 10%	Pericoma/Telmatoscopu 7%	Culicoides sp 5%	Muscidae 2%

Highly tolerant taxa (TV=8,9,10) are highlighted in red; Highly intolerant taxa (TV=0,1,2) are highlighted in blue

Appendix B.5-1: Biological Metric Calculations for Benthic Macroinvertebrates Collected October 2004.

Metric	AHC-ECR	AHC-MR	BVR-CB	CC-C	CC-FB	CCC-805	ESC-EF	ESC-HRB	GVC-WB	LPC-CCR	MB-RC	REF-DC	REF-DLC3	REF-SC2
Taxa Richness	22	23	10	17	13	21	14	16	24	20	23	33	32	27
Ephemeropteran Taxa	2	1	2	1	1	1	2	1	2	2	0	5	3	1
Plecopteran Taxa	0	0	0	0	0	0	0	0	0	0	0	6	1	1
Trichopteran Taxa	1	1	1	0	1	1	3	1	3	1	0	5	7	5
EPT Taxa	3	2	3	1	2	2	5	2	5	3	0	16	11	8
Dipteran Taxa	7	8	3	4	6	7	4	4	7	9	12	8	8	6
Non Insect Taxa	10	12	3	10	3	9	4	8	9	7	8	4	7	5
% EPT	6%	0%	69%	0%	3%	4%	50%	1%	10%	42%	0%	60%	60%	54%
Sensitive EPT %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	52%	27%	18%
Shannon Diversity	2.3	2.2	1.5	1.8	1.7	2.1	1.9	1.8	2.5	2.2	1.7	2.6	2.4	2.4
Margalef Diversity	3.6	3.8	1.5	2.7	1.9	3.3	2.1	2.3	4.0	3.5	3.9	5.1	5.1	4.1
Tolerance Value	6.6	7.2	5.1	7.4	7.1	7.0	5.3	6.5	6.4	5.4	6.0	3.9	4.0	4.1
% Dominant Taxa	28%	36%	38%	35%	30%	34%	31%	29%	21%	34%	53%	19%	23%	21%
% Chironomidae	8%	4%	13%	4%	30%	2%	9%	5%	21%	6%	1%	7%	3%	2%
% Intolerant Organisms	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	44%	26%	23%
% Tolerant Organisms	42%	54%	2%	80%	49%	64%	3%	52%	29%	12%	12%	20%	3%	1%
% Grazer	0%	0%	1%	0%	3%	2%	2%	0%	6%	0%	0%	7%	36%	34%
% Collector Gatherer	63%	49%	97%	53%	66%	52%	20%	86%	41%	75%	24%	21%	20%	15%
% Collector Filterer	19%	2%	1%	34%	2%	1%	72%	0%	4%	10%	0%	18%	33%	37%
% Predator	12%	34%	1%	8%	8%	42%	6%	11%	18%	12%	8%	10%	9%	12%
% Shredder	2%	3%	0%	1%	0%	0%	0%	0%	4%	0%	1%	40%	1%	2%
% Scraper	5%	11%	0%	4%	21%	3%	1%	2%	28%	3%	62%	7%	13%	17%
% Other	0%	0%	1%	1%	3%	3%	1%	0%	6%	1%	1%	1%	25%	17%
Estimated Total Abundance/ft ²	18	65	50	267	806	64	360	913	171	17	21	127	56	73

Appendix B.5-1: Biological Metric Calculations for Benthic Macroinvertebrates Collected October 2004.

Metric	SD-DDH	SDR-1	SDR-MT	SLRR-BR	SLRR-MR	SMR-CP	SMC-LCCC	SMR-WGR	SR-WS	TC-TCNP
Taxa Richness	20	17	23	14	18	13	18	21	9	18
Ephemeropteran Taxa	2	0	0	0	1	3	2	2	1	0
Plecopteran Taxa	0	0	0	0	0	0	0	0	0	0
Trichopteran Taxa	4	1	2	0	2	2	3	6	0	1
EPT Taxa	6	1	2	0	3	5	5	8	1	1
Dipteran Taxa	5	5	11	6	6	5	6	5	3	10
Non Insect Taxa	8	9	8	5	8	2	7	7	5	4
% EPT	30%	2%	11%	0%	9%	27%	60%	71%	0%	3%
Sensitive EPT %	1%	2%	0%	0%	0%	0%	0%	1%	0%	0%
Shannon Diversity	2.0	2.2	2.7	1.9	2.0	1.2	2.0	2.0	1.2	2.1
Margalef Diversity	3.0	2.5	3.6	2.6	3.0	2.0	2.8	3.4	1.5	2.8
Tolerance Value	5.9	6.7	6.8	7.1	5.9	5.7	5.7	5.0	6.0	6.8
% Dominant Taxa	32%	29%	15%	26%	27%	62%	31%	30%	45%	22%
% Chironomidae	26%	5%	15%	0%	9%	8%	3%	14%	35%	18%
% Intolerant Organisms	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%
% Tolerant Organisms	7%	42%	33%	59%	24%	2%	22%	4%	5%	32%
% Grazer	12%	2%	11%	0%	0%	0%	0%	3%	0%	3%
% Collector Gatherer	38%	26%	42%	28%	66%	34%	78%	34%	54%	73%
% Collector Filterer	47%	41%	11%	5%	30%	64%	17%	55%	45%	0%
% Predator	3%	25%	25%	47%	2%	1%	4%	7%	0%	19%
% Shredder	0%	0%	2%	18%	3%	0%	0%	1%	1%	4%
% Scraper	1%	4%	6%	0%	0%	0%	1%	2%	0%	0%
% Other	12%	2%	12%	0%	0%	0%	0%	1%	0%	3%
Estimated Total Abundance/ft ²	184	125	88	143	127	326	40	160	151	101

Appendix B.5-2: Biological Metric Calculations for Benthic Macroinvertebrates Collected May 2005.

Metric	AHC-ECR	AHC-MR	CC-C	CC-FB	CCC-805	ESC-EF	ESC-HRB	GVC-WB	LPC-CCR	MB-RC	REF-DC	REF-SC2	REF-WC
Taxa Richness	17	13	12	16	14	11	16	12	14	9	29	24	19
Ephemeropteran Taxa	2	2	1	2	2	2	2	2	2	2	4	2	2
Plecopteran Taxa	0	0	0	0	0	0	0	0	0	0	8	2	3
Trichopteran Taxa	1	0	1	0	1	3	1	1	2	1	4	3	2
EPT Taxa	3	2	2	2	3	5	3	3	4	3	16	7	7
Dipteran Taxa	5	4	4	7	5	3	5	4	4	2	6	5	5
Non Insect Taxa	8	7	6	5	5	4	7	5	5	3	4	7	0
% EPT	49%	39%	5%	59%	44%	35%	7%	31%	19%	33%	46%	54%	12%
Sensitive EPT %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	38%	3%	4%
Shannon Diversity	1.7	1.5	1.2	1.8	1.4	1.2	1.6	1.2	1.3	1.6	2.2	1.9	1.3
Margalef Diversity	2.6	1.9	1.8	2.5	2.1	1.6	2.5	1.7	2.2	1.3	4.5	3.8	2.3
Tolerance Value	5.2	5.3	6.0	5.4	5.6	5.6	5.6	5.8	5.8	5.8	4.4	5.2	5.6
% Dominant Taxa	41%	39%	64%	40%	42%	54%	46%	60%	60%	32%	42%	34%	51%
% Chironomidae	10%	12%	64%	10%	26%	9%	31%	3%	12%	22%	42%	25%	32%
% Intolerant Organisms	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	31%	4%	5%
% Tolerant Organisms	5%	3%	7%	9%	2%	1%	10%	4%	3%	11%	2%	3%	0%
% Grazer	1%	0%	0%	0%	0%	0%	3%	5%	0%	0%	5%	2%	0%
% Collector Gatherer	94%	89%	75%	77%	72%	42%	90%	33%	36%	75%	54%	63%	41%
% Collector Filterer	1%	9%	18%	19%	27%	56%	3%	61%	62%	23%	3%	27%	51%
% Predator	4%	1%	3%	2%	1%	1%	3%	1%	2%	1%	5%	3%	6%
% Shredder	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	28%	3%	0%
% Scraper	0%	1%	4%	3%	0%	0%	1%	0%	0%	1%	5%	3%	0%
% Other	1%	0%	0%	0%	0%	0%	3%	5%	1%	0%	2%	0%	0%
Estimated Total Abundance/ft ²	179	209	841	188	267	859	542	644	503	474	542	1433	271

Appendix B.5-2: Biological Metric Calculations for Benthic Macroinvertebrates Collected May 2005.

Metric	SD-DDH	SDR-1	SDR-MT	SLRR-BR	SLRR-MR	SMR-CP	SMR-WGR	SR-94	SR-WS	TC-TCNP	TJ-DM
Taxa Richness	7	12	14	11	9	17	11	12	11	13	7
Ephemeropteran Taxa	2	1	2	2	2	3	3	2	1	1	0
Plecopteran Taxa	0	0	0	0	0	0	0	0	0	0	0
Trichopteran Taxa	2	0	1	0	0	2	1	1	1	1	0
EPT Taxa	4	1	3	2	2	5	4	3	2	2	0
Dipteran Taxa	2	2	4	3	3	6	4	5	4	5	6
Non Insect Taxa	1	8	6	6	4	3	2	4	5	5	1
% EPT	16%	0%	33%	25%	39%	58%	59%	19%	3%	2%	0%
Sensitive EPT %	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Shannon Diversity	0.8	1.5	1.3	1.8	1.2	1.7	1.3	1.6	1.5	1.2	1.0
Margalef Diversity	0.9	1.9	2.1	1.9	1.3	2.6	1.6	1.8	1.8	1.9	1.4
Tolerance Value	5.8	6.1	5.6	5.8	5.6	5.0	5.3	5.5	6.9	6.2	6.2
% Dominant Taxa	75%	55%	57%	31%	49%	37%	52%	41%	39%	50%	73%
% Chironomidae	8%	9%	5%	10%	6%	12%	14%	18%	8%	50%	73%
% Intolerant Organisms	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
% Tolerant Organisms	0%	15%	2%	25%	2%	1%	0%	2%	48%	9%	10%
% Grazer	0%	0%	1%	0%	0%	1%	0%	0%	1%	0%	0%
% Collector Gatherer	24%	25%	40%	91%	50%	71%	75%	57%	59%	59%	92%
% Collector Filterer	76%	58%	57%	8%	49%	26%	24%	41%	39%	38%	0%
% Predator	0%	15%	1%	1%	0%	3%	1%	1%	0%	1%	7%
% Shredder	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
% Scraper	0%	3%	1%	0%	0%	0%	0%	1%	0%	2%	0%
% Other	0%	0%	1%	0%	0%	1%	0%	0%	1%	0%	0%
Estimated Total Abundance/ft ²	4060	428	1028	252	501	499	1117	359	753	1043	5

Appendix B.6-1: Physical Habitat Quality Scores. October 2004.

Measure	SMR-WGR	SMR-CP	SLRR-MR	SLRR-BR	AHC-MR	AHC-ECR	ESC-HRB	ESC-EF	GVC-WB	SD-DDH	LPC-CCR	CCC-805
1. Instream Cover	16	17	8	6	8	4	7	19	8	6	17	13
2. Embeddedness	15	17	3	4	15	2	9	19	14	11	18	12
3. Velocity / Depth Regimes	16	15	12	6	12	8	7	18	12	12	14	12
4. Sediment Deposition	17	13	4	5	9	2	9	19	14	17	18	3
5. Channel Flow	17	17	13	4	8	17	19	19	6	16	18	15
6. Channel Alteration	20	16	19	19	18	10	11	17	14	20	17	13
7. Riffle Frequency	17	12	7	1	8	5	7	16	12	7	16	15
8. Bank Stability	18	12	12	16	8	12	16	18	8	20	16	12
9. Vegetation Protection	20	18	20	18	6	12	16	19	10	18	14	12
10. Riparian Vegetative Zone	20	18	18	20	16	12	12	18	11	19	12	12
Total	176	155	116	99	108	84	113	182	109	146	160	119

Measure	MB-RC	TC-TCNP	SDR-MT	SDR-1	CC-FB	SR-WS	SMC-LCCC	CC-C	REF-SC2	REF-DLC3	REF-DC
1. Instream Cover	16	16	18	14	14	8	16	15	18	16	19
2. Embeddedness	18	16	17	6	18	7	19	5	16	17	17
3. Velocity / Depth Regimes	7	11	12	8	13	12	16	7	15	16	8
4. Sediment Deposition	16	13	12	8	16	9	18	3	15	13	18
5. Channel Flow	6	8	6	15	10	18	18	3	16	18	11
6. Channel Alteration	20	20	20	17	16	19	20	12	17	20	20
7. Riffle Frequency	8	8	14	2	17	8	14	6	19	18	18
8. Bank Stability	18	12	20	16	14	16	20	16	18	18	20
9. Vegetation Protection	18	18	20	19	14	12	6	16	14	18	20
10. Riparian Vegetative Zone	19	18	19	15	15	18	16	10	18	19	20
Total	146	140	158	120	147	127	163	93	166	173	171

Appendix B.6-2: Physical Habitat Quality Scores. May 2005.

Measure	SMR-WGR	SMR-CP	SLRR-MR	SLRR-BR	AHC-MR	AHC-ECR	ESC-HRB	ESC-EF	GVC-WB	SD-DDH	LPC-CCR	CCC-805
1. Instream Cover	16	18	12	8	12	3	3	17	15	17	16	14
2. Embeddedness	13	15	4	2	14	0	1	14	15	15	17	18
3. Velocity / Depth Regimes	18	17	16	10	13	10	6	19	13	18	15	14
4. Sediment Deposition	9	14	7	1	13	1	2	18	18	16	18	17
5. Channel Flow	19	17	17	18	11	19	18	19	16	19	16	9
6. Channel Alteration	20	17	18	19	19	15	8	19	14	19	16	13
7. Riffle Frequency	10	14	6	3	12	1	2	17	17	15	16	15
8. Bank Stability	18	10	14	6	12	6	15	12	9	18	16	8
9. Vegetation Protection	19	12	18	16	16	16	13	10	9	12	14	14
10. Riparian Vegetative Zone	20	19	18	18	14	10	11	16	8	19	14	4
Total	162	153	130	101	136	81	79	161	134	168	158	126

Measure	MB-RC	TC-TCNP	SDR-MT	SDR-1	CC-FB	SR-WS	SR-94	CC-C	TJ-DM	REF-SC2	REF-WC	REF-DC
1. Instream Cover	18	18	19	14	15	8	4	14	12	19	16	16
2. Embeddedness	18	17	17	15	18	3	3	10	7	17	17	17
3. Velocity / Depth Regimes	14	15	18	11	14	9	11	12	11	16	14	11
4. Sediment Deposition	19	15	18	13	17	13	5	9	3	17	15	14
5. Channel Flow	15	15	18	19	10	13	15	10	17	16	11	17
6. Channel Alteration	15	16	19	17	11	20	14	15	17	16	17	20
7. Riffle Frequency	16	13	16	2	15	8	3	12	4	18	16	16
8. Bank Stability	15	14	18	18	14	15	16	16	8	16	18	16
9. Vegetation Protection	16	16	18	20	10	18	18	18	10	12	16	18
10. Riparian Vegetative Zone	14	12	20	15	12	18	18	12	9	14	16	20
Total	160	151	181	144	136	125	107	128	98	161	156	165

Appendix B.7-1: Water Quality Data. October 2004.

Parameter	pH	Specific Conductance (mS/cm)	Water Temperature (C)	Chlorophyll (mg/l)	Dissolved Oxygen (mg/l)	Average Depth (In)	Average Velocity (ft/sec)	Elevation (ft above sea level)
SMR-WGR	7.8	1.224	19.1	1.0	9.85	6.0	1.6	500
SMR-CP	7.7	1.461	12.6	1.1	12.33	5.0	1.9	110
SLRR-MR	7.7	2.918	17.9	3.1	8.06	8.0	1.4	70
SLRR-BR	7.3	2.822	18.0	22.2	4.13	8.0	0.1	10
AHC-MR	7.4	2.297	17.9	2.8	9.57	1.3	0.8	360
AHC-ECR	7.9	2.341	15.8	4.9	6.75	6.0	1.9	40
ESC-HRB	8.2	1.868	18.2	6.2	4.80	7.0	1.5	630
ESC-EF	8.4	1.938	17.6	6.1	6.71	5.0	3.6	360
GVC-WB	7.9	2.442	17.6	2.6	4.61	3.0	0.9	340
SD-DDH	8.0	3.059	20.1	3.0	6.90	4.0	1.8	170
LPC-CCR	7.4	1.636	15.1	6.2	9.12	6.0	2.7	440
CCC-805	8.2	3.738	23.7	6.2	9.96	4.0	1.6	80
MB-RC	8.1	3.651	19.8	5.7	6.22	2.0	0.9	65
TC-TCNP	7.4	7.992	18.4	2.3	3.77	2.0	0.9	55
SDR-MT	7.5	6.018	19.4	2.9	3.88	3.0	0.8	180
SDR-1	7.7	3.825	21.4	5.3	5.10	5.3	2.3	10
CC-FB	7.7	4.635	20.5	2.3	7.83	3.0	1.2	220
SR-WS	7.6	3.830	16.3	6.3	7.91	7.3	1.9	40
SMC-LCCC	7.5	0.994	14.6	6.6	6.94	7.3	2.4	320
CC-C	7.2	0.906	12.8	6.8	4.32	2.0	0.4	2550
REF-SC2	8.2	1.944	14.0	2.4	11.62	4.0	3.2	440
REF-DLC3	7.4	1.655	13.7	1.9	11.65	10.0	3.1	280
REF-DC	7.1	0.363	7.7	2.3	10.45	2.0	0.5	4950

Appendix B.7-2: Water Quality Data. May 2005.

Parameter	pH	Specific Conductance (mS/cm)	Water Temperature (C)	Chlorophyll (mg/l)	Dissolved Oxygen (mg/l)	Average Depth (cm)	Average Velocity (ft/sec)	Elevation (ft above sea level)
SMR-WGR	8.4	0.952	24.6	2.0	13.48	9.3	2.8	500
SMR-CP	8.4	1.006	23.1	0.3	16.80	9.0	2.9	110
SLRR-MR	7.9	1.582	17.5	1.8	9.80	10.3	2.1	70
SLRR-BR	7.9	1.529	19.5	4.7	11.05	4.3	2.1	10
AHC-MR	7.9	1.733	18.0	3.6	9.85	3.3	2.6	360
AHC-ECR	8.0	2.622	25.0	1.3	9.43	3.7	1.6	40
ESC-HRB	8.4	1.891	29.7	2.8	13.15	6.0	0.8	630
ESC-EF	8.4	1.920	21.2	2.3	10.66	7.0	1.6	360
GVC-WB	7.9	2.038	18.9	3.1	9.22	5.0	1.2	340
SD-DDH	7.8	1.040	17.3	6.2	8.40	7.0	1.8	170
LPC-CCR	7.6	0.962	18.3	6.5	8.97	4.0	2.1	440
CCC-805	7.8	2.263	18.5	2.7	11.41	3.0	2.0	80
MB-RC	7.7	3.196	15.4	2.9	8.80	3.3	1.3	65
TC-TCNP	7.8	3.594	18.5	3.4	9.19	2.0	1.4	55
SDR-MT	8.2	1.691	18.8	4.9	10.59	8.7	1.6	180
SDR-1	7.4	1.547	20.8	8.2	7.84	5.3	1.8	10
CC-FB	7.6	2.382	22.5	0.2	10.10	3.2	1.0	220
SR-WS	7.8	3.523	19.4	10.0	8.91	5.3	1.6	40
SR-94	8.0	0.757	21.9	4.1	20.30	5.7	0.9	320
CC-C	7.6	1.190	14.6	6.1	18.01	3.3	1.0	2550
TJ-DM	7.1	1.584	17.8	4.7	8.65	4.0	1.3	25
REF-SC2	7.7	1.185	15.5	0.5	10.57	4.0	2.5	440
REF-WC	8.1	0.363	17.9	0.8	19.08	1.3	0.8	2200
REF-DC	7.7	0.178	10.7	2.2	10.87	5.0	1.4	4950

Appendix B.8-1: Index of Biotic Integrity Scores for San Diego Bioassessment Monitoring Sites. October 2004.

Monitoring Reach	Total IBI Score	IBI Rating	% CF+CG		% Non-Insect Taxa		% Tolerant Taxa		Coleoptera Taxa		Predator Taxa		% Intolerant		EPT Taxa	
			Metric score	IBI score	Metric score	IBI score	Metric score	IBI score	Metric score	IBI score	Metric score	IBI score	Metric score	IBI score	Metric score	IBI score
REF-DC	59	Very Good	39%	10	13%	8	7%	9	5	8	8	5	44%	10	16	9
REF-DLC3	50	Good	53%	10	23%	6	19%	6	4	7	8	5	26%	10	11	6
REF-SC2	48	Good	52%	10	19%	7	14%	7	5	8	6	3	23%	9	8	4
GVC-WB	21	Poor	45%	10	40%	2	24%	4	0	0	5	2	0%	0	5	3
MB-RC	21	Poor	24%	10	35%	3	26%	3	2	4	4	1	0%	0	0	0
SDR-MT	20	Poor	53%	10	37%	3	33%	2	0	0	7	4	0%	0	2	1
SMR-WGR	20	Poor	89%	2	32%	4	15%	7	0	0	5	2	1%	1	8	4
TC-TCNP	20	Poor	73%	6	21%	7	21%	5	0	0	5	2	0%	0	1	0
CCC-805	18	Poor	53%	10	44%	1	43%	0	1	2	7	4	0%	0	2	1
CC-FB	17	Poor	68%	7	23%	6	28%	3	0	0	2	0	0%	0	2	1
BVR-CB	15	Poor	98%	0	25%	6	10%	8	0	0	2	0	0%	0	3	1
ESC-EF	15	Poor	92%	2	31%	4	19%	6	0	0	3	0	0%	0	5	3
SMC-LCCC	15	Poor	94%	1	36%	3	16%	7	0	0	4	1	0%	0	5	3
SMR-CP	15	Poor	98%	0	15%	8	23%	4	0	0	3	0	0%	0	5	3
AHC-MR	13	Very Poor	51%	10	51%	0	38%	0	0	0	5	2	0%	0	2	1
SD-DDH	13	Very Poor	85%	3	39%	2	24%	4	0	0	4	1	0%	0	6	3
SLRR-BR	13	Very Poor	34%	10	35%	3	63%	0	0	0	3	0	0%	0	0	0
LPC-CCR	12	Very Poor	85%	3	35%	3	20%	5	0	0	2	0	0%	0	3	1
AHC-ECR	10	Very Poor	81%	4	45%	1	36%	1	0	0	6	3	0%	0	3	1
ESC-HRB	10	Very Poor	86%	3	49%	0	34%	1	2	4	4	1	0%	0	2	1
SDR-1	8	Very Poor	68%	7	56%	0	38%	0	0	0	4	1	0%	0	1	0
CC-C	6	Very Poor	87%	3	62%	0	38%	0	0	0	6	3	0%	0	1	0
SLRR-MR	3	Very Poor	96%	1	48%	0	40%	0	0	0	4	1	0%	0	3	1
SR-WS	1	Very Poor	99%	0	51%	0	34%	1	0	0	0	0	0%	0	1	0

Appendix B.8-2: Index of Biotic Integrity Scores for San Diego Bioassessment Monitoring Sites. May 2005.

Monitoring Reach	Total IBI Score	IBI Rating	% CF+CG		% Non-Insect Taxa		% Tolerant Taxa		Coleoptera Taxa		Predator Taxa		% Intolerant		EPT Taxa	
			Metric score	IBI score	Metric score	IBI score	Metric score	IBI score	Metric score	IBI score	Metric score	IBI score	Metric score	IBI score	Metric score	IBI score
REF-DC	56	Very Good	57%	10	15%	8	11%	8	2	4	10	7	31%	10	16	9
REF-WC	36	Fair	91%	2	0%	10	6%	9	3	5	8	5	5%	2	6	3
REF-SC2	25	Poor	90%	2	29%	5	24%	4	2	4	7	4	4%	2	7	4
SMR-CP	24	Poor	96%	1	20%	7	8%	9	1	2	5	2	0%	0	5	3
SD-DDH	17	Poor	100%	0	13%	8	13%	7	0	0	0	0	0%	0	4	2
SMR-WGR	17	Poor	99%	0	18%	7	9%	8	0	0	3	0	0%	0	4	2
TJ-DM	17	Poor	92%	2	14%	8	14%	7	0	0	2	0	0%	0	0	0
AHC-ECR	12	Very Poor	95%	1	45%	1	25%	4	1	2	6	3	0%	0	3	1
ESC-EF	12	Very Poor	99%	0	34%	4	20%	5	0	0	2	0	0%	0	5	3
CC-FB	10	Very Poor	95%	1	32%	4	38%	0	1	2	5	2	0%	0	2	1
MB-RC	10	Very Poor	98%	0	32%	4	22%	5	0	0	2	0	0%	0	3	1
CCC-805	9	Very Poor	98%	0	37%	3	25%	4	0	0	4	1	0%	0	3	1
LPC-CCR	9	Very Poor	97%	0	37%	3	23%	4	0	0	3	0	0%	0	4	2
ESC-HRB	8	Very Poor	93%	1	42%	2	30%	2	1	2	3	0	0%	0	3	1
SLRR-MR	8	Very Poor	100%	0	46%	1	18%	6	0	0	1	0	0%	0	2	1
SR-94	8	Very Poor	98%	0	35%	3	24%	4	0	0	3	0	0%	0	3	1
SDR-MT	6	Very Poor	98%	0	41%	2	30%	2	0	0	4	1	0%	0	3	1
AHC-MR	5	Very Poor	98%	0	53%	0	29%	3	0	0	4	1	0%	0	2	1
GVC-WB	5	Very Poor	94%	1	44%	1	30%	2	0	0	2	0	0%	0	3	1
SR-WS	5	Very Poor	98%	0	44%	1	28%	3	0	0	2	0	0%	0	2	1
CC-C	4	Very Poor	93%	1	51%	0	33%	2	0	0	3	0	0%	0	2	1
SDR-1	4	Very Poor	83%	4	65%	0	40%	0	0	0	2	0	0%	0	1	0
TC-TCNP	2	Very Poor	97%	0	43%	1	38%	0	0	0	3	0	0%	0	2	1
SLRR-BR	1	Very Poor	99%	0	54%	0	40%	0	0	0	2	0	0%	0	2	1