

Appendix E

Seasonal Surface Water Quality and Flow Data
for the Big Piney Creek Watershed, April and
August, 1982; February, 1983; and April, 1984

TABLE
 ALUMINUM AND MANGANESE LEVELS IN SURFACE WATERS
 OF THE
 BIG PINNEY WATERSHED

Date	Station	Aluminum, mg/l	Manganese, mg/l
3/06/84	GR-52	0.94	0.68
3/06/84	BP-81	1.61	0.62
4/27/82	BP-82	0.47	
8/24/82	BP-82	0.97	
4/26/82	BP-83	0.58	
4/29/82	BP-84	0.31	
8/25/82	BP-84	0.385	
3/06/84	BP-84	0.79	0.12
4/28/82	BP-85	0.669	
8/25/82	BP-85	0.526	
3/06/84	BP-85	0.53	0.12
4/29/82	BP-90	0.436	
8/25/82	BP-90	0.377	
4/29/82	BP-91	0.628	
8/25/82	BP-91	0.588	
4/29/82	BP-92	0.972	
8/25/82	BP-92	0.814	
4/26/82	HR-91	0.39	
4/08/76	HR-89	0.5	
3/06/84	HR-89	1.75	0.6
4/08/76	HR-90	0.6	
3/06/84	HR-90	4.53	2.17

Summary of Surface Water Quality and Flow Data - Big Piney Watershed
 April and August, 1982; February, 1983; and April, 1984

Sample Location	Date	Flow (gpm)	pH		Field Temp. (°C)	Spec. Cond. (umhos)	Method							Net Acidity (lbs/day)					
			(S.U.)	Lab (S.U.)			Orange Acidity (mg/l)	Phenolphthalein Acidity (mg/l)	Alkal. (mg/l)	Total Alkal. (mg/l)	Total Iron (mg/l)	Acidity (mg/l)	Alkal. (mg/l)		Net Acidity (mg/l)	Fe total (mg/l)	Fe ⁺² (mg/l)	SO ₄ (mg/l)	
GR-52	4/27/82	NM	4.35	4.42	10.8	115	--	--	--	--	--	--	19	0	19	0.2	0.1	32	NM
GR-52	8/24/82	1,100	3.5	4.09	18.0	182	2.5	15	0	0	1.4	13	13	0	13	0.2	0	64	172
GR-52	2/2/83	~40,000	3.75	4.33	1.3	112	NR	12.5	0	0	--	17	17	0	17	0.3	0	35	8,154
GR-52	4/3/84	13,074	4.27	4.41	7.0	52	--	--	--	--	--	17	17	0	17	0.26	0	32	2,670
GR-53	4/27/82	NM	4.05	4.30	11.5	140	--	--	--	--	--	20	20	0	20	0.6	0.2	37	NM
GR-53	8/24/82	390	3.6	4.03	18.0	175	5	25	0	0	2.1	13	13	0	13	0.2	0	63	60.9
GR-53	2/2/83	28,974	3.45	4.30	2.0	230	NR	11	NR	NR	--	16	16	0	16	0.3	0	36	5,559
GR-53	4/3/84	6,307	3.95	4.33	7.5	55	--	--	--	--	--	17	17	0	17	0.4	0	41	1,285
BP-80	4/27/82	NM	4.30	4.67	10.5	65	--	--	--	--	--	14	14	2	12	0	0	27	NM
BP-80	8/24/82	290	3.50	4.34	17.0	172	2.5	20	0	0	1.0	15	15	0	15	0.1	0	83	52
BP-80	2/2/83	10,500	3.85	4.43	3.5	145	NR	12.5	NR	NR	--	15	15	0	15	0.2	0.1	31	1,889
BP-80	4/3/84	3,129	4.12	4.42	6.2	49	--	--	--	--	--	18	18	0	18	0.26	0.04	37	676
BP-82	4/27/82	675	4.15	4.65	10.8	75	--	--	--	--	--	16	16	2	14	0.1	0.1	29	115
BP-82	8/24/82	200	3.6	4.37	17.0	425	2.5	17.5	0	0	3.2	15	15	0	15	0.3	0	67	36
BP-82	2/2/83	10,323	4.2	4.42	3.4	109	NR	12.5	0	0	--	15	15	0	15	0.3	0	40	1,857
BP-82	4/3/84	2,915	4.1	4.41	6.5	42	--	--	--	--	--	18	18	0	18	0.24	0.04	37	626
BP-83	4/26/82	350	4.10	4.47	13.0	55	--	--	--	--	--	12	12	0	12	0.5	0.2	27	50
BP-83	NOT SAMPLED																		
BP-83	2/2/83	4,759	3.7	4.39	3.4	49	NR	10	NR	NR	--	15	15	0	15	0.3	0.1	29	856
BP-83	4/3/84	1,373	4.02	4.46	7	30	--	--	--	--	--	13	13	0	13	0.34	0.04	24	214

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Field Analyses

Laboratory Analyses

Sample Location	Date	Flow (gpm)	pH		Field Temp. (°C)	Spec. Cond. (umhos)	Method							Total Iron (mg/l)	Acidity (mg/l)	Alkal. (mg/l)	Net			SO ₄ (mg/l)	Net Acidity Loading (lbs/day)
			(S.U.)	Lab (S.U.)			Orange Acidity (mg/l)	Phenolphthalein Acidity (mg/l)	Total Alkal. (mg/l)	Alkal. (mg/l)	Net Acidity (mg/l)	Fetotal Fe+2 (mg/l)									
HR-91	4/26/82	325	4.32	4.70	11.0	70	--	--	--	--	--	--	10	3	7	0	0	32	28		
HR-91	NOT SAMPLED																				
HR-91	2/2/83	5,987	4.4	4.44	3.7	310	NR	10	0	0	--	15	0	15	0.2	0.1	37	1,077			
HR-91	4/3/84	1,600	3.96	4.37	6	50	--	--	--	--	--	21	0	21	0.22	0.06	28	403			
HR-92	8/26/82	83	3.90	4.22	14	195	5	30	0	0	1.3	27	0	27	1.0	0.2	97	27			
BP-84	4/29/82	90	3.65	4.48	6.8	30	--	--	--	--	--	9	5	4	0	0	20	5			
BP-84	8/25/82	570	3.6	4.11	16.2	145	2.5	10	0	0	7.9	12	0	12	0.3	0.2	20	82.2			
BP-84	2/2/83	977	3.25	4.51	5	312	NR	10	NR	NR	--	13	1	12	0.2	0.1	28	141			
BP-84	4/3/84	~200	4.1	4.67	6	23	--	--	--	--	--	10	1	9	0.16	0	20	22			
BP-85	4/28/82	300	3.50	4.55	6.3	75	--	--	--	--	--	15	1	14	0.1	0	39	50			
BP-85	8/25/82	1,420	3.40	4.03	16.0	52	2.5	12.5	0	0	7.2	14	0	14	0.3	0.2	21	239			
BP-85	2/2/83	~2,100	3.75	4.39	4.1	300	NR	15	NR	NR	--	13	0	13	0.3	0.1	35	327			
BP-85	4/3/84	1,076	3.96	4.49	6	33	--	--	--	--	--	12	0	12	0.22	0.08	27	156			
BP-86	4/28/82	50	3.65	4.86	10.0	75	--	--	--	--	--	9	6	3	0	0	249	2			
BP-86	NOT SAMPLED																				
BP-86	2/2/83	174.5	--	4.39	--	--	--	--	--	--	--	16	0	16	0.2	0	36	33			
BP-86	4/3/84	~140	3.71	4.43	5.2	38	--	--	--	--	--	13	0	13	0.18	0	23	22			
BP-87	4/29/82	250	3.70	4.51	8.5	75	--	--	--	--	--	15	1	14	0.1	0	29	42			
BP-87	NOT SAMPLED																				
BP-87	2/2/83	1,311	3.2	4.25	3.7	171	NR	12.5	NR	NR	NR	14	0	14	0.3	0.1	37	220			
BP-87	4/3/84	690	3.83	4.47	5	35	--	--	--	--	--	12	0	12	0.18	0	26	99			

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Field Analyses

Laboratory Analyses

Sample Location	Date	Flow (gpm)	pH		Field Temp. (°c)	Spec. Cond. (umhos)	Methol							Total Iron (mg/l)	Acidity (mg/l)	Alkal. (mg/l)	Net				SO4 (mg/l)	Net Acidity Loading (lbs/day)
			(S.U.)	Lab (S.U.)			Orange Acidity (mg/l)	Phenolphthalein Acidity/Alkal. (mg/l)	Total Alkal. (mg/l)	Total Iron (mg/l)	Acidity (mg/l)	Alkal. (mg/l)	Net Acidity (mg/l)				Fetotal Fe+2 (mg/l)	SO4 (mg/l)				
BP-88	4/29/82	15	3.60	4.49	11.3	60	--	--	--	--	--	--	16	0	16	0.1	0	111	3			
BP-88	4/3/84	673	3.92	4.50	3.5	33	--	--	--	--	--	--	19	0	19	0.12	0	37	153			
BP-89	4/29/82	225	3.65	4.46	11.9	85	--	--	--	--	--	--	17	0	17	0.4	0.1	35	46			
BP-89	4/3/84	~90	4.17	4.45	3.5	30	--	--	--	--	--	--	14	0	14	0	0	23	15			
BP-90	4/29/82	50	3.90	4.70	11.1	80	--	--	--	--	--	--	10	3	7	0	0	31	4			
BP-90	8/25/82	230	3.40	4.37	16.5	60	0	11.5	0	2.5	1.0	11	0	11	0.5	0.3	24	30				
BP-90	2/1/83	~200	3.65	4.55	3.0	240	NR	7.5	NR	0	--	12	1	11	0.2	0.1	32	26				
BP-90	4/2/84	218	4.12	4.67	7.0	35	--	--	--	--	--	10	1	9	0.1	0	23	24				
BP-91	4/29/82	100	3.85	4.48	9.8	75	--	--	--	--	--	14	0	14	0	0	28	17				
BP-91	8/25/82	120	3.30	4.19	16.7	59	2.5	15	0	0	1.2	12	0	12	0.3	0.2	22	17				
BP-91	2/1/83	~90	3.70	4.33	3.5	75	NR	10	NR	NR	NR	14	0	14	0.1	0	29	15				
BP-91	NOT SAMPLED																					
BP-92	4/29/82	100	3.45	3.97	15.0	165	--	--	--	--	--	--	23	0	23	0.4	0.2	55	28			
BP-92	8/25/82	--	3.00	3.78	19.0	106	7.5	20	0	0	1.2	18	0	18	0.6	0.4	35	1.5				
BP-92	2/2/83	~39	3.3	3.96	5	115	NR	17.5	NR	NR	NR	18	0	18	0.3	0	45	65				
BP-92	NOT SAMPLED																					
BP-93	4/2/84	317	3.5	4.34	6	38	--	--	--	--	--	--	13	0	13	0.18	0	24	49			
BP-94	4/2/84	424	3.65	4.43	6.5	40	--	--	--	--	--	--	12	0	12	0.10	0	25	61			

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Sample Location	Date	Flow (gpm)	pH		Field Temp. (°c)	Spec. Cond. (umhos)	Field Analyses										Laboratory Analyses					
			Field (S.U.)	Lab (S.U.)			Methol Orange Acidity (mg/l)	Phenolphthalein Acidity (mg/l)	Total Alkal. (mg/l)	Total Alkal. (mg/l)	Total Iron (mg/l)	Acidity (mg/l)	Alkal. (mg/l)	Net Acidity (mg/l)	Net Fe total (mg/l)	Fe +2 (mg/l)	SO4 (mg/l)	Net Acidity Loading (lbs/day)				
S-1	4/29/82	5	5.05	5.65	NA	30	--	--	--	--	--	--	4	6	-2	0	0	16	0			
S-1	NOT SAMPLED																					
S-1	2/2/83	15.3	4.1	4.94	4	175	0	7.5	0	2.5	--	--	6	1	5	0.2	0.1	23	0.92			
S-1	NOT SAMPLED																					
S-8	4/29/82	10	3.70	3.90	17.0	190	--	--	--	--	--	--	25	0	25	0.5	0.4	59	3			
S-8	8/26/82	3	3.00	3.75	17.0	115	7.5	20	0	0	1.1	--	17	0	17	0.5	0	42	0.6			
S-8	2/2/83	75	3.25	4.02	6	170	5	20	NR	NR	--	--	14	0	14	0.2	0.1	30	12.6			
S-8	NOT SAMPLED																					
S-12	4/29/82	5	3.85	4.03	17.5	135	--	--	--	--	--	--	20	0	20	1.1	0.3	40	1			
S-13	4/29/82	25	4.20	4.80	17.8	55	--	--	--	--	--	--	10	4	6	0.5	0.2	20	2			
S-13	8/26/82	10	3.80	4.97	16.0	85	0	7.5	0	2.5	2.1	--	5	2	3	0.3	0	20	0.4			
S-13	2/2/83	88	3.75	4.67	3	30	2.5	7.5	0	2.5	--	--	11	1	10	0.2	0	24	10.6			
S-13	NOT SAMPLED																					
S-14	4/29/82	15	3.60	3.94	15.2	145	--	--	--	--	--	--	18	0	18	0	0	40	3			
S-14	8/26/82	~5	2.90	3.71	15.5	118	7.5	15	0	0	0.5	--	16	0	16	0.1	0	40	1			
S-14	2/2/83	24	3.65	3.90	4	230	5	14	0	0	NR	--	16	0	16	0.6	0.1	52	4.6			
S-14	NOT SAMPLED																					
S-15	4/30/82	12	3.95	4.95	7.2	35	--	--	--	--	--	--	10	4	6	0	0	10	1			
S-15	8/26/82	~2	4.00	4.74	14.0	27	0	5	0	2.5	0.8	--	6	1	5	0.2	0.1	21	0.1			
S-15	2/2/83	--	--	4.62	--	--	--	--	--	--	--	--	10	1	9	0.1	0	24	--			
S-15	NOT SAMPLED																					

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Sample Location	Date	Flow (gpm)	pH		Field Temp. (°C)	Spec. Cond. (umhos)	Field Analyses							Laboratory Analyses						
			(S.U.)	(S.U.)			Method Orange Acidity (mg/l)	Phenolphthalein Acidity (mg/l)	Total Alkal. (mg/l)	Total Iron (mg/l)	Acidity (mg/l)	Alkal. (mg/l)	Net Acidity (mg/l)	Fe total (mg/l)	Fe+2 (mg/l)	SO ₄ (mg/l)	Net Acidity Loading (lbs/day)			
S-24	4/30/82	32	4.35	5.01	8.5	75	--	--	--	--	--	7	5	2	0	0	26	1		
S-24	8/25/82	23	4.60	4.77	18.0	60	0	6.5	0	2.5	4.2	9	1	8	1.8	1.1	22	2.2		
S-24	2/2/83	--	--	4.94	--	--	--	--	--	--	--	7	1	6	0.2	0.1	31	--		
S-24	4/2/84	60	4.60	5.00	8.0	32	--	--	--	--	--	7	2	5	0.26	0	24	--		
S-29	4/30/82	10	3.55	3.99	12.5	160	--	--	--	--	--	31	0	31	0.5	0.2	48	4		
S-29	8/25/82	3	3.30	3.72	19.0	113	10	27.5	0	0	1.2	23	0	23	0.3	0	48	0.8		
S-29	2/2/83	--	--	4.17	--	--	--	--	--	--	--	16	0	16	0.5	0.1	40	--		
S-29	NOT SAMPLED																			
S-31	4/30/82	20	4.15	4.46	11.0	115	--	--	--	--	--	16	0	16	0.2	0.2	47	4		
S-31	4/2/84	200	3.95	4.41	7.0	38	--	--	--	--	--	13	0	13	0.16	0.02	25	31		
S-36	8/25/82	~3	5.0	4.8	19.8	53	0	10	0	5	7.5	7	1	6	5.8	0	19	0.2		
S-36	2/2/83	--	--	4.74	--	--	--	--	--	--	--	9	1	8	0.3	0.1	29	--		
SP-1	8/26/82	--	4.5	5.54	--	23	0	2.5	0	6.5	.2	2	7	-5	0	0	13	--		
S-102	8/26/82	--	--	4.81	--	--	0	7.5	0	1.25	0	4	2	2	0	0	28	--		

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