

SCRA SITE 42 AMD TREATMENT SYSTEM WATER QUALITY (6/4/2013 SNAPSHOT MEASUREMENTS)

Location	Flow (gpm)	pH	Temp (°C)	Cond (µS/cm)	ORP (mV)	D.O. (mg/L)	Hot Acidity	Alkalinity	Chloride	Sulfate	Fe ²⁺	Total Fe	Dissolved Fe	Total Al	Dissolved Al	Total Mn	Dissolved Mn	Dissolved Ca	Dissolved Mg	Dissolved K	Dissolved Na	T.I.C.
Raw AMD (US End VFW)	N.M.	5.40	12.4	300	-27	0.0	-23	26	<2.0	83.5	9.5	14.6	10.2	0.11	<0.1	1.5	1.5	24	11	0.78	1.8	15.7
VFW Outfall (Pipes)	294	6.2	12	393	-54	0	-122.7	117	<2.0	74.3	8	10.3	8.1	<0.11	<0.1	1	0.97	56.4	11.9	1.2	2.1	30.3
Settling Pond Outfall	242	5.9	13.6	257	-5	5.6	-31.6	34		80.5		6.3	<0.06	<0.11	<0.1	1.5						
Vegetated Channel	N.M.	6.63	14.2	251	-16	7.3																
Final System Outfall	203	6.12	19.4	256	-17	8.9	-27.1	34		86.5		1.3	<0.06	<0.11	<0.1	1.1	0.98					

*Total estimated flow from VFW, water was discharging through the spillway and outlet pipes, flow measured from the outlet pipes (2) was 108 gpm, flow measured at 186 gpm over spillway for a total of 294 gpm

Site 42 Raw AMD Historic Data & 6/4/13 Data

Date	Temp_C	Cond_µS_cm	DO_ppm	pH	ORP_mV	Acidity_mg/l	Al_ppm	Ca_ppm	Fe_ppm	Mn_ppm	Sulfate_ppm	Alkalinity_mg/l	Flow_gpm	Fe2+_ppm
6/17/1997				6.1		20.2	<0.14		8.4	1.5	98	12.2	369	8
7/15/1997				5.7		38	0.60		21.3	3.9	152	7.6	403	17
8/19/1997				5.2		52	0.30		20.9	3.6	154	3.6	196	11
9/17/1997				5.2		64	0.30		29.0	3.3	162	7.2	279	21
10/15/1997				5.6		92	<0.20		27.4	2.9	149	15	193	23
11/17/1997				5.6		60	<0.20		25.9	2.6	124	15	225	20
1/12/1998				5.4		46	0.80		33.0	2.7	184	12	618	25
2/19/1998				5.7		28	0.30		26.8	2.4	44	19.2	464	22
3/12/1998				5.7		30	0.80		24.9	2.5	168	18.2	566	21
4/14/1998				5.7		24	0.70		22.1	2.1	125	16.6	647	18
5/18/1998				5.7		30	0.60		21.6	1.8	124	16.2		17
7/15/1999	10.32		1.41	5.43									179.5	
8/4/1999	10.29		1.4	5.16		50			6.7			7.8	179.5	
3/23/2000	13.69	437	2.75	5.6		9.5	<0.50		11.5	1.8	100	15.8	476	12.41
4/20/2000	20.64	470	1.72	6.3		10.5	<0.50		22.7	1.8	79	11.6	375	10.1
5/13/2000	12.48	404	1.54	5.42		20	<0.50		18.5	1.9	79	11.6	90	12
6/20/2000	13.5	401	1.57	5.22		6.3	<0.50			1.9	99	15.8		10
7/19/2000	10.3	358	1.1	5.56		<1	<0.50			1.95	90	12.6		9.4
8/17/2000	10.3	376	1.6	5.66		20	<0.50			2	149	22.1		13.4
12/3/2000	8.2	449		5.4		<1	<0.50			1.9	57	27.5		9.2
3/20/2001	11.69	363	7.43	6.59		<1	<0.50			1.8	81	36		12.7
6/20/2001	10.32	297	1.29	5.76		<1	<0.50			1.9	73	30		10.7
7/24/2002									15.4					
6/24/2008						-1	<0.50	26.1	8.5	1.8	110			
7/17/2008						<1	<0.50	26.6	7.7	1.8	100			
6/17/2010	14.43	281	10.25	5.15	81	-5	<0.50	25.9	11.5	1.8	110	22		
11/15/2011	10.37	269	6.3	5.1	160	2	<0.50	22.1	12.5	1.6	90	26		
1997-2011 AVERAGES	12.04	373.18	3.20	5.48	120.5	23.90	0.18	25.18	18.82	2.22	112.5	16.6	350.7	15.15
6/4/2013	12.4	300	0.0	5.40	-27	-23	0.11	24	14.6	1.5	83.5	26		10.2

Site 42 VFW Outfall Historic Data & 6/4/13 Data

Date	Temp_C	Cond_μS_cm	DO_ppm	pH	ORP_mV	Acidity_mg/l	Al_ppm	Ca_ppm	Fe_ppm	Mn_ppm	Sulfate_ppm	Alkalinity_mg/l	Flow_gpm	Fe2+_ppm
3/23/2000	9.73	618	<0.03	5.95		<1	<0.50		5.2	1.5	100	84	246	4.97
4/20/2000	10.74	490	0.39	5.76		<1	<0.50		8.47	1.9	100	84	370	
5/13/2000	10.93	500	<0.30	5.98		<1	<0.50		12.1	1.9	79	97.7		10.7
6/20/2000	11.34	488	<0.30	5.44		<1	<0.50		13.2	2.0	90	85.1		12.0
7/19/2000	11.51	429	0.37	6.19		<1	<0.50		11.0	1.98	80	121		9.2
8/17/2000	12.17	458	0.55	6.28		<1	<0.50			2.2	129	92.4		11.3
12/3/2000	6.96	550	2.53	6.2		<1	<0.50		8.3	2.0		89.1		7.8
3/20/2001	9.22	430	2.39	6.56		<1	<0.50		4.1	0.98	77	93		2.63
6/20/2001	12.11	469	<0.30	6.38		<1	<0.50		10.5	2.4	75	114		7.68
11/1/2005	9.00	395	3.54	6.61		-49.9		56	5.2	2.2	86	67	76	7.13
Early 2008	9.48	554	2.86	5.90									7.4	
2000-2008 AVERAGES	10.29	489.18	1.80	6.11		-49.90	<0.50	56.00	8.67	1.91	90.67	92.73	174.85	8.16
6/4/2013	12.00	393	0.00	6.20	-54	-122.7	<0.11	56.4	10.3	0.97	74.3	117	108	8.1

Site 42 Final Outfall Historic Data & 6/4/13 Data

Date	Temp_C	Cond_μS_cm	DO_ppm	pH	ORP_mV	Acidity_mg/l	Al_ppm	Ca_ppm	Fe_ppm	Mn_ppm	Sulfate_ppm	Alkalinity_mg/l	Flow_gpm	Fe2+_ppm
3/23/2000	12.2	294	7.53	5.57		<1	<0.50		1.2	0.98	67	33.6	476	0.08
4/20/2000	12.11	427	5.6	5.94		<1	<0.50		2.1	1.9	89	58	375	10.1
5/13/2000	21.69	431	7.97	5.84		<1	<0.50		2	1.7	89	68.3	90	<0.04
6/20/2000	20.42	439	7.75	6.08		<1	<0.50		2.5	1.6	90	64.1		0.16
7/19/2000	23.7	369	8.47	6.77		<1	<0.50		1.52	1.32	90	73.5		<0.04
8/17/2000	19.96	430	11.76	6.67		<1			0.97					
12/3/2000	4.09	529	10.72	6.17		<1	<0.50		1.5	1.3		88		<0.04
3/20/2001	7.68	400	12.75	7.02		<1	<0.50		1.3	0.78	64	90		<0.04
6/20/2001	24.02	430	10.27	7.07		<1	<0.50		0.53	1.7	77	100		0.09
7/24/2002									3.19					
11/1/2005	9.11	322	10.76	6.93		-31.1		42.0	0.6	1.3	71	51	151	0.05
4/29/2008	13.08	343	10.94	6.20				30.0	2.8	1.4		13.1	292	0.5
6/24/2008						-27	<0.50	35.8	1.2	1.2	110			
7/17/2008						-11	<0.50	40.1	0.77	1	100			
6/17/2010	17.32	262	9.84	5.84	69.6	-20	<0.50	32.3	1.1	1.1	80	37		
11/15/2011	10.23	250	11.90	5.48	189	0	<0.50	24.4	4.2	1.4	60	22		
2000-2011 AVERAGES	15.05	378.92	9.71	6.00	129.3	-6.36	<0.50	34.10	1.72	1.33	82.3	58.2	277	0.10
6/4/2013	19.4	256	8.90	6.12	-17	-27	<0.11		1.3	1.1	86.5	34	203	<0.06

The 4/20/00 ferrous iron result (10.1 mg/L) is suspect since it dramatically exceeds the total iron result (2.1 mg/L)

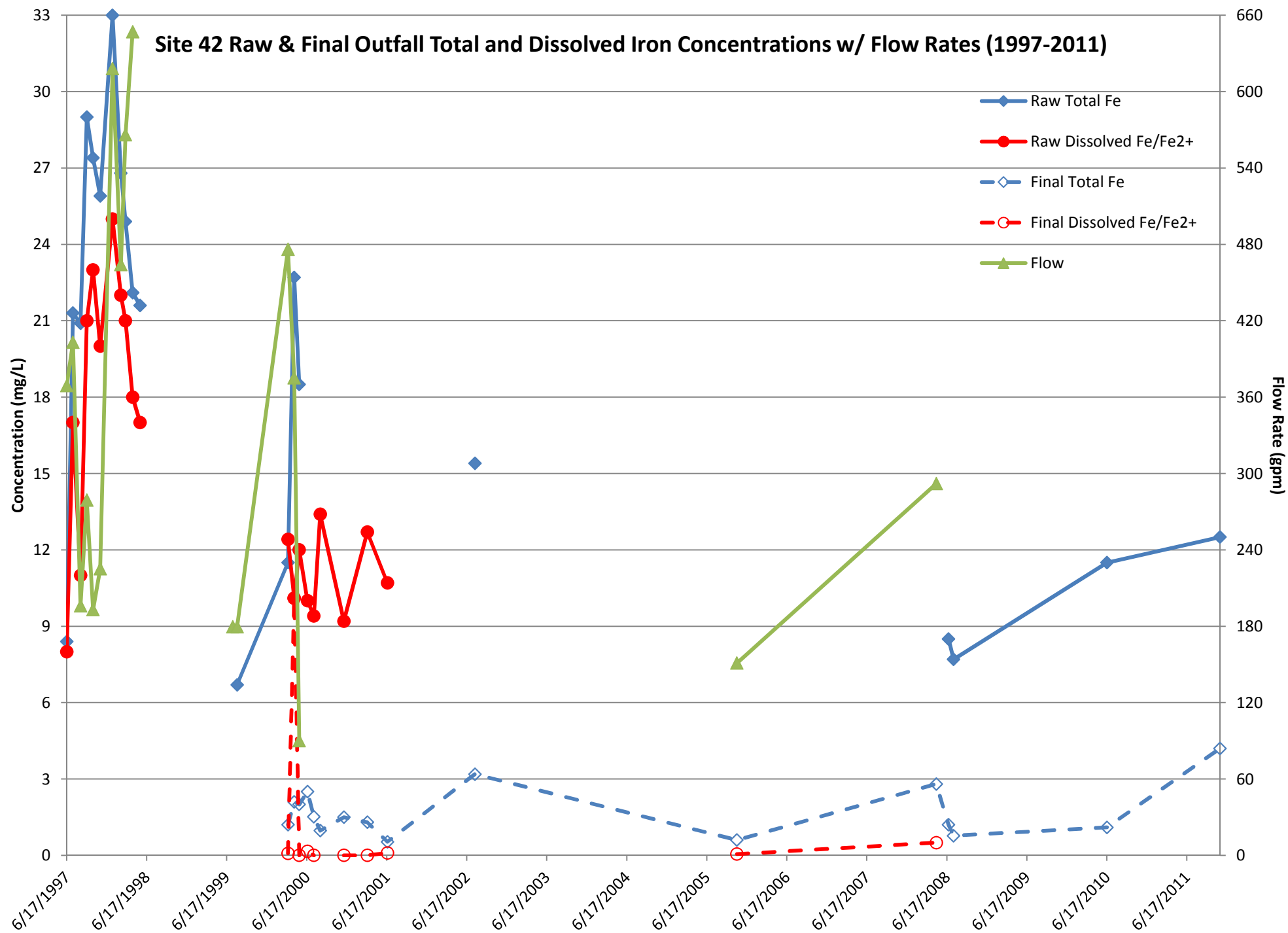
Site 42 - Carbon Run Upstream of System Outfall Historic Data & 6/4/13 Data (CR2)

Date	Temp_C	Cond_μS_cm	DO_ppm	pH	ORP_mV	Acidity_mg/l	Al_ppm	Ca_ppm	Fe_ppm	Mn_ppm	Sulfate_ppm	Alkalinity_mg/l	Flow_gpm	Fe2+_ppm
6/17/1997				6.00		9	0.1		0.5	0.7	77	6	78	
7/15/1997				6.10		0	0.2		0.5	0.6	71	8.6	14	
8/19/1997				6.30		2.6	0.2		1	0.6	47	11.2	1	
9/17/1997				6.10		2	0.2		1.7	0.7	40	13	34	
10/15/1997				6.40		3.6	0.2		0.8	0.7	48	17.4	15	
11/17/1997				6.10		8	0.2		1.5	0.8	34	7	161	
1/12/1998				5.10		9.4	0.5		0.9	0.8	34	2.8	564	
2/19/1998				4.80		10	1.1		0.7	0.8	28	2	1115	
3/12/1998				4.70		24	2.5		0.9	1.4	53	1.8	572	
4/14/1998				4.80		17.6	1.9		0.7	1.2	45	2	369	
5/18/1998				4.70		12.6	1.6		0.6	1.6	84	2	N.M.	
5/29/1998	18.5	190	8.66	4.94		3.47	0.51		0.63	1.4	52	1.0	136	
7/2/1998	15.5	140	9.48	6.56		1.5	0.12		1.25	1.15	38	7.4	53	
3/23/2000	8.67	121	9.83	4.73		17.9	0.8		0.33	0.81	24.5	3.2	898	
4/20/2000	12.57	157	8.50	4.38		20	1		0.68	0.87	48	3		
5/13/2000	16.8	156	8.00	4.9		15.8	0.5		0.94	1.2	31.5	3.7		0.66
6/20/2000	15.9	169	7.60	5.84		2.1	<0.50		1.8	1.1	28	8.4		1.4
7/19/2000	17.07	138	8.26	6.15		<1	<0.50		1.87	1.1	36	12.6		1.87
8/17/2000	16.93	150	6.04	6.23		<1	<0.50		1.72	0.99	99	22.1		0.9
12/3/2000	1.13	152	9.21	6.26		<1	<0.50		1.6	0.8		23.1		1.3
3/20/2001	6.37	97	12.43	5.86		7.2	<0.50		1.2	0.88	13.5	6		0.98
6/20/2001	18.97	151	8.24	6.55		<1	<0.50		1.5	0.89	17	22.5		1.1
11/1/2005	9.2	132	9.73	6.33		-1		14.0		1.2	25	18		2.3
11/15/2011	10.67	137	12.00	5.65	149	10	<0.50	11.00	1.40	1.0	52	10		
1997-2011 AVERAGES	12.94	145.38	9.08	5.25	149.0	7.32	0.51	12.50	1.07	0.97	44.6	9.0	308	1.31
6/4/2013	15.72	112	8.00	5.86	-12	-10.8	<0.1		0.67	0.5	37	10	29	0.27

Site 42 - Carbon Run Downstream of Site 42 (Raw-Historic) & System Outfall 6/4/13 Data (CR3)

Date	Temp_C	Cond_μS_cm	DO_ppm	pH	ORP_mV	Acidity_mg/l	Al_ppm	Ca_ppm	Fe_ppm	Mn_ppm	Sulfate_ppm	Alkalinity_mg/l	Flow_gpm	Fe2+_ppm
5/29/1998	13.5	260	9.42	6.05		0.42	0.25		9.60	1.86	90	6.09	508	
7/2/1998	12.5	250	8.62	6.35		13.2			12.00	1.97	85	23.1	385	
3/23/2000	9.45	172	9.60	5.81		<1	<0.50		0.55	0.64	30	11.6	2668	
4/20/2000	12.87	255	8.21	6.22		<1	<0.50		1.00	1.00	48	33		
5/13/2000	18.9	252	7.89	6.15		<1	<0.50		0.95	0.97	48	32.6		0.15
6/20/2000	18.98	299	8.15	6.29		<1	<0.50		1.60	0.94	61	38.9		0.18
7/19/2000	21.59	273	8.66	6.8		<1	<0.50		0.73	0.84	48	73.5		0.14
8/17/2000	20.04	342	9.08	6.87		<1	<0.50		0.67	0.82	85	66.2		0.05
12/3/2000	2.83	417	11.50	6.1		<1	<0.50		0.79	0.80		57.2		0.13
3/20/2001	6.61	214	12.86	6.65		<1	<0.50		0.78	0.48	36	31.2		0.26
6/20/2001	22.07	337	9.96	7.19		<1	<0.50		0.46	1.10	60	75		0.21
11/1/2005	9.64	235	10.57	7.06		-14.9		42		0.90	43	32		0.40
1998-2005 AVERAGES	14.08	275.50	9.54	6.28	N/A	-0.11	0.03	42	2.65	1.03	57.6	40.0	1187	0.19
6/4/2013	17.8	194	8.54	6.36	-19	-20.8	<0.11		0.91	0.65	60	31.0	414	<0.06

Site 42 Raw & Final Outfall Total and Dissolved Iron Concentrations w/ Flow Rates (1997-2011)



Site 42 VFW Outfall Historic Water Quality Data Comparison - 2000 to 2008

