Chollas Creek

STATION	METHOD	PARAMETER	UNITS	SAMPLE DATE 11/8/98	1/25/99	3/15/99
		GRAB SAMPLES				
		GENERAL/PHYSICAL/ORGANIC				
SD8		TEMPERATURE	C	NM		
SD8		pH	UNITS	6.67	6.65	6.25
SD8	EPA 413.2	OIL AND GREASE	MG/L	1.29	1.56	0.95
SD8	SM 2510-B	ELECTRICAL CONDUCTIVITY	UMHOS/CM	286	270	215
		BACTERIOLOGICAL				
SD8	9221B/MMO-MUG	TOTAL COLIFORM	MPN/100ML	> 241900	298700	> 2419000
SD8	9221E/MMO-MUG	FECAL COLIFORM	MPN/100ML	> 1600	> 1600	> 1600
SD8	9230	FECAL STREPTOCOCCI	MPN/100ML	30	> 1600	240
		COMPOSITE SAMPLES				
		INORGANIC - WET CHEM				
SD8	SM 5210-B	BOD	MG/L	19.0	6.0	11.0
SD8	SM 5220-C	CHEMICAL OXYGEN DEMAND	MG/L	59.0	41.0	85.0
SD8	SM 2340-B	TOTAL HARDNESS	MG/L	77.0	42.5	90.8
SD8	SM 5540-C	SURFACTANTS (MBAS)	MG/L	0.48	0.19	0.07
SD8	SM 4500 NH_3-C	AMMONIA AS NITROGEN	MG/L	1.0	0.78	1.06
SD8	SM 4500 NO_3-E	NITRATE-N	MG/L	1.1	0.98	0.44
SD8	SM 4500 NO_2-B	NITRITE-N	MG/L	0.06	0.12	0.14
SD8	SM 4500 P-E	DISSOLVED PHOSPHOROUS	MG/L	1.07	0.27	0.22
SD8	SM 4500 P-E	TOTAL PHOSPHORUS	MG/L	1.28	0.30	0.17
SD8	SM 4500 H-B	pH	UNITS	7.19	6.98	7.00
SD8	SM 2540-C	TOTAL DISSOLVED SOLIDS	MG/L	249	125	222
SD8	SM 4500 NH_3-C	TOTAL KJELDAHL NITROGEN	MG/L	0.44	1.25	3.61
SD8	SM 2540-D	TOTAL SUSPENDED SOLIDS	MG/L	7.58	280	159
SD8	SM 2130 B	TURBIDITY	NTU	69.0	38.0	21.0
		INORGANIC - METALS				
SD8	EPA 200.7	ARSENIC	MG/L	0.006	0.0018	0.003
SD8	EPA 200.7	CADMIUM	MG/L	0.002	< 0.00025	< 0.00025
SD8	EPA 200.7	CHROMIUM	MG/L	< 0.005	0.015	0.035
SD8	EPA 200.7	COPPER	MG/L	0.006	< 0.005	0.015
SD8	EPA 200.7	NICKEL	MG/L	0.04	0.028	0.016
SD8	EPA 200.7	LEAD	MG/L	< 0.001	0.007	0.082
SD8	EPA 200.7	ANTIMONY	MG/L	< 0.0015	< 0.0015	< 0.0015
SD8	EPA 200.7	SELENIUM	MG/L	0.002	< 0.001	< 0.001
SD8	EPA 200.7	ZINC	MG/L	0.03	0.048	0.21
		ORGANOPHOSPHATE PESTICIDES				
SD8	EPA 8141	DIAZINON	UG/L	0.46	0.46	0.53
SD8	EPA 8141	CHLORPYRIFOS	UG/L	0.10	--	< 0.50

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Table 5-1
CONVENTIONAL, BIOLOGICAL AND ORGANIC COMPOUNDS AT MASS LOADING STATIONS (AH1, SD5, SD8, SD13, SV1), 1999/2000

Parameter	Units	AH1			SV1			SD5			SD8			SD13		
		1/25/00	2/20/00	3/5/00	1/25/00	3/5/00	4/17/00	2/12/00	2/20/00	3/5/00	2/12/00	2/20/00	3/5/00	2/12/00	2/20/00	3/5/00
Grab Samples General/Physical/Organic																
Field pH	units	8.3	7.7	8.0	8.3	8.6	--	7.6	7.7	8.1	7.9	8.6	8.3	8.3	8.4	9.0
Oil and Grease	mg/l	3.24	3.54	2.28	2.98	2.54	2.10	4.16	1.56	2.96	1.92	2.04	1.48	1.76	1.76	5.60
Electrical Conductivity	umhos/cm	2160	1172	1194	463	312	120	746	823	792	186	187	185	118	107	98.0
Bacteriological																
Total Coliform	mpn/100ml	>1600	>1600	300	--	>1600	300	240	>1600	900	500	>1600	>1600	>1600	>1600	>1600
Fecal Coliform	mpn/100ml	>1600	>1600	<2.0	--	>1600	240	<2.0	>1600	<2.0	<2.0	>1600	>1600	>1600	>1600	>1600
Fecal Streptococci	mpn/100ml	>1600	>1600	<2.0	--	>1600	23.0	<2.0	>1600	<2.0	<2.0	>1600	>1600	<2.0	>1600	>1600
Composite Samples Inorganic - Wet Chemistry																
Laboratory pH	units	7.50	7.30	7.51	6.73	6.75	7.06	7.50	7.10	7.50	7.52	6.90	7.20	7.50	7.02	7.03
Biochemical Oxygen Demand	mg/l	6.00	2.98	6.60	17.7	3.30	3.00	11.7	2.38	5.70	7.80	2.54	6.10	7.60	5.25	5.00
Chemical Oxygen Demand	mg/l	70	66	41	141	28	42	74	60	36	41	104	57	50	48	35
Nitrate - nitrogen	mg/l	1.60	1.42	1.58	3.50	2.33	2.33	3.30	0.60	2.30	3.22	1.04	3.10	2.67	1.24	2.32
Nitrite - nitrogen	mg/l	0.057	<0.050	<0.050	0.280	<0.050	0.070	0.065	<0.050	<0.050	0.086	<0.050	<0.050	0.064	<0.050	<0.050
Ammonia as Nitrogen	mg/l	0.40	<0.10	0.11	3.6	0.29	1.21	1.57	<0.10	<0.10	1.65	<0.10	0.21	1.28	0.11	<0.10
Total Kjeldahl Nitrogen	mg/l	0.85	4.02	2.11	0.28	0.52	0.80	2.10	0.77	1.83	2.98	3.10	2.36	3.70	2.26	2.61
Dissolved Phosphorous	mg/l	0.12	0.22	<0.01	0.23	<0.01	<0.01	<0.01	0.13	<0.01	0.33	0.26	0.22	0.45	0.32	0.18
Total Phosphorous	mg/l	0.16	1.04	0.74	0.21	0.31	0.06	0.21	0.34	0.40	0.46	0.33	0.60	0.51	0.39	0.20
Total Hardness	mg/l CaCO3	52.2	155	35.3	44.6	21.0	26.0	216	126	105	40.9	35.1	45.5	44.3	35.3	25.0
Total Dissolved Solids	mg/l	1356	335	362	372	69	133	279	304	302	120	111	140	132	116	117
Total Suspended Solids	mg/l	65	134	286	53	174	34	478	80	87	457	62	200	45	39	42
Turbidity	ntu	22	52	58	30	25	13	17	63	60	50	27	38	18	32	35
Surfactants (MBAS)	mg/l	0.33	0.21	0.08	1.49	0.13	0.60	0.48	0.24	0.20	0.35	0.22	0.13	0.47	0.44	0.14
Organophosphate Pesticides																
Diazinon	µg/l	<0.50	0.47**	0.29	<0.50	<0.05	<0.50	0.30*	0.39**	0.18	0.27*	0.35**	0.20**	0.43*	0.48**	.08
Chlorpyrifos	µg/l	<0.50	<0.50	<0.05	<0.50	<0.05	<0.50	<0.50	<0.50	<0.05	<0.50	<0.50	0.04*	<0.50	<0.50	<0.05

Asterisk (*) indicates an estimated value that is below quantification limit. Double asterisk (**) indicates the percent difference between primary and confirmation columns is greater than 40%.

Table 5-2
DISSOLVED METAL, TOTAL METAL, AND HARDNESS DATA SUMMARY — MASS LOADING STATIONS (AH1, SD5, SD8, SD13, SV1), 1999/2000

	AH1			SV1			SD5			SD8			SD13		
PARAMETER	1/25/00	2/20/00	3/5/00	1/25/00	3/5/00	4/17/00	2/12/00	2/20/00	3/5/00	2/12/00	2/20/00	3/5/00	2/12/00	2/20/00	3/5/00
TOTAL HARDNESS (mg/l $CaCO_3$)	52.2	155	35.3	44.6	21.0	26.0	216	126	105	40.9	35.1	45.5	44.3	35.3	25.0
TOTAL METALS (µg/l)															
ANTIMONY	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
ARSENIC	<1.0	18.0	7.0	<1.0	<1.0	<1.0	<1.0	6.0	9.0	<1.0	7.0	5.0	<1.0	5.0	3.0
CADMIUM	<0.25	1.0	0.25	<0.25	<0.25	<0.25	<0.25	1.0	<0.25	<0.25	2.0	<0.25	2.0	1.0	<0.25
CHROMIUM	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
COPPER	<5.0	54.0	20.0	40.0	10.0	<5.0	36.0	17.0	<5.0	29.0	16.0	14.0	33.0	17.0	<5.0
LEAD	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	27.0	<1.0	<1.0	15.0	<1.0	<1.0	15.0	<1.0	<1.0
NICKEL	<5.0	50.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SELENIUM	<1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
ZINC	10.0	110.0	50.0	110.0	80.0	110.0	160.0	12.0	50.0	96.0	50.0	80.0	110.0	94.0	60.0
DISSOLVED METALS (µg/l)															
ANTIMONY	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
ARSENIC	<1.0	11.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.0	<1.0	1.0	4.0	<1.0
CADMIUM	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
CHROMIUM	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
COPPER	<5.0	<5.0	<5.0	38.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
LEAD	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
NICKEL	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SELENIUM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
ZINC	10.0	<1.0	5.0	70.0	9.0	40.0	16.0	12.0	<1.0	19.0	28.0	8.0	19.0	53.0	9.0

Table 5-2
TOTAL METAL AND HARDNESS DATA SUMMARY — MASS LOADING STATIONS (AH1, SD5, SD8, SD13, SV1), 1998/99

Metals Results 1997/98		AH1			SD5			SD8			SD13			SV1		
		11/8/98	1/31/99	3/15/99	11/8/98	1/25/99	3/15/99	11/8/98	1/25/99	3/15/99	11/8/98	1/25/99	3/15/99	11/8/98	1/25/99	3/15/99
Arsenic	mg/l	0.008	<0.001	<0.001	0.004	0.0015	0.002	0.006	0.0018	0.003	<0.001	<0.001	0.006	0.006	0.0012	0.002
Cadmium	mg/l	0.007	<0.00025	<0.00025	0.004	<0.00025	<0.00025	0.002	<0.00025	<0.00025	0.0069	<0.00025	<0.00025	0.016	<0.00025	<0.00025
Chromium	mg/l	<0.005	<0.005	0.12	<0.005	0.009	0.056	<0.005	0.015	0.035	<0.005	0.019	0.07	<0.005	0.023	0.02
Copper	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	0.015	<0.005	<0.005	0.10	<0.005	<0.005	0.022
Nickel	mg/l	0.03	<0.005	0.01	0.02	<0.005	0.009	0.04	0.028	0.016	0.03	0.048	0.029	0.006	0.088	0.018
Lead	mg/l	<0.001	<0.001	0.0017	0.04	0.003	0.023	<0.001	0.007	0.082	0.009	0.006	0.145	0.01	0.009	0.039
Antimony	mg/l	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	0.003	0.0019	<0.0015	<0.0015	<0.0015	<0.0015
Selenium	mg/l	<0.001	<0.001	<0.001	0.004	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.005	<0.001	<0.001
Zinc	mg/l	0.03	0.194	0.035	<0.025	<0.025	0.071	0.03	0.048	0.21	0.06	0.036	0.51	<0.025	<0.025	0.15
Total hardness	mg/l	137	365	568	148	218	277	77	42.5	90.8	32.9	24.5	130	151	41.0	102

Table 5-1
CONVENTIONAL, BIOLOGICAL AND ORGANIC COMPOUNDS AT MASS LOADING STATIONS (AH1, SD5, SD8, SD13, SV1), 1998/99

Mass Loading Stations		AH1			SD5			SD8			SD13			SV1		
Conventional/Biological/ Organic Constituents	Units	11/8/98	1/31/99	3/15/99	11/8/98	1/25/99	3/15/99	11/8/98	1/25/99	3/15/99	11/28/98	1/25/99	3/15/99	11/8/98	1/25/99	3/15/
Laboratory pH	pH units	7.58	7.95	8.47	7.55	7.39	7.99	7.19	6.98	7.00	6.88	6.66	6.46	7.63	7.36	7.1
Electrical conductivity	µmhos/cm	652	1560	2270	6070	629	542	286	270	215	451	221	136	2.03	-	141
Total hardness	mg/l	137	365	568	148	218	277	77	42.5	90.8	32.9	24.5	130	151	41.0	102
Total suspended solids	mg/l	979	35.0	5.0	913	540	55.0	7.58	280	159	<1.0	164	372	349	276	116
Total dissolved solids	mg/l	853	892	1611	1492	563	660	249	125	222	111	97.0	407	1624	125	249
Turbidity	NTU	72.0	8.0	14.0	84.0	450	17.0	69	38.0	21.0	10.0	22.0	68.0	22.0	40.0	26.0
Biochemical oxygen demand	mg/l	20	<3.0	5.25	30.0	5.0	9.0	19.0	6.0	11.0	<3.0	<3.0	24.0	37.0	4.0	11.0
Chemical oxygen demand	mg/l	34.0	<5.0	21.0	61.0	33.0	33.0	59.0	41.0	85.0	38	32	160	39.0	19.0	59.0
Total coliform	MPN/100ml	>241900	8130	197000	>241900	125900	613000	>241900	298700	>2419000	344800	307600	>2419000	141360	-	9800
Fecal coliform	MPN/100ml	>1600	240	>1600	>1600	>1600	>1600	>1600	>1600	>1600	>1600	>1600	>1600	>1600	-	>160
Fecal streptococci	MPN/100ml	50	8	130	<1	>1600	240	30	>1600	240	240	>1600	240	30	-	130
Oil and grease	mg/l	0.67	<0.5	0.6	0.7	<0.5	<0.5	1.29	1.56	0.95	4.6	0.9	<0.5	1.11	-	<0.5
Surfactants (MBAS)	mg/l	0.25	0.07	<0.05	0.51	0.08	<0.05	0.48	0.19	0.07	0.15	0.12	0.17	0.21	0.19	0.16
Total Kjeldahl nitrogen	mg/l	<0.01	0.44	2.8	0.12	2.93	1.85	0.44	1.25	3.61	2.10	0.94	5.62	<0.01	0.16	1.70
Nitrate-nitrogen	mg/l	2.1	0.86	1.10	0.52	0.70	0.53	1.1	0.98	0.44	1.70	1.10	0.45	1.96	0.93	0.98
Nitrite – nitrogen	mg/l	<0.05	<0.05	<0.05	0.10	<0.05	0.05	0.06	0.12	0.14	0.19	0.07	<0.05	0.12	0.07	<0.05
Ammonia as nitrogen	mg/l	0.3	0.15	0.21	0.6	0.57	0.51	1.00	0.78	1.06	0.94	0.79	2.28	0.3	0.71	0.79
Total phosphorus	mg/l	0.72	0.13	0.12	0.61	0.16	0.16	1.28	0.3	0.17	0.46	0.33	0.32	1.61	0.09	0.08
Dissolved phosphorus	mg/l	0.57	0.12	0.10	0.52	0.15	0.10	1.07	0.27	0.22	0.41	0.34	0.18	1.39	0.09	0.08
Diazinon	µg/l	0.16	<0.50	0.38	0.40	0.28	0.41	0.46	0.46	0.53	0.72	0.47	0.79	0.23	<0.50	<0.50
Chlorpyrifos	µg/l	<0.05	-	<0.50	<0.05	-	<0.50	0.10	-	<0.50	-	-	<0.50	<0.05	-	<0.50

Table 5-5
CONVENTIONAL, BIOLOGICAL AND ORGANIC COMPOUNDS AT MASS LOADING STATIONS (SD5, SD8, SD13, SV1), 1997/98

Mass Loading Stations		SD5			SD8			SD13			SV1		
Conventional/Biological/Organic Constituents	**Units**	**11/10/97**	**12/6/97**	**3/25/98**	**11/10/97**	**12/6/97**	**3/14/98**	**11/10/97**	**11/26/97**	**2/3/98**	**11/10/97**	**11/26/97**	**2/3/98**
Laboratory pH	pH units	7.35	7.82	7.27	6.97	7.56[e]	6.70[e]	6.35[e]	7.10	6.70	7.41	8.90	7.19
Electrical conductivity	µmhos/cm	1130	1690	726	310	155	1146	732	337	61	—	259	62
Total hardness	mg/l	694	186	124	116	39	96.4	44.2	16.5	14.4	46.3	52.0	54.7
Total suspended solids	mg/l	410	503	2024	182	315	805	350	140	198	164	258	348
Total dissolved solids	mg/l	1730	447	318	374	2500	344	167	92	98	154	180	214
Turbidity	NTU	160	27	96	90	29	24	62	71	43	63	68	392
Biochemical oxygen demand	mg/l	33	43	22	49	24	40[e]	39	62	4	15	52	15
Chemical oxygen demand	mg/l	89	20	22	146	44	135	85	100	17	124	87	22
Total coliform	MPN/100ml	>160,000	>20,000	>20,000	>160,000	>20,000	—	>160,000	>20,000	>20,000	—	>20,000	16,500
Fecal coliform	MPN/100ml	160,000	3,640	8,850	>160,000	9,450	—	90,000	10,900	9,450	—	3,640	420
Fecal streptococci	MPN/100ml	160,000	16,000[e]	50	>160,000	16,000[e]	—	160,000[e]	230	170	—	2,400	1,600
Oil and grease	mg/l	3.6	1.6	0.6	6.9	<0.5	4.56	2.9	1.3	<0.5	—	<0.5	<0.5
Total petroleum hydrocarbons (TPH)	mg/l	—	—	—	—	—	—	—	—	—	—	—	—
Surfactants (MBAS)	mg/l	<0.10	0.05	0.20	<0.10	0.07	0.66[e]	0.14	0.062	<0.05	0.10	0.112	0.08
Total Kjeldahl nitrogen	mg/l	1.6	<1.0	1.1	1.6	<1.0	15.0	1.5	1.41	1.6	0.95	1.32	<1.0
Nitrate-nitrite as nitrogen	mg/l	1.7	—	—	3.5	—	—	2.8	—	—	2.3	—	—
Nitrate-nitrogen	mg/l	—	0.54	0.5	—	0.52	0.4	—	1.0	0.5	—	1.5	0.3
Nitrite - nitrogen	mg/l	—	0.06	0.05	—	0.08	<0.05	—	<0.05	<0.05	—	0.05	<0.05
Ammonia as nitrogen	mg/l	0.56	0.57	0.60	1.3	0.4	10.0	0.55	1.09	<0.5	1.3	0.80	<0.5
Total phosphorus	mg/l	0.70	0.12	0.23	0.7	<0.10	2.2	0.90	0.70	0.36	0.30	0.273	0.25
Dissolved phosphorus	mg/l	<0.10	0.10	0.12	0.40	<0.10	1.41	0.50	0.54	0.21	0.10	0.15	0.12
Total cyanide	mg/l	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	<0.01	<0.02	<0.02	—	<0.02	<0.02
Bis (2-ethylhexyl) phthalate*	µg/l	15[e]	24.7	13.3	24[e]	8.72	37.5	—	94.5	10.9	—	14.7	9.98
Butyl benzyl phthalate	µg/l	<10[e]	<2.5	2.51	<10[e]	<2.5	13.3	—	29.3	<2.5	—	12.8	<2.5
Di-n-butyl phthalate	µg/l	<10[e]	37.5	42.7	<10[e]	34.6	15.9	—	49.8	55.7	—	69.5	43.8

* Bis (2-ethylhexyl) phthalate was detected in a field equipment blank taken prior to the start of the wet-weather monitoring season. Since this compound was detected in the blank, levels present in the stormwater should be considered as non-detect at an elevated level.

[e] Estimated result due to sample holding time exceedence.

Table 5-8
TOTAL METAL AND HARDNESS DATA SUMMARY — INDUSTRIAL SITES (SC2, NC3, SD11), 1997/98

Metals Results 1997/98		NC3			SC2			SD11		
		11/26/97	12/6/97	3/14/98	11/10/97	12/6/97	2/3/98	11/10/97	11/26/97	2/3/98
Silver	µg/l	<7	<7	<7	<5	<7	<7	<5	<7	<7
Arsenic	µg/l	<53	<53	<53	<1	<53	<53	5	<53	<53
Beryllium	µg/l	<0.3	<0.3	<0.3	<2	<0.3	<0.3	<2	<0.3	<0.3
Cadmium	µg/l	<4	<4	<4	0.60	<4	<4	0.70	<4	<4
Chromium	µg/l	<7	<7	18	<5	<7	22	<5	12	<7
Copper	µg/l	42	38	60	28	36	43	96	128	37
Aqueous Mercury	µg/l	<2	<2	<2	<0.5	<2	<2	<0.5	<2	<2
Nickel	µg/l	31	43	<15	11	39	<15	16	24	<15
Lead	µg/l	<42	<42	151	2	<42	<42	5	<42	<42
Antimony	µg/l	<32	<32	<32	2.7	<32	<32	<1.5	<32	<32
Selenium	µg/l	<75	<75	<75	1	<75	<75	<1	<75	<75
Thallium	µg/l	<40	<40	<40	<2	<40	<40	<2	<40	<40
Zinc	µg/l	204	214	81	543	482	149	606	876	190
Hardness	µg/l	67.0	148.0	221.0	50.0	18.0	35.9	66.7	39.0	16.1

Table 5-9
TOTAL METAL AND HARDNESS DATA SUMMARY — MASS LOADING STATIONS (SD5, SD8, SD13, SV1), 1997/98

Metals Results 1997/98		SD5			SD8			SD13			SV1		
		11/10/97	12/6/97	3/25/98	11/10/97	12/6/97	3/14/98	11/10/97	11/26/97	2/3/98	11/10/97	11/26/97	2/3/98
Silver	µg/l	<5	<7	<7	<5	<7	<7	<5	<7	<7	<5	<7	<7
Arsenic	µg/l	1	<53	<53	2	<53	<53	<1	<53	<53	2	<53	<53
Beryllium	µg/l	<2	<0.3	<0.3	<2	<0.3	<0.3	<2	<0.3	<0.3	<2	<0.3	<0.3
Cadmium	µg/l	<0.25	<4	<4	0.30	<4	<4	<0.25	<4	<4	<0.25	<4	<4
Chromium	µg/l	<5	<7	19	<5	<7	11	<5	16	24	<5	11	23
Copper	µg/l	9	56	146	17	28	28	35	61	37	14	50	30
Aqueous Mercury	µg/l	<0.5	<2	<2	<0.5	<2	<2	<0.5	<2	<2	<0.5	<2	<2
Nickel	µg/l	<5	<15	<15	9	<15	<15	6	38	<15	5	27	<15
Lead	µg/l	<1	<42	<42	3	<42	95	5	<42	<42	1	<42	<42
Antimony	µg/l	<1.5	<32	<32	1.6	<32	<32	<1.5	<32	<32	<1.5	<32	<32
Selenium	µg/l	<1	<75	<75	1	<75	<75	<1	<75	<75	1	<75	<75
Thallium	µg/l	<2	<40	<40	<2	<40	<40	<2	<40	<40	<2	<40	<40
Zinc	µg/l	69	68	130	176	11	92	176	329	70	129	189	67
Hardness	µg/l	694.0	186.0	124.0	116.0	39.0	96.4	44.2	16.5	14.4	463	52.0	54.7

Kyle Olewnik

303(d) Fact Sheet Region 9 Water Quality Control Board

Summary of Proposed Action

HU 908.22 Chollas Creek pictures of **collected trash** were reviewed and it was not determined to be sufficient evidence to list Chollas Creek on the 303d list for impairment for trash at this time. However, a potential trash problem exists, and this waterbody should be considered as a threatened waterbody from trash as a pollutant.

303(d) Listing / TMDL Information

- Chollas Creek
- HU 908.22
- Potential pollutants: Trash

Watershed Characteristics

Chollas Creek is an urban creek that runs through portions of San Diego, La Mesa, and Lemon Grove, and terminates at the Mouth of Chollas Creek in San Diego Bay. Much of the creek is channelized.

Water Quality Objectives Not Attained (or Objectives being Attained for Delisting)

None (other than current listing)

Evidence of Impairment

Photographs of trash collected by a US Navy boom at the Mouth of Chollas Creek indicate a significant amount of trash being collected following a wet weather event. However, no additional information other than these photos is available to document a potential trash problem in Chollas Creek. In addition, trash is a pervasive problem in most urban settings and may not be notably more significant for this creek than other urban creeks. Additional information would be needed before making a determination that Chollas Creek should be listed as impaired for trash on 303d. It is recommended that this waterbody be listed as threatened on 305b, as additional investigation of this potential impairment may be warranted.

Extent of Impairment (or Extent of Attainment)

None (other than current listing)

Potential Sources

Urban nonpoint

TMDL Priority

This water body is not recommended for a new TMDL.

Information Sources

Photos of the Mouth of Chollas Creek provided by the US Navy

From: Kyle Olewnik
To: "breznik@sdbaykeeper.org".mime.Internet; Pardy, Linda; Sarabia, Hiram
Date: 7/23/01 11:03AM
Subject: Re: FW: TRASH EXAMPLE AT CHOLLAS CREEK

Hi Bruce,

We had this info and have been considering it for a TMDL. At the least, I believe we will be listing it so that additional information on this issue is required, even if we don't schedule it for a TMDL at this point. Thanks for keeping us informed.

Kyle

>>> "breznik" <breznik@sdbaykeeper.org> 07/23/01 10:50AM >>>
FYI (a picture tells a thousand words)....should we be considering a trash TMDL for Chollas?

br

-----Original Message-----
From: Friedman, Randal A (NRSW N453)
[mailto:Friedman.Randal.A@asw.cnrsw.navy.mil]
Sent: Monday, July 23, 2001 10:33 AM
To: 'tmdls@paradiesproductions.com'
Subject: TRASH EXAMPLE AT CHOLLAS CREEK

At the last PAG meeting I brought up the need to consider in TMDL program development the development/implementation of multi-agency agreements. Spending a great deal of time on a numeric goal won't solve the problem of the widely dispersed nature of stormwater. The example I used was the trash example at Naval Station San Diego this winter.

The Navy placed an oil-spill boom across Chollas Creek as part of our oil-spill program. The purpose of the boom is , the boom will prevent any oil spill from moving upstream with the high tide. What this boom did, however, was create a dam blocking the trash from a major storm.

The attached picture shows a scene from this. We estimate that about 5 tons of materials were blocked. We made repeated efforts with city/county government to get the trash picked up. Without any quick agreement the boom finally broke and all this trash went into the bay (where it would have gone anyway without the boom.) Since then we are making ongoing efforts, with limited success, to reach agreement before the next rainy season and this process is repeated. Our shore installation budget won't allow for us to pick-up and dispose of this material coming from this solidly urbanized watershed reaching as far as La Mesa ten miles away.

I would ask that my fellow PAG members think about what types of institutional changes might be necessary to implement TMDLs. Whether it is trash or pesticides, the overwhelming amount of materials come from upstream. It is not reasonable or feasible to expect landowners at the bottom of a watershed to carry this burden. Randy

Randal Friedman
California Governmental Affairs

Navy Region Southwest
(619) 524-6358
(619) 954-3684 mobile

From: "breznik" <breznik@sdbaykeeper.org>
To: "Kyle Olewnik" <olewk@rb9.swrcb.ca.gov>, "Hiram Sarabia" <hsarabia@sdbaykeeper.org>, "Linda Pardy" <pardl@rb9.swrcb.ca.gov>
Date: 7/23/01 10:50AM
Subject: FW: TRASH EXAMPLE AT CHOLLAS CREEK

FYI (a picture tells a thousand words)....should we be considering a trash TMDL for Chollas?

br

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Randal Friedman
California Governmental Affairs
Navy Region Southwest
(619) 524-6358
(619) 954-3684 mobile


Chollas Creek

From: Linda Pardy
To: Deborah Jayne; Keri Cole; Kyle Olewnik; Lisa Brown
Date: 3/14/01 4:23PM
Subject: Fwd: Meeting with Navy (TRASH 303d listing)

Kyle, Maybe. We'll have to meet w/everyone working on 303(d) list and figure out how we want to proceed to list for trash...I'm thinking most of our urban streams,estuaries, bays look like this after rains especially if we had booms to collect the trash...Should where the trash ends up be listed or where it originates from upstream...
First step would be to see how other Regions proceeded...Lesley and/or Joan has the Ballona Creek Trash TMDL (also check LA River TMDL)...and how much evidence would we want to collect to convince the RB and others there is an impairment? If we looked, we might find this to be a very pervasive problem in urban areas...how should we proceed? Is a TMDL the best alternative...is there a better way...do we need to look at some of our other streams (to be fair).... This will be among things to discuss. Is there value to a 303(d) listing or can we approach the problem another way? By the way, the Tijuana River is already listed for trash...Would this complement other TMDLs in the creek...What about storm water permit, how does this fit in? What about funding...can we get $$ to solve the problem now? what about storm water ordinances? do we want to wait for a TMDL...it might be a while before we could solve the problem...what can be done now...what's the best way to correct this...where is the best place to start...I've seen tons of trash even in the most beautiful watercourses because of road crossings and the highway litterbug....its one reason the toll road being planned over San Mateo Creek (our southern steelhead water) would be another source of pollutants to a unique natural area/stream (if planned construction goes through). -Linda

CC: Joan Brackin; Lesley Dobalian

From: Kyle Olewnik
To: Pardy, Linda
Date: 3/14/01 2:46PM
Subject: Fwd: Meeting with Navy

Linda, here is the pic I was telling you about - if you wanted to do a trash TMDL for Chollas - this would justify it, huh?

From: Alan Monji
To: Olewnik, Kyle
Date: 1/23/01 10:12AM
Subject: Meeting with Navy

My schedule is open in the morning and I am interested. (I am always up for a chance to eat at Point Loma Seafoods after the meeting too.)

Here is a recent photo of mouth of Chollas provided by the Navy to JR after the recent storms. Find the soccer ball and win a prize.

AM

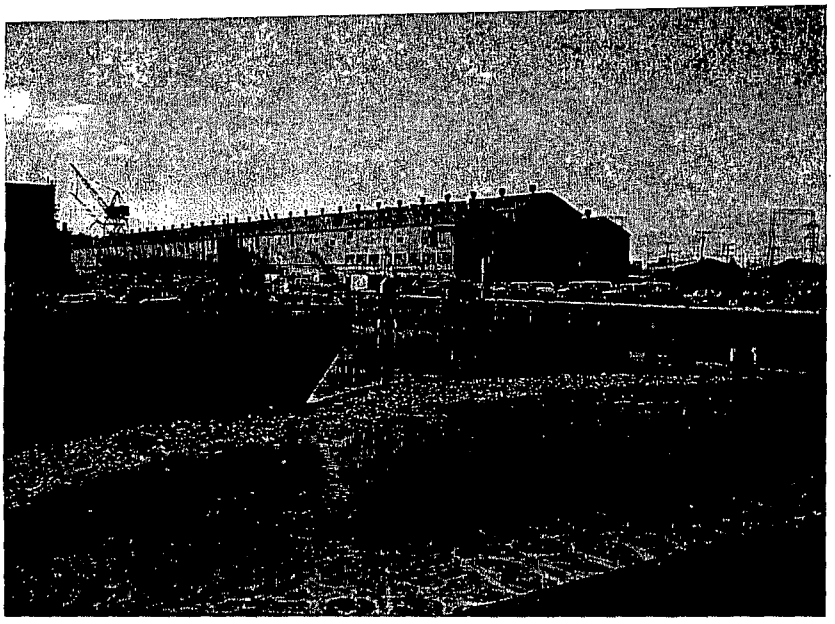
From: Linda Pardy
To: Deborah Jayne; Erick Burres; Keri Cole; Lisa Brown
Date: 3/14/01 4:45PM
Subject: Fwd: Meeting with Navy (TRASH 303d listing)

Staff, It would be interesting to utilize citizen monitors for documenting the scope of the Trash problem in our rivers and streams (snapshot day). It's measurable, and might be a bit easier to start with than some other types of analytical measurements for citizens (like diazinon). The photos could be linked to our WBS/WQA/GIS and help us to prioritize clean up activities. How would we quantify the extent of the problem, or should we worry about this now/later? I know we are limited in staff, but this might be something citizens could measure for us w/photos. We would need to give them guidance of course, but it might help us in selecting the biggest problems first...
-Linda

><> ><> ><> ><> ><> ><> ><> ><> ><> ><>
Linda Pardy, Environmental Specialist
California Regional Water Quality Control Board
San Diego Region
9771 Clairemont Mesa Blvd, Suite A
San Diego, CA 92124-1324
(858) 627-3932, fax (858) 571-6972
calnet 8-734-3932
email <PARDL@RB9.SWRCB.CA.GOV>
Internet Address <www.swrcb.ca.gov/~rwqcb9>
Primary Office Phone Number (858) 467-2952
><> ><> ><> ><> ><> ><> >>>: ><> >>>:

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways to reduce demand and cut your energy costs, see the tips at: http://www.swrcb.ca.gov/news/echallenge.html

CC: Cynthia Gorham-Test; David Barker; David Gibson; Joan Brackin



Kyle Olewnik

303(d) Fact Sheet Region 9 Water Quality Control Board

Summary of Proposed Action

HU 908.22 Chollas Creek data from TSMP 2000 and Regional Board sampling were reviewed for **TDS, nutrients, pesticides, metals, and organics** in both fish tissue and water samples. No new impairments were noted and it is recommended to keep it on the 303d list as it is currently.

303(d) Listing / TMDL Information

- ✓ Chollas Creek
- ✓ HU 908.22
- ✓ Potential pollutants: TDS, nutrients, pesticides, metals, organics
- ✓

Watershed Characteristics

Areas of Chollas Creek considered include Main Channel at end of Durant St., just north of SR 94 and I-15, Home Ave. near Police Canine Training Field; South Branch at 38th St. bridge, Federal Blvd., and just south of Jamacha Rd. at 69th St.

Water Quality Objectives Not Attained (or Objectives being Attained for Delisting)

None (other than current listing)

Evidence of Impairment

No impairment demonstrated (other than current listing). Data from 1999-2000 Wet Weather Season Water Quality sampling for Chollas Creek did not indicate any new water quality exceedances other than those already known for Chollas Creek, based on comparison with Basin Plan water quality standards and California Toxics Rule criteria. In addition, 2000 TSMP data did not indicate any excessive accumulation of organics in fish tissue, based on comparison with NAS guidelines for fish tissue.

Extent of Impairment (or Extent of Attainment)

None (other than current listing)

Potential Sources

N/A

TMDL Priority

This water body is not recommended for a new TMDL.

Information Sources

SDRWQCB 1998 sampling data, TSMP 2000

TABLE 1

Toxic Substances Monitoring Program
Regions 4, 8, and 9

Preliminary Summary of 2000 Data: Organic Chemicals in Fish an Crayfish (ppb, wet weight)

MTRL 5

1.1

Station Number	Station Name	Species Code	Tissue Type	Sample Date	Aldrin	alpha-Chlordene	cis-Chlordane	gamma-Chlordene	trans-Chlordane	cis-Nonachlor	trans-Nonachlor	Oxychlordane	Total Chlordane	Chlorpyrifos	Dacthal
802.31.00	Lake Elsinore	CP	F	07/11/00	<1.0	<1.0	<2.0	<1.0	<2.0	<2.0	<1.0	<1.0	ND	<2.0	<2.0
901.20.#A	San Juan Cr/Camino Capistrano	AC	W	07/25/00	<1.0	<1.0	2.5	<1.0	<2.0	<2.0	3.6	1.5	7.6	<2.0	<2.0
901.20.#A	San Juan Cr/Camino Capistrano	PRS	W	07/25/00	<1.0	<1.0	3.1	<1.0	<2.0	<2.0	4.0	<1.0	7.1	<2.0	<2.0
905.11.00	San Dieguito Lagoon	CH	F	07/25/00	<1.0	<1.0	<2.0	<1.0	<2.0	<2.0	<1.0	<1.0	ND	<2.0	<2.0
906.50.##	Tecolote Creek Estuary	CKF	W	07/24/00	<1.0	<1.0	5.2	<1.0	<2.0	5.4	10.9	2.4	23.9	<2.0	<2.0
907.11.00	Famosa Slough	MOL	W	07/25/00	<1.0	<1.0	8.3	<1.0	3.9	7.9	9.8	1.9	31.8	<2.0	<2.0
908.22.01	Chollas Creek/Main Street	CKF	W	07/24/00	<1.0	<1.0	4.3	<1.0	<2.0	4.3	9.2	1.8	19.6	<2.0	<2.0
908.31.##	7th Street Ch/Trolley Xing	CKF	W	07/24/00	<1.0	<1.0	2.4	<1.0	<2.0	2.3	5.3	1.2	11.1	<2.0	<2.0
908.32.##	Paradise Creek Marsh	CKF	W	07/24/00	<1.0	<1.0	4.1	<1.0	<2.0	3.9	6.8	1.2	15.9	<2.0	<2.0
909.12.00	F-G St Salt Marsh/Chula Vista	CKF	W	07/24/00	<1.0	<1.0	<2.0	<1.0	<2.0	<2.0	<1.0	<1.0	ND	<2.0	<2.0

Station Number	Dieldrin	o,p' DDD	p,p' DDD	o,p' DDE	p,p' DDE	o,p' DDT	p,p' DDT	p,p' DDMU	p,p' DDMS	Total DDT	Dicofol	Diazinon	Endosulfan I	Endosulfan II	Endosulfan Sulfate	Total Endosulfan	Endrin	Ethion
										5 PPM - 0.014 PPM							
802.31.00	<2.0	<2.0	<2.0	<2.0	23.8	<3.0	<5.0	<3.0	NA	23.8	NA	<20.0	<2.0	NA	NA	ND	<2.0	<6.0
901.20.#A	2.0	<2.0	3.6	<2.0	28.1	<3.0	<5.0	<3.0	NA	31.7	NA	<20.0	<2.0	NA	NA	ND	<2.0	<6.0
901.20.#A	<2.0	<2.0	3.9	<2.0	29.7	<3.0	<5.0	<3.0	NA	33.6	NA	<20.0	<2.0	NA	NA	ND	<2.0	<6.0
905.11.00	<2.0	<2.0	<2.0	<2.0	21.7	<3.0	<5.0	<3.0	NA	21.7	NA	<20.0	<2.0	NA	NA	ND	<2.0	<6.0
906.50.##	2.5	<2.0	2.8	<2.0	12.6	<3.0	<5.0	<3.0	NA	15.4	NA	<20.0	<2.0	NA	NA	ND	<2.0	<6.0
907.11.00	2.5	<2.0	3.1	<2.0	9.1	<3.0	<5.0	<3.0	NA	12.2	NA	<20.0	<2.0	NA	NA	ND	<2.0	<6.0
908.22.01	2.6	<2.0	5.8	<2.0	18.9	<3.0	<5.0	<3.0	NA	24.7	NA	<20.0	<2.0	NA	NA	ND	<2.0	<6.0
908.31.##	<2.0	2.7	14.6	<2.0	18.7	<3.0	<5.0	3.3	NA	39.4	NA	<20.0	<2.0	NA	NA	ND	<2.0	<6.0
908.32.##	<2.0	<2.0	2.9	<2.0	21.6	<3.0	<5.0	<3.0	NA	24.5	NA	<20.0	<2.0	NA	NA	ND	<2.0	<6.0
909.12.00	<2.0	<2.0	<2.0	<2.0	6.8	<3.0	<5.0	<3.0	NA	6.8	NA	<20.0	<2.0	NA	NA	ND	<2.0	<6.0

Station Number	alpha-HCH	beta-HCH	delta-HCH	gamma-HCH (Lindane)	Total HCH	Heptachlor	Heptachlor-epoxide	Hexachlorobenzene	Methoxychlor	Oxadiazon	Ethyl Parathion	Methyl Parathion	PCB 1248	PCB 1254	PCB 1260	Total PCB	Toxaphene	Chemical Group A
																2.0 ppm		
802.31.00	<1.0	<2.0	<2.0	<1.0	ND	<2.0	<1.0	<0.3	<5.0	<3.0	<2.0	<4.0	43.0	10.0	<10.0	53.0	<20.0	ND
901.20.#A	<1.0	<2.0	<2.0	<1.0	ND	<2.0	<1.0	<0.3	<5.0	88.8	<2.0	<4.0	<25.0	35.0	<10.0	35.0	<20.0	9.6
901.20.#A	<1.0	<2.0	<2.0	<1.0	ND	<2.0	<1.0	<0.3	<5.0	120.0	<2.0	<4.0	<25.0	41.0	<10.0	41.0	<20.0	7.1
905.11.00	<1.0	<2.0	<2.0	<1.0	ND	<2.0	<1.0	<0.3	<5.0	<3.0	<2.0	<4.0	<25.0	<10.0	<10.0	ND	<20.0	ND
906.50.##	<1.0	<2.0	<2.0	<1.0	ND	<2.0	<1.0	<0.3	<5.0	6.8	<2.0	<4.0	<25.0	32.0	<10.0	32.0	<20.0	26.4
907.11.00	<1.0	<2.0	<2.0	<1.0	ND	<2.0	<1.0	<0.3	<5.0	<3.0	<2.0	<4.0	<25.0	49.0	14.0	63.0	<20.0	34.3
908.22.01	<1.0	<2.0	<2.0	<1.0	ND	<2.0	<1.0	<0.3	<5.0	15.0	<2.0	<4.0	<25.0	81.0	20.0	101.0	<20.0	22.1
908.31.##	<1.0	<2.0	<2.0	<1.0	ND	<2.0	<1.0	<0.3	<5.0	31.4	<2.0	<4.0	<25.0	85.0	<10.0	85.0	<20.0	11.1
908.32.##	<1.0	<2.0	<2.0	<1.0	ND	<2.0	<1.0	<0.3	<5.0	<3.0	<2.0	<4.0	<25.0	24.0	<10.0	24.0	<20.0	15.9
909.12.00	<1.0	<2.0	<2.0	<1.0	ND	<2.0	<1.0	<0.3	<5.0	<3.0	<2.0	<4.0	33.0	114.0	10.0	157.0	<20.0	ND

NA Means that the sample was not analyzed for the chemical.
ND Means that the chemical was not detected.
< Means that the chemical was not detected above the indicated limit of detection.

F = Filet.
W = Whole Body.
Species codes are listed in Table 2.

2.0 ppb
MTRL 5

TABLE 1

Toxic Substances Monitoring Program
Regions 4, 8, and 9
Preliminary Summary of 2000 Data: Organic Chemicals in Fish an Crayfish (ppb, wet weight)

Station Number	Station Name	Species Code	Tissue Type	Sample Date	Aldrin	alpha-Chlordene	cis-Chlordane	gamma-Chlordene	trans-Chlordane	cis-Nonachlor	trans-Nonachlor	Oxychlordane	Total Chlordane	Chlorpyrifos	Dacthal
909.12.01	Sweetwater Marsh	CKF	W	07/24/00	<1.0	<1.0	<2.0	<1.0	<2.0	<2.0	1.6	<1.0	1.6	<2.0	<2.0

Station Number	Dieldrin	o,p' DDD	p,p' DDD	o,p' DDE	p,p' DDE	o,p' DDT	p,p' DDT	p,p' DDMU	p,p' DDMS	Total DDT	Dicofol	Diazinon	Endosulfan I	Endosulfan II	Endosulfan Sulfate	Total Endosulfan	Endrin	Ethion
909.12.01	<2.0	<2.0	2.8	<2.0	25.6	<3.0	<5.0	<3.0	NA	28.4	NA	<20.0	<2.0	NA	NA	ND	<2.0	<6.0

Station Number	alpha-HCH	beta-HCH	delta-HCH	gamma-HCH (Lindane)	Total HCH	Heptachlor	Heptachlor-epoxide	Hexachlorobenzene	Methoxychlor	Oxadiazon	Ethyl Parathion	Methyl Parathion	PCB 1248	PCB 1254	PCB 1260	Total PCB	Toxaphene	Chemical Group A
909.12.01	<1.0	<2.0	<2.0	<1.0	ND	<2.0	<1.0	<0.3	<5.0	<3.0	<2.0	<4.0	<25.0	75.0	14.0	89.0	<20.0	1.6

NA Means that the sample was not analyzed for the chemical.
ND Means that the chemical was not detected.
< Means that the chemical was not detected above the indicated limit of detection.

F = Filet.
W = Whole Body.
Species codes are listed in Table 2.

TABLE 2

Toxic Substances Monitoring Program
Regions 4, 8, and 9
2000 Species Code List

Freshwater Fish *

Species Code	Common Name	Species Name	Family Name
AC	Arroyo Chub	*Gila orcutti*	Cyprinidae
BLB	Black Bullhead	*Ameiurus melas*	Ictaluridae
CP	Carp	*Cyprinus carpio*	Cyprinidae
GAM	Mosquitofish	*Gambusia affinis*	Poeciliidae
LMB	Largemouth Bass	*Micropterus salmoides*	Centrarchidae
MOL	Sailfin Molly	*Poecilia latipinna*	Poeciliidae
PRS	Red Shiner	*Cyprinella lutrensis*	Cyprinidae
RBT	Rainbow Trout	*Oncorhynchus mykiss*	Salmonidae
TL	Tilapia	*Tilapia sp.*	Cichlidae

Marine Fish *

Species Code	Common Name	Species Name	Family Name
CH	California Halibut	*Paralichthys californicus*	Bothidae
CKF	California Killifish	*Fundulus parvipinnis*	Cyprindontidae

Non-Fish

Species Code	Common Name	Species Name	Family Name
PROI	Red Swamp Crayfish	Procambarus clarki	Astacidae

* Common and scientific fish names were obtained from Robins, C.R., R.M. Bailey, C.E. Bond, J.R. Brooker, E.A. Lachner, R.N. Lea, and W.B. Scott. 1991. Common and Scientific Names of Fishes from the United States and Canada. American Fisheries Society Special Publication 20, Bethesda, Maryland.

REPORT

CHOLLAS CREEK WATER QUALITY SAMPLING 1999-2000 WET-WEATHER SEASON

Prepared for

City of San Diego
Environmental Protection Division,
Environmental Services Department
9601 Ridgehaven Court MS 1103-A
San Diego, California 92123-1636

URS Project No. 589553054F.00

October 24, 2000

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SCOPE OF WORK

URS Corporation (URS), under contract to the City of San Diego, conducted two rounds of wet-weather sampling for organophosphate pesticides (diazinon and chlorpyrifos) and metals in the Chollas Creek Watershed. URS' portion of the project was funded by the City of San Diego to provide technical input for developing Total Maximum Daily Loads (TMDLs) for pesticides and metals in Chollas Creek. The San Diego Regional Water Quality Control Board (RWQCB) is in the process of developing the TMDLs, which are scheduled to be finalized by the end of this year. Five sampling sites along the North and South Forks of Chollas Creek were designated for sampling through discussions with the City, the Port of San Diego, the RWQCB, and the Southern California Coastal Water Research Program (SCCWRP) in December 1999. The sampling was conducted on February 12 and 21, 2000, at three sites along branches of the main Chollas Channel and three sites along the south branch of Chollas Creek while rainstorms passed through the San Diego area. The samples were to be analyzed for the parameters listed in Table 1. In addition, Caltrans conducted sampling at a sixth location on Chollas Creek.

Table 1
ANALYSES AND LABORATORIES [1]

Analysis	Diazinon Chlorpyrifos	Physical and Chemical Constituents Total and Dissolved Metals	Toxicity Tests Using *Ceriodaphnia dubia* and *Hyalella azteca*
Laboratory	Aqua-Science 17 Arboretum Dr. Davis, CA 95616 (530) 753-5456 Contact: Jeff Miller	Babcock Laboratories 6100 Quail Valley Ct. Riverside, CA 92507 (909) 653-3351 Contact: Cindy Moore	Ogden Environmental 5510 Morehouse Dr. San Diego, CA 92121 (858) 458-9111 Contact: Marilyn Schwartz

(1) Laboratories used for composite samples from SD(8)2, SD(8)3, SD(8)5, and SD(8)6. Samples for SD(8)1 and SD(8)4 were analyzed as part of the San Diego Storm Water Monitoring Program and Caltrans Monitoring, respectively. SD(8)1 samples were analyzed by D-TEK, APPL, and MBC, for metals and nutrients, pesticides, and toxicity, respectively. SD(8)4 samples were analyzed by Pat-Chem Laboratories (PCL).

SAMPLE COLLECTION

Flow-weighted composite samples were collected using automated samplers on February 12 and 21, 2000, by URS field personnel at the three sites on the main channel and two sites on the south tributary of Chollas Creek (Figure 1). The third south Chollas Creek site (SD(8)4) was sampled on February 12 and 23, 2000, by Caltrans. The hydrological requirements were that the storm events generate at least 0.1 inches of rainfall within the watershed, were preceded by at least 72 hours of dry weather, and the forecasted storm volume was within 50% of the average storm volume and duration for the region. The sampling sites are as follows:

- **SD(8)1 Main Chollas Channel** – A mass loading station for the San Diego Storm Water Monitoring Project, SD(8)1 is located in a concrete-lined channel at the end of Durant Street.
- **SD(8)2 Wabash Avenue (I-15) Branch of the Main Chollas Channel** – This is a City of San Diego field screening site and is located just north of the SR 94 and I-15 interchange. The site is a natural channel which follows next to I-15 through the I-805 interchange where it splits and follows each freeway up to approximately Landis Street.

- **SD(8)3 Home Avenue Branch of the Main Chollas Channel** - This is a City of San Diego field screening site and is located next to the San Diego Police Department Canine Training Field. It is a channelized portion of the creek with a natural bottom.
- **SD(8)4 South Branch of Chollas Creek (Caltrans monitoring site)** - This is a City of San Diego field screening site and is located at the 38th Street bridge over Chollas Creek just north of Beta Street. It is a channelized portion of the creek with a natural bottom and is just upstream of the South Branch confluence with the Main Chollas Creek Channel.
- **SD(8)5 Federal Boulevard Branch of South Chollas Creek** – This site is located where the creek crosses Federal Blvd., next to SR 94 and discharges from Lemon Grove and La Mesa.
- **SD(8)6 Jamacha Road Branch of South Chollas Creek** – This site is just downstream from a City of San Diego field screening site located along a natural stream within a residential area. The site is located south of Jamacha Road at the 69th Street crossing of Chollas Creek.

The flow-weighted samples were collected following the storm and stored on ice during transportation from the monitoring locations. The samples were delivered to the Environmental Engineering Lab (EEL) at the RWQCB for compositing prior to shipment to the analytical labs (except for SD(8)1 which went to D-TEK for compositing and to the San Diego Storm Water Monitoring Program Laboratories for analysis). Water samples for toxicity tests using *Ceriodaphnia dubia* and *Hyalella azteca* were delivered on the same day to Odgen Environmental (toxicity samples for SD(8)1 were shipped to MBC). Water samples for general constituents and metals, and pesticides analyses from SD(8)2, SD(8)3, SD(8)5, and SD(8)6 were shipped via Federal Express for next day delivery in styrofoam coolers packed with Blue Ice to Babcock Laboratories and Aqua-Science, respectively. Water samples from SD(8)1 were analyzed by the laboratories under contract with the San Diego Storm Water Monitoring Program (D-TEK, APPL, and MBC). Water samples for SD(8)4 were collected by Caltrans and delivered to Pat-Chem Laboratories for analysis.

HYDROLOGY

The storm event requirements were that the storm events generate at least 0.1 inches of rainfall within the watershed, were preceded by at least 72 hours of dry weather, and the forecasted storm volume was within +/- 50% of the average storm volume and duration for the region. The hydrographs for February 12 and 21 flows at the sampling stations are provided in Appendix A for all stations except SD(8)4 which was monitored by Caltrans. The hydrologic data from SD(8)4 are also provided in Appendix A. Note that the second storm monitored by Caltrans occurred on February 23, 2000, rather than February 21, 2000 at the other five sampling sites.

RESULTS

Physical, Chemical, and Metals Constituents

A large suite of constituents was analyzed for in the composite samples from Chollas Creek. The results from the three analytical laboratories were compiled and are presented in Tables 2 and 3. Table 2 presents the physical and general constituents, as well as the nutrients. Table 3 presents the total and dissolved metals results for the six sampling locations. The following subsections describe the range of values for each of the analyses. Quality assurance/quality control protocols (QA/QC) were followed by the laboratories to reduce the potential for contamination, as well as to validate the findings. The laboratory reports for sampling stations SD(8)2, SD(8)3, SD(8)5, and SD(8)6 are provided in Appendix B.

General

The pH was measured for eight samples and ranged from 6.9 to 8.3. Specific conductance (conductivity) was measured for seven samples and ranged from 140 to 510 umho/cm.

Results for turbidity from eight samples ranged from 27 to 310 NTU.

Results for TSS ranged from 22 to 946 mg/l. Results for TDS at mass loading stations ranged from 100 to 320 mg/l.

COD is measured over 24 hours and represents the oxygen consumed in the breakdown of chemical constituents during that time period. Results for COD ranged from 36 to 104 mg/l.

Oil and grease results were detected in four of the eight samples analyzed and ranged from 1.92 to 19 mg/l. Surfactants (MBAS) were detected in five of the six samples analyzed and ranged from 0.05 to 0.35 mg/l.

Total hardness ranged from 36.0 to 120.0 mg/l CaCO3. Calcium and magnesium were detected in all samples analyzed in concentrations ranging from 10 to 26 µg/l and 3.0 to,13.0 µg/l, respectively.

Nutrients

Total Kjeldahl nitrogen (TKN) ranged from 1.2 to 3.1 mg/l. Nitrate concentrations ranged from 0.4 to 3.22 mg/l. Nitrite was detected in three of the eight samples, in concentrations ranging from 0.05 to 0.09 mg/l. Ammonia (reported as nitrogen) was detected in seven of the twelve samples from mass loading stations in concentrations ranging from 0.08 to 3.6 mg/l. Total phosphorus was detected in all of the samples in concentrations ranging from 0.33 to 4 mg/l, and dissolved phosphorus was also detected in all eight samples analyzed in concentrations ranging from 0.26 to 0.38 mg/l.

Table 2. Physical and General Constituents, Chollas Creek Water Monitoring

Constituent	Units	February 12, 2000						February 21, 2000 (1)					
		SD(8)1	SD(8)2	SD(8)3	SD(8)4	SD(8)5	SD(8)6	SD(8)1	SD(8)2	SD(8)3	SD(8)4	SD(8)5	SD(8)6
Physical/General													
pH	s.u.	7.52	8.3	8.1	7.7	7.5	7.4	6.9	N/A	N/A	8	N/A	N/A
Specific Conductance	umho/cm	186	N/A	N/A	234	N/A	N/A	187	190	140	202	220	510
TDS	mg/l	120	140	100	190	220	310	111	140	110	232	180	320
TSS	mg/l	457	220	270	946	520	170	62	110	110	416	280	22
Turbidity	NTU	50	120	81	157	240	68	27	N/A	N/A	310	N/A	N/A
COD	mg/l	41	N/A	N/A	N/A	N/A	N/A	104	96	78	N/A	85	36
Oil & Grease	mg/l	1.92	N/A	N/A	19	N/A	N/A	2.04	<5	<5	7	<5	<5
MBAS	mg/l	0.35	0.05	0.11	N/A	<0.05	0.11	0.22	N/A	N/A	N/A	N/A	N/A
Total Hardness	mg/l	40.9	58	54	N/A	100	120	35.1	47	36	N/A	63	100
Ca	mg/l	N/A	13	14	N/A	21	26	N/A	12	10	N/A	14	24
Mg	mg/l	N/A	6	5	N/A	12	13	N/A	4	3	N/A	7	11
Nutrients													
NH4-N	mg/l	1.65	0.3	0.5	0.13	0.4	0.3	<0.10	<0.1	<0.1	0.08	<0.1	<0.1
NO3-N	mg/l	3.22	1.3	0.9	0.67	1.1	1	1.04	N/A	N/A	0.4	N/A	N/A
NO2-N	mg/l	0.086	<0.1	<0.1	0.09	<0.1	<0.1	<0.05	N/A	N/A	0.05	N/A	N/A
TKN	mg/l	2.98	2.3	2.6	N/A	2.6	2	3.1	2	1.9	N/A	1.4	1.2
Dis P	mg/l	0.33	0.38	0.36	0.3	0.37	0.34	0.26	N/A	N/A	0.35	N/A	N/A
TP	mg/l	0.46	0.66	1.2	0.85	0.95	4	0.33	0.53	0.57	0.44	0.58	0.37
Pesticides													
Diazinon	ug/l	0.27 (4)	N/A (3)	N/A (3)	<1	N/A (3)	0.3376	0.35 (5)	0.0337	0.0955	<1	N/A (2)	0.0509
Chlorpyrifos	ug/l	<0.5	N/A (3)	N/A (3)	<1	N/A (3)	0.0717	<0.5	0.0433	0.0429	<1	N/A (2)	0.034

(1) SD(8)4 sampled on February 23, 2000.

(2) SD(8)5 sample broke inside cooler during delivery to Aqua-Science

(3) Sample not forwarded to Aqua-Science by EEL.

(4) Below quantification level. Value is estimated.

(5) Difference between primary and confirmation columns is greater than 40%.

Note that detection limits varied between the laboratories. Non-detects are reported as less than the reporting limit. N/A - not analyzed.

Total Metals

Total antimony was not detected in any samples. Total chromium was detected in two of the twelve samples analyzed and was reported at levels of 17.0 and 23.0 µg/l . Total arsenic was detected in three samples in concentrations of 7, 11.0 and 11.0 µg/l. Total cadmium was also detected in three samples in concentrations of 0.7, 1.3 and 2.0 µg/l. Copper was detected in all but one of the samples analyzed in concentrations ranging from 16 to 68 µg/l. Lead was detected all but two samples in concentrations ranging from 15.0 to 83.0 µg/l. Nickel was detected in two of the twelve samples at 10.3 and 18.3 µg/l. Selenium was also detected in two samples at 6.0 and 8.0 µg/l. Zinc was detected in all samples in concentrations ranging from 10.0 to 370.0 µg/l. In general, more total metal constituents were detected above the reporting limits at the SD(8)4 station than at the other stations.

Dissolved Metals

Antimony was not detected in the dissolved form in any of the samples. Dissolved arsenic and dissolved cadmium were detected in one sample in concentrations of 5.0 and 0.3 µg/l, respectively. Dissolved chromium was detected in two samples in concentrations of 2.1 and 9.0 µg/l. Dissolved lead was also detected during both sampling events at station SD(8)4 in concentrations of 3.6 and 10.5 µg/l. Dissolved copper was detected in four samples in concentrations ranging from 5.3 to 37.0 µg/l one Dissolved nickel was detected in two samples in concentrations of 5.0 and 6.1 µg/l. Dissolved zinc was detected in all twelve samples in concentrations ranging from 5.0 to 19.0 µg/l. Dissolved selenium was detected in two samples in concentrations of 6.0 and 8.0 µg/l. In general, more dissolved metal constituents were detected above the reporting limits at the SD(8)4 station than at the other stations.

Diazinon & Chlorpyrifos

The organophosphate pesticides, diazinon and chlorpyrifos were analyzed in three of the six February 12 samples and five of the six February 21 samples (Table 2). Aqua-Science did not receive the composited sample water from the analytical laboratory (EEL) for SD(8)2, SD(8)3, and SD(8)5 from the February 12 storm event. In addition, the SD(8)5 sample from February 21 broke within the cooler during transportation to the analytical lab. Of the samples analyzed, diazinon ranged from non-detect to 0.35 µg/l, and chlorpyrifos ranged from non-detect to 0.072 µg/l. Note that laboratory reporting limits varied between the studies, and that these ranges may be misleading considering the range in the reporting limits. Specifically, the reporting limit of 1.0 µg/l used by Caltrans' contract laboratory is above the detection level for diazinon and chlorpyrifos commonly observed in urban runoff. QA/QC was followed by the laboratories to prohibit contamination, as well as to validate the findings. The laboratory reports for sampling stations SD(8)2, SD(8)3, SD(8)5, and SD(8)6 are provided in Appendix C.

Table 3. Total and Dissolved Metals, Chollas Creek Water Quality Monitoring

	February 12, 2000						February 21, 2000 (1)					
	SD(8)1	SD(8)2	SD(8)3	SD(8)4	SD(8)5	SD(8)6	SD(8)1	SD(8)2	SD(8)3	SD(8)4	SD(8)5	SD(8)6
Total Metals												
An	<1.5	<10	<10	<1	<10	<10	<1.5	<10	<10	<1	<10	<10
As	<1.0	<5	<5	N/A	11	<5	7	<5	<5	N/A	11	<5
Cd	<0.25	<2	<2	1.3	<2	<2	2	<2	<2	0.7	<2	<2
Cr	<5.0	<20	<20	23	<20	<20	<5.0	<20	<20	17	<20	<20
Cu	29	68	68	33	43	23	16	23	19	19	27	>10
Pb	15	34	52	83	76	16	<1.0	23	19	25.9	35	>10
Ni	<5.0	<20	<20	18.3	<20	<20	<5.0	<20	<20	10.3	<20	<20
Se	<1.0	<5	<5	<2	<5	6	<1.0	<5	<5	<2	<5	8
Zn	96	160	300	327	370	100	50	180	160	81	10	54
Dissolved Metals												
An	<1.5	<10	<10	<1	<10	<10	<1.5	<10	<10	<1	<10	<10
As	<1.0	<5	<5	N/A	<5	<5	5	<5	<5	N/A	<5	<5
Cd	<0.25	<2	<2	<0.2	<2	<2	<0.25	<2	<2	0.3	<2	<2
Cr	<5.0	<20	<20	2.1	<20	<20	<5.0	<20	<20	9	<20	<20
Cu	<5.0	37	<10	5.3	<10	<10	<5.0	11	<10	9.6	<10	<10
Pb	<1.0	<10	<10	3.6	<10	<10	<1.0	<10	<10	10.5	<10	<10
Ni	<5.0	<20	<20	5	<20	<20	<5.0	<20	<20	6.1	<20	<20
Se	<1.0	<5	<5	<2	<5	6	<1.0	<5	<5	<2	<5	8
Zn	19	45	20	16.8	45	20	28	67	57	42	10	30

(1) SD(8)4 sampled on February 23, 2000.

Note that detection limits varied between the laboratories. Non-detects are reported as less than the reporting limit. N/A - not analyzed.

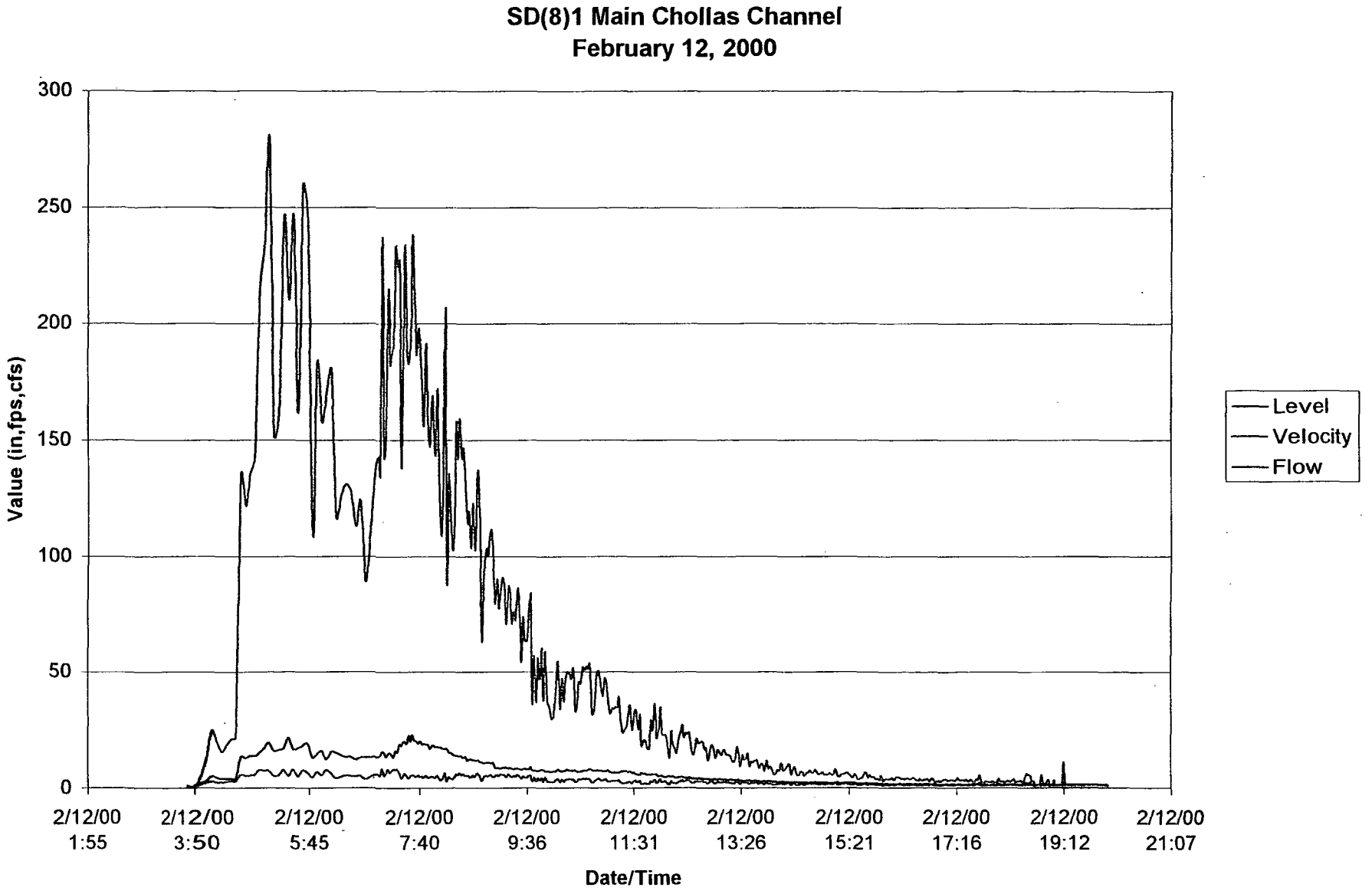
Toxicity Tests with *Hyalella azteca* and *Ceriodaphnia dubia*

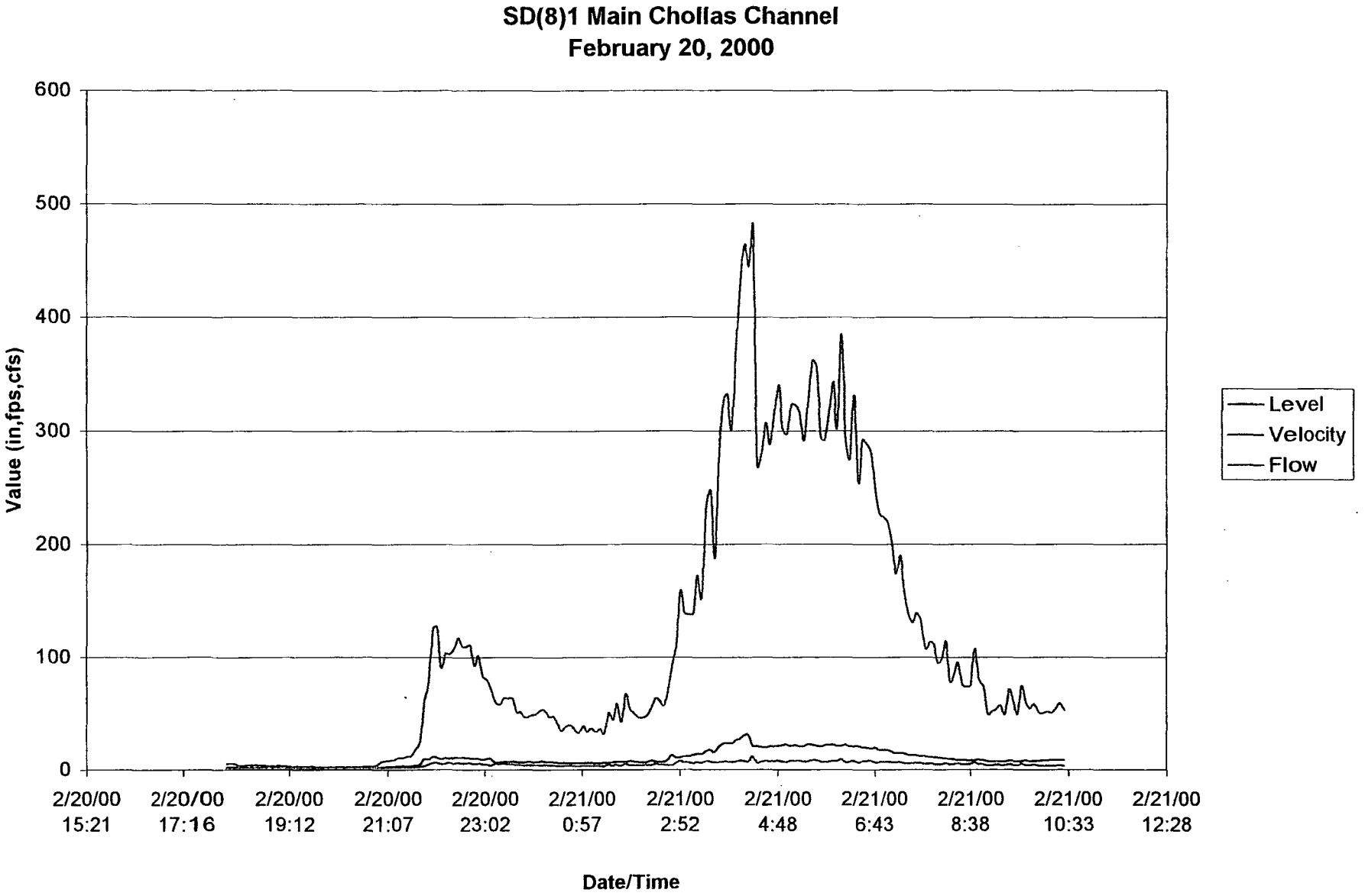
Toxicity tests on the February 12 and 21 water samples were conducted using the freshwater flea, *Ceriodaphni dubia*, and the amphipod, *Hyalella azteca* (Table 4). An exception to this protocol was the use of the flathead minnow, *Pimephales promelas*, in place of the amphipod by Caltrans for SD(8)4. In addition, no toxicity tests were performed for February 12 water samples from sampling stations SD(8)4 and SD(8)5. Amphipod bioassays for SD(8)2, SD(8)3, SD(8)5, and SD(8)6 indicated measurable toxicity in the water samples from both sampling events. All water quality measurements recorded during the 96-hour exposure were within the range defined as acceptable by the test protocol and mean control survival exceeded the ASTM control survival acceptability criterion of 90 percent. Detailed information on the toxicity tests for sampling stations SD(8)2, SD(8)3, SD(8)5, and SD(8)6, can be found in the Ogden Environmental Supplemental Storm Water Toxicity Monitoring of Chollas Creek 1999-2000 Wet-Season dated June 2000. Likewise, detailed information on the toxicity tests for sampling station SD(8)1 can be found in the 1999-2000 City of San Diego and Co-Permittee NPDES Storm Water Monitoring Program Report prepared by URS, dated August 2000.

Table 4. Toxicity Testing, Chollas Creek Water Quality Monitoring

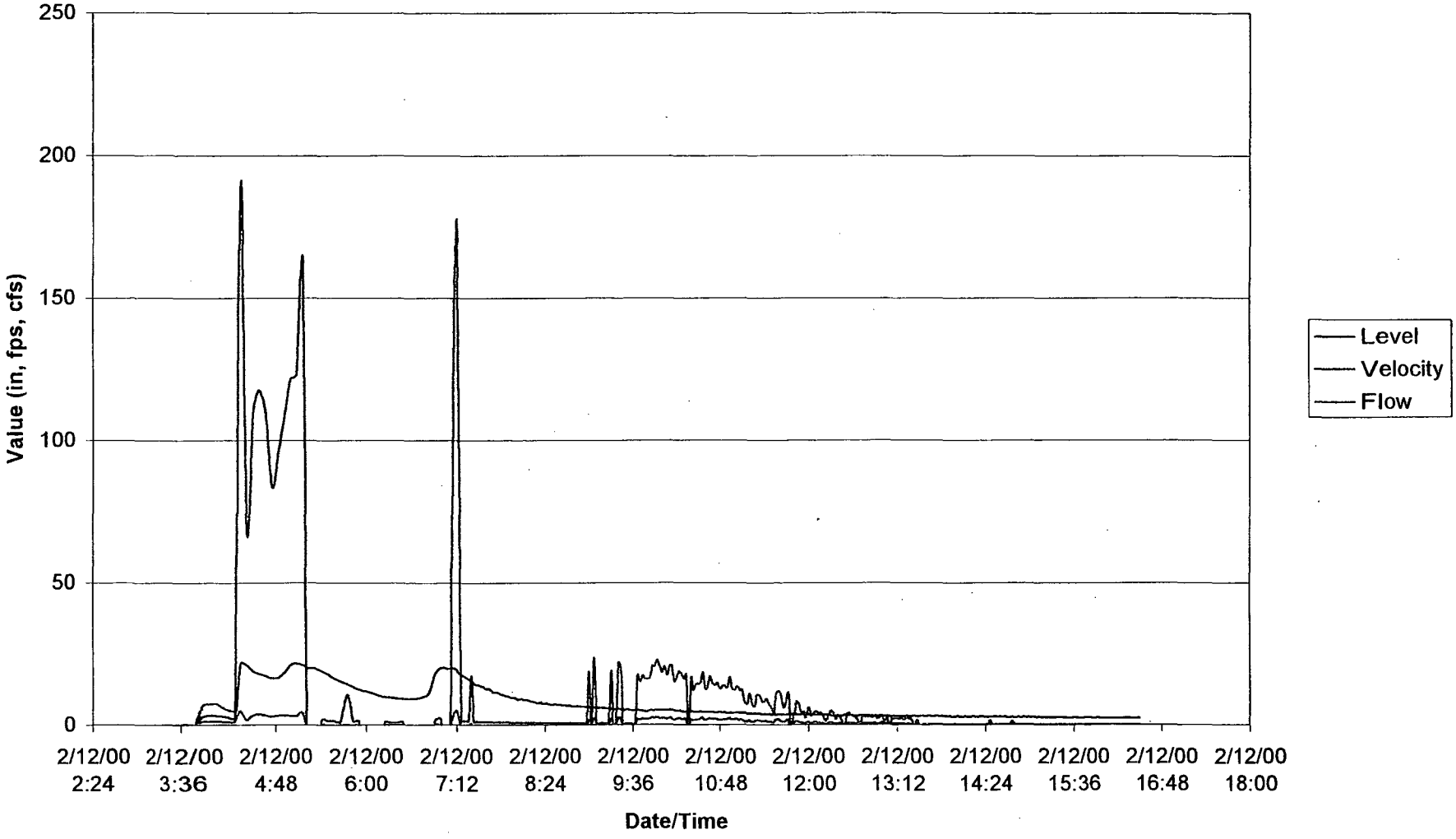
Sample	96 hour				LT50 hours	7 day			
	Mean % Survival Control	Mean % Survival (in 100% Sample)	LC50 (% Sample)	LOEC (% Sample)		LC50 (%sample)	NOEC Survival (%sample)	NOEC Repro/Growth (%sample)	TUc Survival/ Sublethal
Ceriodaphnia - February 12, 2000									
sd(8)1	N/A	N/A	>100	N/A	168	78.5	67	44	1.49/2.27
sd(8)2	100	100	>100	>100	N/A	N/A	N/A	N/A	N/A
sd(8)3	100	65	>100	>100	N/A	N/A	N/A	N/A	N/A
sd(8)4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
sd(8)5 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
sd(8)6	100	80	>100	>100	N/A	N/A	N/A	N/A	N/A
Ceriodaphnia - February 21, 2000 [1]									
sd(8)1	N/A	N/A	>100	N/A	>192	>100	100	100	1/1
sd(8)2	100	100	>100	>100	N/A	N/A	N/A	N/A	N/A
sd(8)3	100	100	>100	>100	N/A	N/A	N/A	N/A	N/A
sd(8)4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
sd(8)5	100	100	>100	>100	N/A	N/A	N/A	N/A	N/A
sd(8)6	95	100	>100	>100	N/A	N/A	N/A	N/A	N/A
Hyalella - February 12, 2000 [2]									
sd(8)1	N/A	N/A	>100	N/A	125	81.8	100	100 [3]	1/1 [3]
sd(8)2	94	8	49	<50	N/A	N/A	N/A	N/A	N/A
sd(8)3	94	4	30	<50	N/A	N/A	N/A	N/A	N/A
sd(8)5 [4]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
sd(8)6	94	34	74	<50	N/A	N/A	N/A	N/A	N/A
Hyalella - February 21, 2000									
sd(8)1	N/A	N/A	>100	N/A	>168	>100	100	100 [3]	1/1 [3]
sd(8)2	98	12	65	<50	N/A	N/A	N/A	N/A	N/A
sd(8)3	98	10	34	<50	N/A	N/A	N/A	N/A	N/A
sd(8)5	98	32	77	<50	N/A	N/A	N/A	N/A	N/A
sd(8)6	98	52	>100	<50	N/A	N/A	N/A	N/A	N/A
Pimephales promelas - February 23, 2000 [2]									
sd(8)4	N/A	N/A	>100	N/A	N/A	N/A	100 [5]	100 [5]	1/1 [5]

(1) SD(8)4 sample taken during February 23, 2000 storm
(2) Caltrans used Pimelas promelas in place of Hyalella for SD(8)4. There were no February 12, 2000 toxicity tests for SD(8)4.
(3) Results qualified as estimates. Some dilution results were identified as outliers and were not included in the calculation.
(4) No SD(8)5 samples were delivered to lab for toxicity testing from the February 12 storm event.
(5) 96-toxicity test.
NOEC = No Observed Effect Concentration. LOEC = Lowest Observed Effect Concentration. LT50 = Time for 50% mortality in 100% sample. LC50 = Concentration for 50% mortality. TUc = Chronic Toxicity Units, which equal 100/NOEC. Tuc of 1 indicates no toxicity observed.

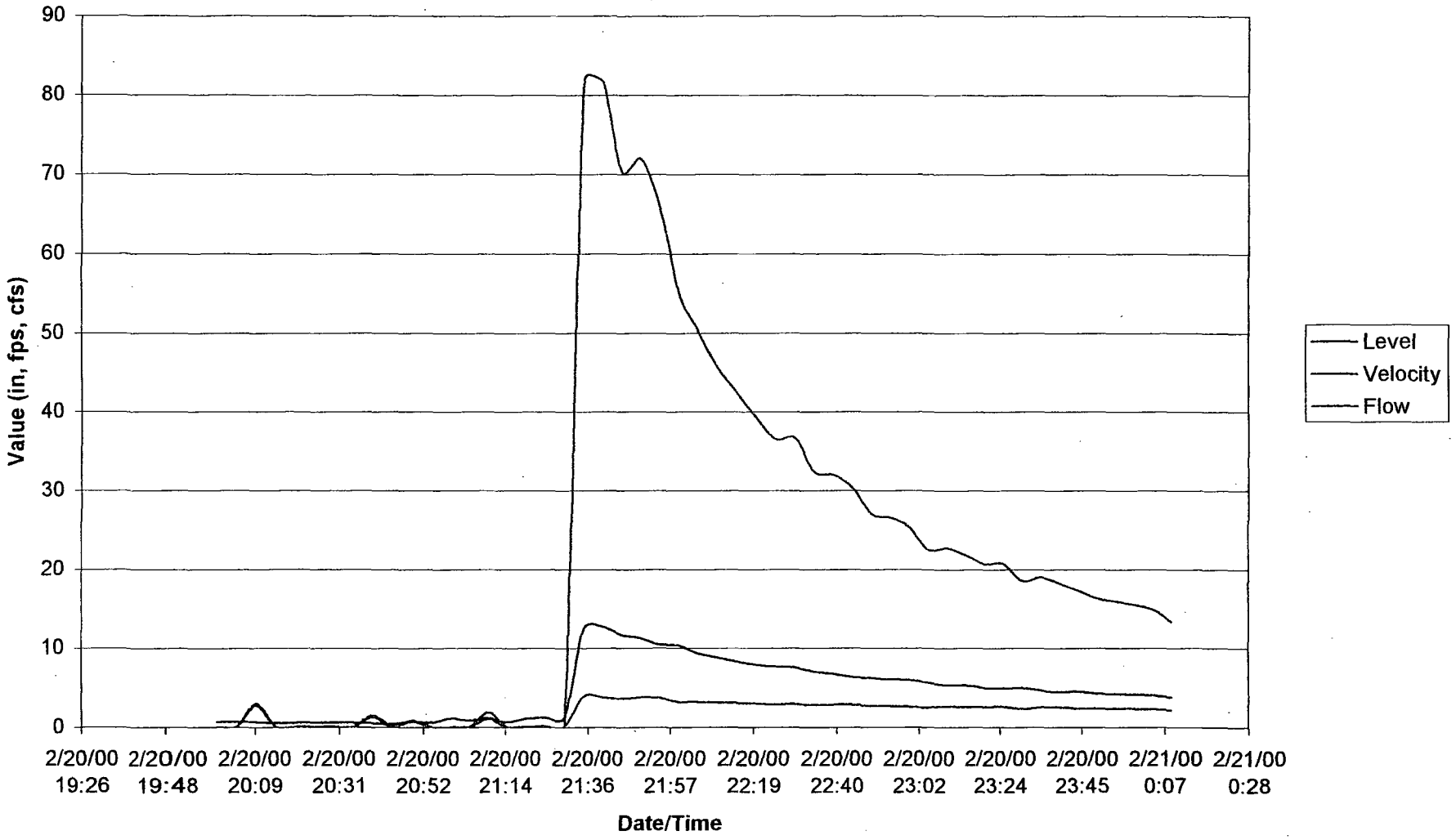

SD(8)1 Main Chollas Channel
February 12, 2000
Value (in,fps,cfs)
300
250
200
150
100
50
0
2/12/00 1:55
2/12/00 3:50
2/12/00 5:45
2/12/00 7:40
2/12/00 9:36
2/12/00 11:31
2/12/00 13:26
2/12/00 15:21
2/12/00 17:16
2/12/00 19:12
2/12/00 21:07
Date/Time
Level
Velocity
Flow

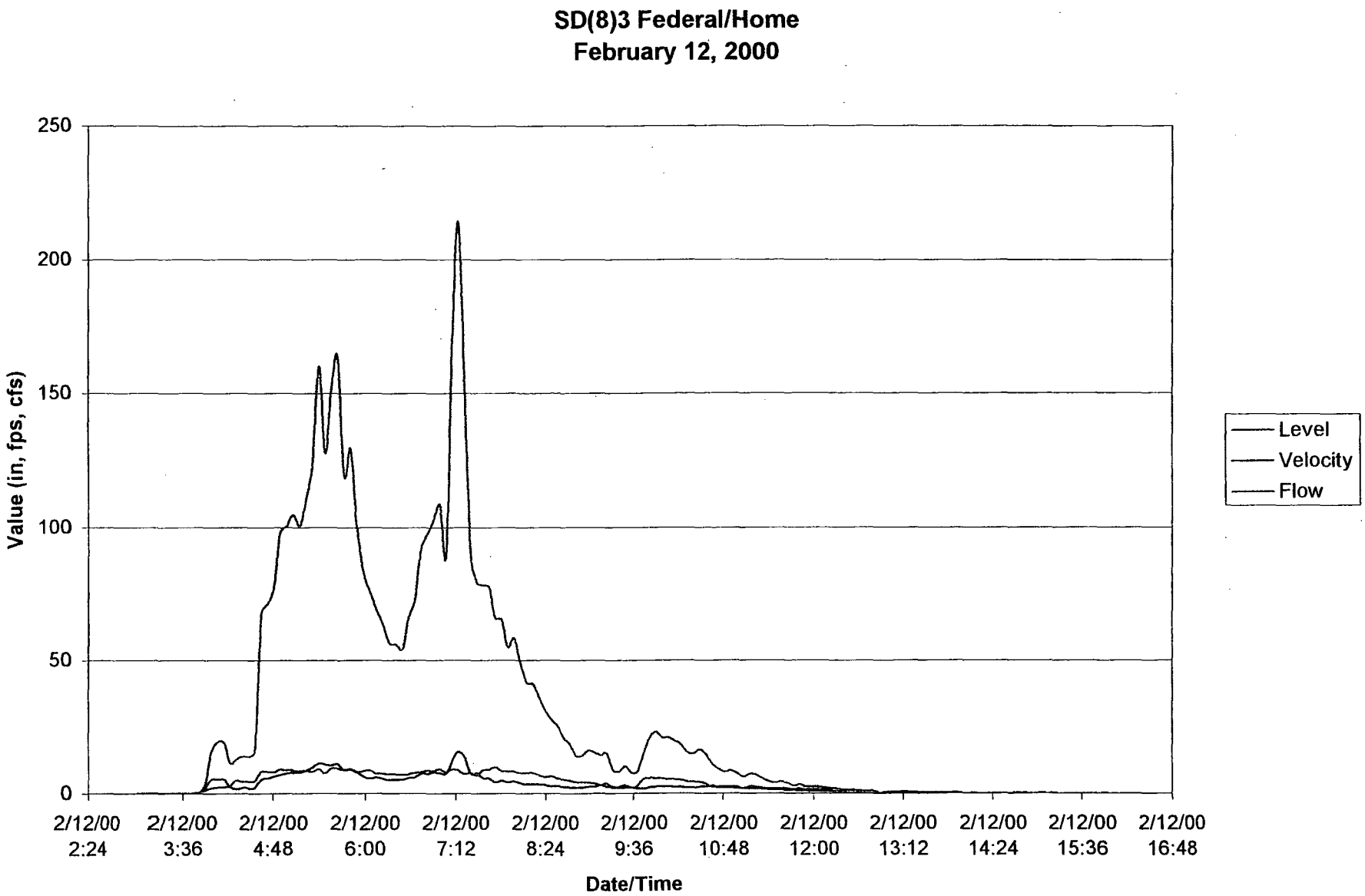

SD(8)1 Main Chollas Channel
February 20, 2000
600
500
400
300
200
100
0
Value (in,fps,cfs)
2/20/00 15:21
2/20/00 17:16
2/20/00 19:12
2/20/00 21:07
2/20/00 23:02
2/21/00 0:57
2/21/00 2:52
2/21/00 4:48
2/21/00 6:43
2/21/00 8:38
2/21/00 10:33
2/21/00 12:28
Date/Time
Level
Velocity
Flow

SD(8)2 Wabash/I-15
February 12, 2000



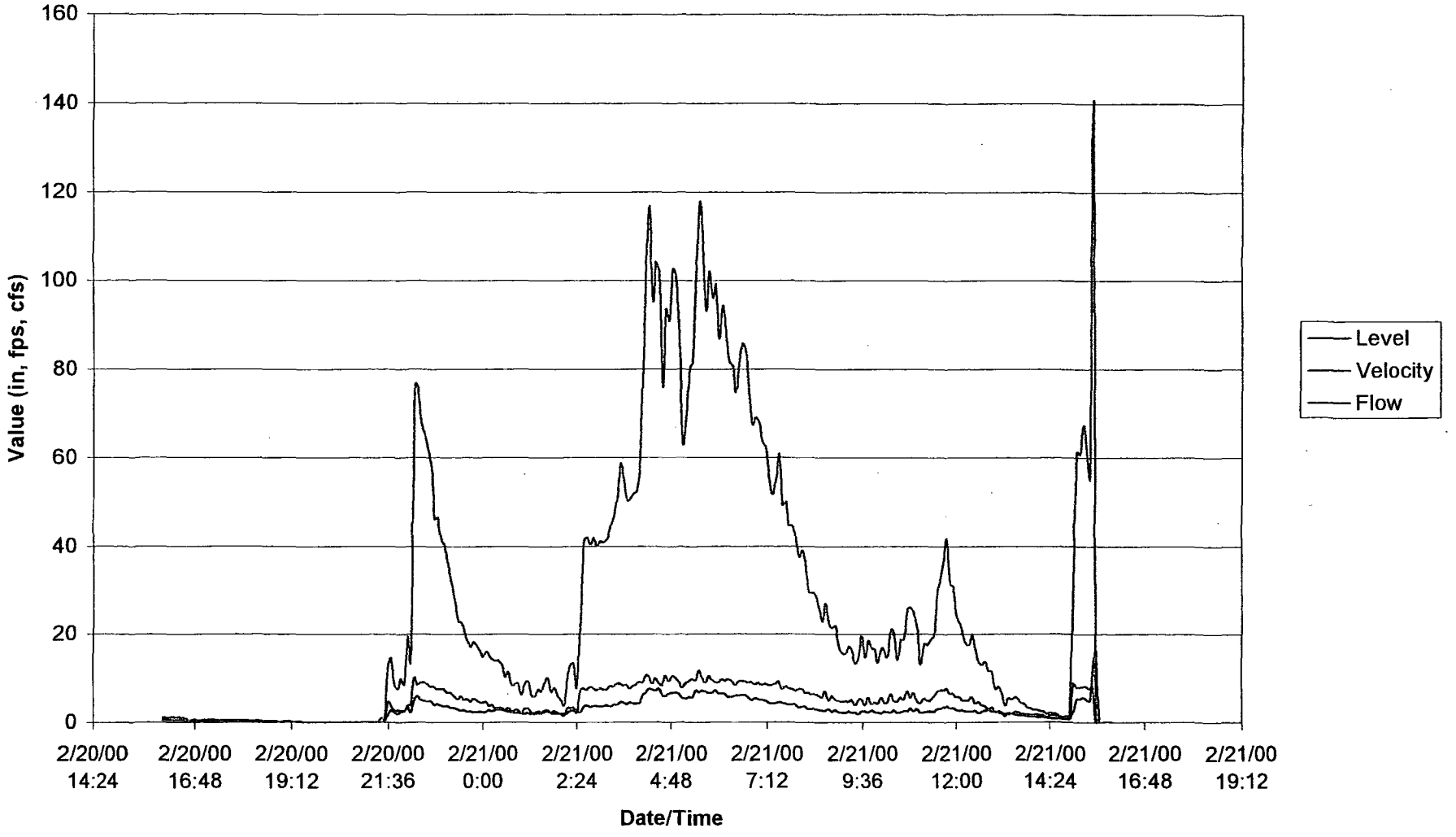
SD(8)2 Wabash/I-15
February 20, 2000





SDSW Supplemental Chollas.xls

SD(8)3 Federal/Home
February 20, 2000



SD(8)4 South Branch Hydrological Data (Caltrans)

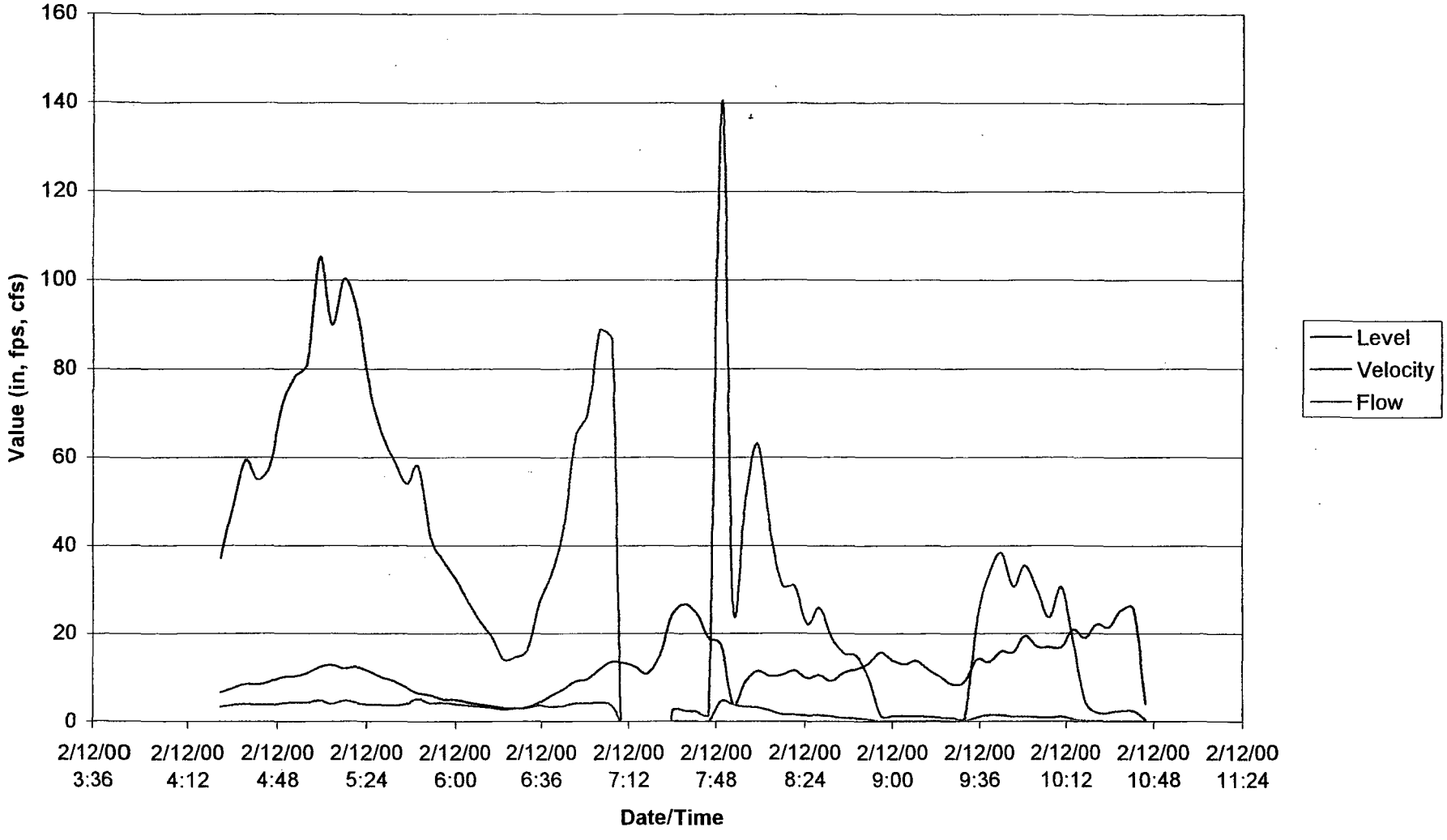
Chollas Creek South Fork Storm
2/12/2000 Field Data Log Summary

Measurement Number	Sample Time	Depth (inches)	Flow Rate (cfs)	pH	Temperature (°C)	Conductivity (µmhos/cm)
1	0420	17.5	913	7.35	14.7	460
2	0440	19.75	1066	7.32	15.0	180
3	0500	20.5	1145	7.29	14.7	270
4	0520	22.0	1226	7.31	14.5	350
5	0540	23.0	1308	7.58	15.0	430
6	0600	20.0	1066	7.68	15.6	250
7	0620	16.0	765	7.53	15.3	260
8	0640	16.0	765	7.61	16.3	240
9	0700	17.0	838	7.68	16.0	230
10	0720	22.0	1226	7.62	13.9	210
11	0740	27.0	1647	7.72	14.4	190
12	0800	26.0	1561	7.78	14.5	170
13	0820	26.0	1561	7.75	14.6	190
14	0840	25.0	1475	7.75	14.7	200
15	0900	12.0	495	7.74	14.8	200
16	0920	10.0	373	7.74	15.9	210
17	0940	10.0	373	7.73	15.8	210
18	1000	8.0	264	7.67	16.5	240
19	1020	8.0	264	7.71	16.5	250
20	1040	8.0	264	7.69	15.9	270
21	1100	8.0	264	7.71	16.9	300

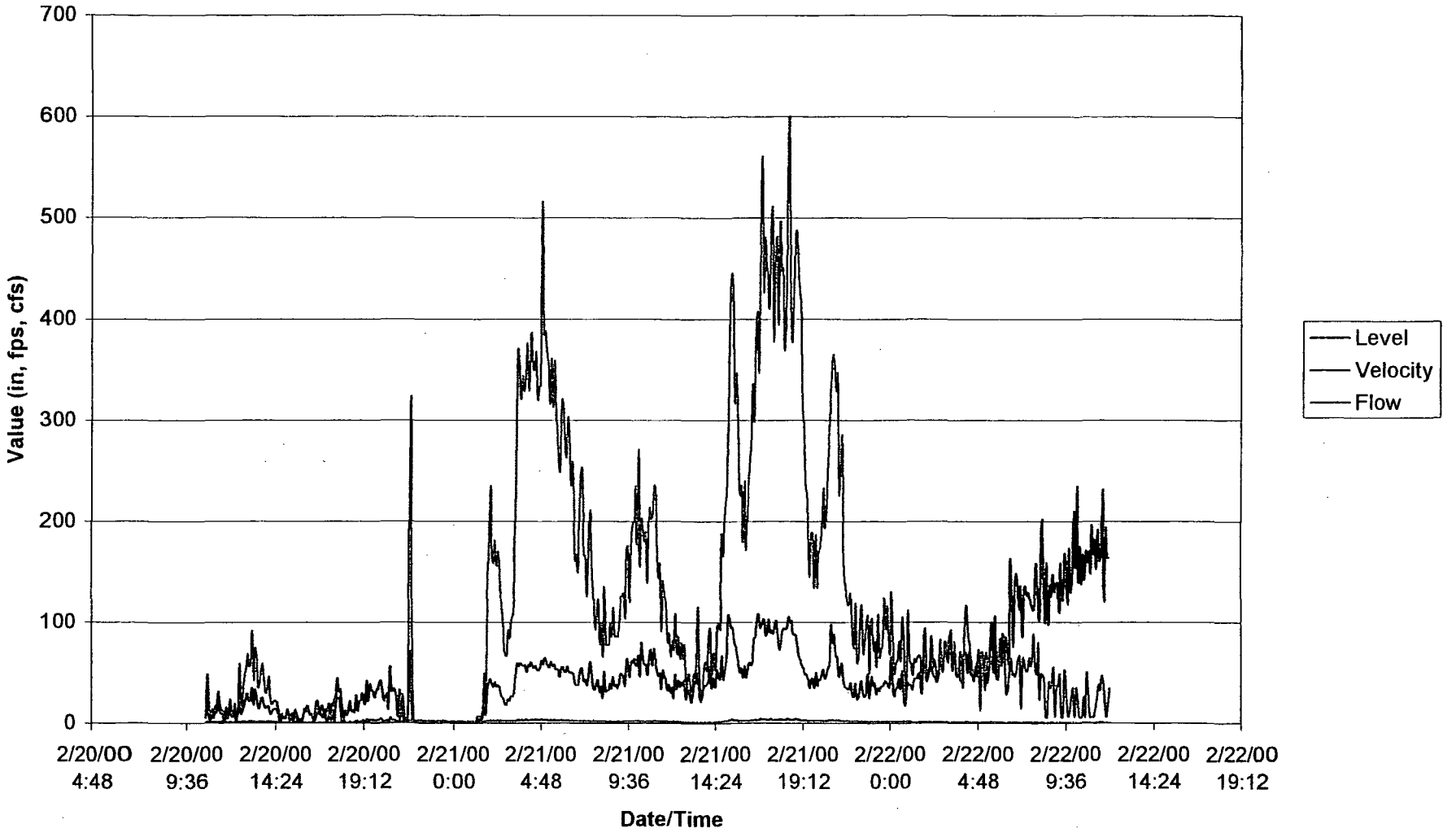
Chollas Creek South Fork Storm
2/23/2000 Field Data Log Summary

Measurement Number	Sample Time	Depth (inches)	Flow Rate (cfs)	pH	Temperature (°C)	Conductivity (µmhos/cm)
1	1615	0.25	2	8.63	16.5	510
2	1635	1.0	9	8.01	15.9	360
3	1655	3.0	55	7.80	15.5	560
4	1715	9.0	317	7.93	15.5	290
5	1735	18.0	913	7.72	15.6	410
6	1755	24.0	1391	7.92	16.0	270
7	1815	26.0	1561	8.08	14.2	240
8	1835	19.0	989	8.06	14.7	170
9	1855	16.0	765	8.04	14.2	130
10	1915	11.0	433	8.04	14.1	130
11	1935	7.0	214	7.90	13.9	150
12	1955	5.0	125	7.86	13.8	170

SD(8)5 Federal/94
February 12, 2000



SD(8)5 Federal/94
February 20, 2000



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3117-1
Client:
Calif. Reg. WQCB, San Diego
Diane S. Welch
9771 Claremont Mesa Blvd.,Ste A

San Diego,CA 92124-1324

Client I.D.: SAMPLE #81
Site: URSGWC
Description: Delevan - SD(8)2

Matrix: wastewater

Page: 1 of 1
Lab No.: L65635-001

Date Reported: 02/23/00

Collected By:
Date: 02/12/00
Time: 1025
Submitted By: Courier
Date: 02/15/00
Time: 1045

Constituent	Result		Method	RL	Date / Analyst
Total Hardness	58.	mg/L	EPA 200.7	3.	000218/LT
Calcium	13.	mg/L	EPA 200.7	1.	000218/LT
Magnesium	6.	mg/L	EPA 200.7	1.	000218/LT
Ammonia-Nitrogen	0.3	mg/L	SM4500-NH3 H	0.1	000216/KS
Nitrate-Nitrogen	1.2	mg/L	EPA 300.0	0.2	000215/KOS
pH	8.3	units	EPA 150.1	1.	000215/DD
Total Dissolved Solids	140	mg/L	EPA 160.1	10	000218/SF
Total Suspended Solids	220	mg/L	EPA 160.2	5.	000218/SL
MBAS	0.05	mg/L	EPA 425.1	0.05	000216/CW
Total Dissolved Phosphorus	0.38	mg/L	SM 4500-PE	0.05	000215/RK
Total Phosphorus	0.66	mg/L	SM 4500-PB4E	0.05	000215/RK
Nitrite-Nitrogen	ND	mg/L	EPA 354.1	0.1	000215/TF
Kjeldahl Nitrogen	2.3	mg/L	EPA 351.2	0.1	000221/TF
Turbidity	120	NTU	EPA 180.1	0.05	000216/LA
Antimony	ND	ug/L	EPA 200.8	10	000221/DA
Arsenic	ND	ug/L	EPA 200.8	5.	000221/DA
Cadmium	ND	ug/L	EPA 200.8	2.	000221/DA
Total Chromium	ND	ug/L	EPA 200.8	20.	000221/DA
Copper	68.	ug/L	EPA 200.8	10	000221/DA
Lead	34.	ug/L	EPA 200.8	10	000221/DA
Nickel	ND	ug/L	EPA 200.8	20	000221/DA
Selenium	ND	ug/L	EPA 200.8	5.	000221/DA
Zinc	160	ug/L	EPA 200.8	10	000221/DA

ND = None detected at RL (Reporting Limit). RL units same as result.

cc:

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SD(8)2

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3117-1

Client:
Calif. Reg. WQCB, San Diego
Diane S. Welch
9771 Claremont Mesa Blvd., Ste A

San Diego, CA 92124-1324

Lab No.: L65635-002

Date Reported: 02/23/00

Collected By:
Date: 02/12/00
Time: 1025
Submitted By: Courier
Date: 02/15/00
Time: 1045

Client I.D.: SAMPLE #81 DISSOLVED
Site: URSGWC
Description: Delevan SD(8)2
Matrix: wastewater

Constituent	Result		Method	RL	Date / Analyst
Antimony	ND	ug/L	EPA 200.8	10	000221/DA
Arsenic	ND	ug/L	EPA 200.8	5.	000221/DA
Cadmium	ND	ug/L	EPA 200.8	2.	000221/DA
Total Chromium	ND	ug/L	EPA 200.8	20.	000221/DA
Copper	37.	ug/L	EPA 200.8	10	000221/DA
Lead	ND	ug/L	EPA 200.8	10.	000221/DA
Nickel	ND	ug/L	EPA 200.8	20	000221/DA
Selenium	ND	ug/L	EPA 200.8	5.	000221/DA
Zinc	45.	ug/L	EPA 200.8	10	000221/DA

ND = None detected at RL (Reporting Limit). RL units same as result.

Sample filtered prior to metals analysis.

cc:

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3117-1
Client:
Calif. Reg. WQCB, San Diego
Diane S. Welch
9771 Claremont Mesa Blvd.,Ste A

San Diego,CA 92124-1324

Client I.D.: DELEVAN SD(8)2
Site:
Description: Stormwater-Dissolved

Matrix: wastewater

Page: 1 of 1
Lab No.: L65995-007

Date Reported: 03/08/00

Collected By:
Date: 02/21/00
Time: 0725
Submitted By: UPS
Date: 02/23/00
Time: 0915

Constituent	Result		Method	RL	Date / Analyst
Antimony	ND	ug/L	EPA 200.8	10	000228/LT
Arsenic	ND	ug/L	EPA 200.8	5.	000228/LT
Cadmium	ND	ug/L	EPA 200.8	2.	000228/LT
Total Chromium	ND	ug/L	EPA 200.8	20	000228/LT
Copper	11.	ug/L	EPA 200.8	10	000228/LT
Lead	ND	ug/L	EPA 200.8	10	000228/LT
Nickel	ND	ug/L	EPA 200.8	20	000228/LT
Selenium	ND	ug/L	EPA 200.8	5.	000228/LT
Zinc	67.	ug/L	EPA 200.8	10	000228/LT

ND = None detected at RL (Reporting Limit). RL units same as result.

Sample filtered for dissolved metals.

CC:

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SD(8)2

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3117-1
Client:
Calif. Reg. WQCB, San Diego
Diane S. Welch
9771 Claremont Mesa Blvd.,Ste A

San Diego,CA 92124-1324

Client I.D.: SAMPLE #82
Site: URSGWC
Description: Federal @ Home SD(8)3

Matrix: wastewater

Page: 1 of 1
Lab No.: L65635-003

Date Reported: 02/23/00

Collected By:
Date: 02/12/00
Time: 0905
Submitted By: Courier
Date: 02/15/00
Time: 1045

Constituent	Result		Method	RL	Date / Analyst
Total Hardness	54.	mg/L	EPA 200.7	3.	000218/LT
Calcium	14.	mg/L	EPA 200.7	1.	000218/LT
Magnesium	5.	mg/L	EPA 200.7	1.	000218/LT
Ammonia-Nitrogen	0.5	mg/L	SM4500-NH3 H	0.1	000218/KS
Nitrate-Nitrogen	0.9	mg/L	EPA 300.0	0.2	000215/KOS
pH	8.1	units	EPA 150.1	1.	000215/DU
Total Dissolved Solids	100	mg/L	EPA 160.1	10	000218/SF
Total Suspended Solids	270	mg/L	EPA 160.2	5.	000218/SL
MBAS	0.11	mg/L	EPA 425.1	0.05	000216/CW
Total Dissolved Phosphorus	0.36	mg/L	SM 4500-PE	0.05	000215/RK
Total Phosphorus	1.2	mg/L	SM 4500-PB4E	0.05	000215/RK
Nitrite-Nitrogen	ND	mg/L	EPA 354.1	0.1	000215/TF
Kjeldahl Nitrogen	2.6	mg/L	EPA 351.2	0.1	000221/TF
Turbidity	81	NTU	EPA 180.1	0.05	000216/LA
Antimony	ND	ug/L	EPA 200.8	10	000221/DA
Arsenic	ND	ug/L	EPA 200.8	5.	000221/DA
Cadmium	ND	ug/L	EPA 200.8	2.	000221/DA
Total Chromium	ND	ug/L	EPA 200.8	20	000221/DA
Copper	68.	ug/L	EPA 200.8	10	000221/DA
Lead	52.	ug/L	EPA 200.8	10	000221/DA
Nickel	ND	ug/L	EPA 200.8	20	000221/DA
Selenium	ND	ug/L	EPA 200.8	5.	000221/DA
Zinc	300	ug/L	EPA 200.8	10	000221/DA

ND = None detected at RL (Reporting Limit). RL units same as result.

cc:

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(SD(8)3

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www.babcocklabs.com

3117-1

Client:
Calif. Reg. WQCB, San Diego
Diane S. Welch
9771 Claremont Mesa Blvd.,Ste A

San Diego,CA 92124-1324

Client I.D.: SAMPLE #82 DISSOLVED
Site: URSGWC
Description: Federal @ Home SB(8)3

Matrix: wastewater

Page: 1 of 1
Lab No.: L65635-004

Date Reported: 02/23/00

Collected By:
Date: 02/12/00
Time: 0905
Submitted By: Courier
Date: 02/15/00
Time: 1045

Constituent	Result		Method	RL	Date / Analyst
Antimony	ND	ug/L	EPA 200.8	10	000221/DA
Arsenic	ND	ug/L	EPA 200.8	5.	000221/DA
Cadmium	ND	ug/L	EPA 200.8	2.	000221/DA
Total Chromium	ND	ug/L	EPA 200.8	20	000221/DA
Copper	ND	ug/L	EPA 200.8	10	000221/DA
Lead	ND	ug/L	EPA 200.8	10	000221/DA
Nickel	ND	ug/L	EPA 200.8	20	000221/DA
Selenium	ND	ug/L	EPA 200.8	5.	000221/DA
Zinc	20.	ug/L	EPA 200.8	10	000221/DA

ND = None detected at RL (Reporting Limit). RL units same as result.

Sample filtered prior to metals analysis.

cc:

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3117-1
Client:
Calif. Reg. WQCB, San Diego
Diane S. Welch
9771 Claremont Mesa Blvd.,Ste A

San Diego,CA 92124-1324

Client I.D.: FEDERAL @ HOME SD(8)3
Site:
Description: Stormwater

Matrix: wastewater

Page: 1 of 1
Lab No.: L65995-002

Date Reported: 03/08/00

Collected By:
Date: 02/21/00
Time: 1650
Submitted By: UPS
Date: 02/23/00
Time: 0915

Constituent	Result		Method	RL	Date / Analyst
Total Hardness	36.	mg/L	EPA 200.7	3.	000229/LT
Calcium	10.	mg/L	EPA 200.7	1.	000229/LT
Magnesium	3.	mg/L	EPA 200.7	1.	000229/LT
Ammonia-Nitrogen	ND	mg/L	SM4500-NH3 H	0.1	000225/KS
Specific Conductance	140	umho/cm	EPA 120.1	1.0	000223/DU
Total Dissolved Solids	110	mg/L	EPA 160.1	10	000225/BW
Total Suspended Solids	110	mg/L	EPA 160.2	5.	000228/KMS
Chemical Oxygen Demand	78	mg/L	EPA 410.4	10	000227/KQS
Oil & Grease	ND	mg/L	EPA 1664	5.	000304/JKB
Total Phosphorus	0.57	mg/L	SM 4500-PB4E	0.05	000225/RR
Kjeldahl Nitrogen	1.9	mg/L	EPA 351.2	0.1	000301/BW
Antimony	ND	ug/L	EPA 200.8	10	000228/LT
Arsenic	ND	ug/L	EPA 200.8	5.	000228/LT
Cadmium	ND	ug/L	EPA 200.8	2.	000228/LT
Total Chromium	ND	ug/L	EPA 200.8	20	000228/LT
Copper	19.	ug/L	EPA 200.8	10	000228/LT
Lead	19.	ug/L	EPA 200.8	10	000228/LT
Nickel	ND	ug/L	EPA 200.8	20	000228/LT
Selenium	ND	ug/L	EPA 200.8	5.	000228/LT
Zinc	160	ug/L	EPA 200.8	10	000228/LT

ND = None detected at RL (Reporting Limit). RL units same as result.

cc:

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ST.(8)7

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3117-1

Client:
Calif. Reg. WQCB, San Diego
Diane S. Welch
9771 Claremont Mesa Blvd.,Ste A

San Diego,CA 92124-1324

Client I.D.: FEDERAL @ HOME SD (8)3
Site:
Description: Stormwater-Dissolved

Matrix: wastewater

Page: 1 of 1
Lab No.: L65995-006

Date Reported: 03/08/00

Collected By:
Date: 02/21/00
Time: 1650
Submitted By: UPS
Date: 02/23/00
Time: 0915

Constituent	Result		Method	RL	Date / Analyst
Antimony	ND	ug/L	EPA 200.8	10	000228/LT
Arsenic	ND	ug/L	EPA 200.8	5.	000228/LT
Cadmium	ND	ug/L	EPA 200.8	2.	000228/LT
Total Chromium	ND	ug/L	EPA 200.8	20	000228/LT
Copper	ND	ug/L	EPA 200.8	10	000228/LT
Lead	ND	ug/L	EPA 200.8	10.	000228/LT
Nickel	ND	ug/L	EPA 200.8	20	000228/LT
Selenium	ND	ug/L	EPA 200.8	5.	000228/LT
Zinc	57.	ug/L	EPA 200.8	10	000228/LT

ND = None detected at RL (Reporting Limit). RL units same as result.

Sample filtered for dissolved metals.

cc:

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5 of 13

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3117-1
Client:
Calif. Reg. WQCB, San Diego
Diane S. Welch
9771 Claremont Mesa Blvd., Ste A

San Diego, CA 92124-1324

Client I.D.: SAMPLE #83
Site: URSGWC
Description: Federal @ 94 SD(8)5

Matrix: wastewater

Page: 1 of 1
Lab No.: L65635-005

Date Reported: 02/23/00

Collected By:
Date: 02/12/00
Time: 1045
Submitted By: Courier
Date: 02/15/00
Time: 1045

Constituent	Result		Method	RL	Date / Analyst
Total Hardness	100	mg/L	EPA 200.7	3.	000218/LT
Calcium	21.	mg/L	EPA 200.7	1.	000218/LT
Magnesium	12.	mg/L	EPA 200.7	1.	000218/LT
Ammonia-Nitrogen	0.4	mg/L	SM4500-NH3 H	0.1	000218/KS
Nitrate-Nitrogen	1.1	mg/L	EPA 300.0	0.2	000215/KOS
pH	7.5	units	EPA 150.1	1.	000215/DD
Total Dissolved Solids	220	mg/L	EPA 160.1	10	000218/SF
Total Suspended Solids	520	mg/L	EPA 160.2	5.	000218/SL
MBAS	ND	mg/L	EPA 425.1	0.05	000216/CW
Total Dissolved Phosphorus	0.37	mg/L	SM 4500-PE	0.05	000215/RK
Total Phosphorus	0.95	mg/L	SM 4500-PB4E	0.05	000215/RK
Nitrite-Nitrogen	ND	mg/L	EPA 354.1	0.1	000215/TF
Kjeldahl Nitrogen	2.6	mg/L	EPA 351.2	0.1	000221/TF
Turbidity	240	NTU	EPA 180.1	0.05	000216/LA
Antimony	ND	ug/L	EPA 200.8	10	000221/DA
Arsenic	11.	ug/L	EPA 200.8	5.	000221/DA
Cadmium	ND	ug/L	EPA 200.8	2.	000221/DA
Total Chromium	ND	ug/L	EPA 200.8	20	000221/DA
Copper	43.	ug/L	EPA 200.8	10	000221/DA
Lead	76.	ug/L	EPA 200.8	10	000221/DA
Nickel	ND	ug/L	EPA 200.8	20	000221/DA
Selenium	ND	ug/L	EPA 200.8	5.	000221/DA
Zinc	370	ug/L	EPA 200.8	10	000221/DA

ND = None detected at RL (Reporting Limit). RL units same as result.

cc:

E. S. Babcock & Sons Inc.

4-615

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3117-1
Client:
Calif. Reg. WQCB, San Diego
Diane S. Welch
9771 Claremont Mesa Blvd., Ste A

San Diego, CA 92124-1324

Client I.D.: SAMPLE #83 DISSOLVED
Site: URSGWC
Description: Federal @ 94 SD(8)S

Matrix: wastewater

Lab No.: L65635-006

Date Reported: 02/23/00

Collected By:
Date: 02/12/00
Time: 1045
Submitted By: Courier
Date: 02/15/00
Time: 1045

Constituent	Result		Method	RL	Date / Analyst
Antimony	ND	ug/L	EPA 200.8	10	000221/DA
Arsenic	ND	ug/L	EPA 200.8	5.	000221/DA
Cadmium	ND	ug/L	EPA 200.8	2.	000221/DA
Total Chromium	ND	ug/L	EPA 200.8	20	000221/DA
Copper	ND	ug/L	EPA 200.8	10	000221/DA
Lead	ND	ug/L	EPA 200.8	10	000221/DA
Nickel	ND	ug/L	EPA 200.8	20	000221/DA
Selenium	ND	ug/L	EPA 200.8	5.	000221/DA
Zinc	45.	ug/L	EPA 200.8	10	000221/DA

ND = None detected at RL (Reporting Limit). RL units same as result.

Sample filtered prior to metals analysis.

cc:

E. S. Babcock & Sons Inc.

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e-mail: esbsales@aol.com
www.babcocklabs.com

3117-1

Client:
Calif. Reg. WQCB, San Diego
Diane S. Welch
9771 Claremont Mesa Blvd.,Ste A

San Diego,CA 92124-1324

Client I.D.: FEDERAL @ 94TH SD(8)S
Site:
Description: Stormwater

Matrix: wastewater

Page: 1 of 1
Lab No.: L65995-001

Date Reported: 03/08/00

Collected By:
Date: 02/21/00
Time: 1330
Submitted By: UPS
Date: 02/23/00
Time: 0915

Constituent	Result		Method	RL	Date / Analyst
Total Hardness	63.	mg/L	EPA 200.7	3.	000229/LT
Calcium	14.	mg/L	EPA 200.7	1.	000229/LT
Magnesium	7.	mg/L	EPA 200.7	1.	000229/LT
Ammonia-Nitrogen	ND	mg/L	SM4500-NH3 H	0.1	000225/KS
Specific Conductance	220	umho/cm	EPA 120.1	1.0	000223/DU
Total Dissolved Solids	180	mg/L	EPA 160.1	10	000225/BW
Total Suspended Solids	280	mg/L	EPA 160.2	5.	000228/KMS
Chemical Oxygen Demand	85.	mg/L	EPA 410.4	10	000227/ROS
Oil & Grease	ND	mg/L	EPA 1664	5.	000304/JKB
Total Phosphorus	0.58	mg/L	SM 4500-PE&F	0.05	000225/RK
Kjeldahl Nitrogen	1.4	mg/L	EPA 351.2	0.1	000301/BW
Antimony	ND	ug/L	EPA 200.8	10	000228/LT
Arsenic	11.	ug/L	EPA 200.8	5.	000228/LT
Cadmium	ND	ug/L	EPA 200.8	2.	000228/LT
Total Chromium	ND	ug/L	EPA 200.8	20	000228/LT
Copper	27.	ug/L	EPA 200.8	10	000228/LT
Lead	35.	ug/L	EPA 200.8	10	000228/LT
Nickel	ND	ug/L	EPA 200.8	20	000228/LT
Selenium	ND	ug/L	EPA 200.8	5.	000228/LT
Zinc	220	ug/L	EPA 200.8	10	000228/LT

ND = None detected at RL (Reporting Limit). RL units same as result.

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SD(8)S

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3117-1
Client:
Calif. Reg. WQCB, San Diego
Diane S. Welch
9771 Claremont Mesa Blvd.,Ste A

San Diego,CA 92124-1324

Client I.D.: FEDERAL @ 94TH SD(8)5
Site:
Description: Stormwater-Dissolved

Matrix: wastewater

Page: 1 of 1
Lab No.: L65995-005

Date Reported: 03/08/00

Collected By:
Date: 02/21/00
Time: 1330
Submitted By: UPS
Date: 02/23/00
Time: 0915

Constituent	Result		Method	RL	Date / Analyst
Antimony	ND	ug/L	EPA 200.8	10	000228/LT
Arsenic	ND	ug/L	EPA 200.8	5.	000228/LT
Cadmium	ND	ug/L	EPA 200.8	2.	000228/LT
Total Chromium	ND	ug/L	EPA 200.8	20	000228/LT
Copper	ND	ug/L	EPA 200.8	10	000228/LT
Lead	ND	ug/L	EPA 200.8	10	000228/LT
Nickel	ND	ug/L	EPA 200.8	20	000228/LT
Selenium	ND	ug/L	EPA 200.8	5	000228/LT
Zinc	32.	ug/L	EPA 200.8	10	000228/LT

ND = None detected at RL (Reporting Limit). RL units same as result.

Sample filtered for dissolved metals.

cc:

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4-(8)5

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3117-1
Client:
Calif. Reg. WQCB, San Diego
Diane S. Welch
9771 Claremont Mesa Blvd., Ste A

San Diego, CA 92124-1324

Page: 1 of 1
Lab No.: L65635-007

Date Reported: 02/23/00

Collected By:
Date: 02/12/00
Time: 1055
Submitted By: Courier
Date: 02/15/00
Time: 1045

Client I.D.: SAMPLE #84
Site: URSGWC
Description: 69th SD(8)6

Matrix: wastewater

Constituent	Result		Method	RL	Date / Analyst
Total Hardness	120	mg/L	EPA 200.7	3.	000218/LT
Calcium	26.	mg/L	EPA 200.7	1.	000218/LT
Magnesium	13.	mg/L	EPA 200.7	1.	000218/LT
Ammonia-Nitrogen	0.3	mg/L	SM4500-NH3 H	0.1	000218/KS
Nitrate-Nitrogen	1.	mg/L	EPA 300.0	0.2	000215/KOS
pH	7.4	units	EPA 150.1	1.	000215/DU
Total Dissolved Solids	310	mg/L	EPA 160.1	10	000218/SF
Total Suspended Solids	170	mg/L	EPA 160.2	5.	000218/SL
MBAS	0.11	mg/L	EPA 425.1	0.05	000216/CW
Total Dissolved Phosphorus	0.34	mg/L	SM 4500-PE	0.05	000216/RK
Total Phosphorus	4.0	mg/L	SM 4500-PB4E	0.05	000216/RK
Nitrite-Nitrogen	ND	mg/L	EPA 354.1	0.1	000215/TP
Kjeldahl Nitrogen	2.0	mg/L	EPA 351.2	0.1	000221/TP
Turbidity	68.	NTU	EPA 180.1	0.05	000216/LA
Antimony	ND	ug/L	EPA 200.8	10	000221/DA
Arsenic	ND	ug/L	EPA 200.8	5.	000221/DA
Cadmium	ND	ug/L	EPA 200.8	2.	000221/DA
Total Chromium	ND	ug/L	EPA 200.8	20	000221/DA
Copper	23.	ug/L	EPA 200.8	10	000221/DA
Lead	16.	ug/L	EPA 200.8	10	000221/DA
Nickel	ND	ug/L	EPA 200.8	20	000221/DA
Selenium	6.	ug/L	EPA 200.8	5.	000221/DA
Zinc	100	ug/L	EPA 200.8	10	000221/DA

ND = None detected at RL (Reporting Limit). RL units same as result.

cc:

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3117-1
Client:
Calif. Reg. WQCB, San Diego
Diane S. Welch
9771 Claremont Mesa Blvd.,Ste A

San Diego,CA 92124-1324

Client I.D.: SAMPLE #84 DISSOLVED
Site: URSGWC
Description: 69th SD(8)6

Matrix: wastewater

Page: 1 of 1
Lab No.: L65635-008

Date Reported: 02/23/00

Collected By:
Date: 02/12/00
Time: 1055
Submitted By: Courier
Date: 02/15/00
Time: 1045

Constituent	Result		Method	RL	Date / Analyst
Antimony	ND	ug/L	EPA 200.8	10	000221/DA
Arsenic	ND	ug/L	EPA 200.8	5.	000221/DA
Cadmium	ND	ug/L	EPA 200.8	2.	000221/DA
Total Chromium	ND	ug/L	EPA 200.8	20	000221/DA
Copper	ND	ug/L	EPA 200.8	10	000221/DA
Lead	ND	ug/L	EPA 200.8	10	000221/DA
Nickel	ND	ug/L	EPA 200.8	20	000221/DA
Selenium	6.	ug/L	EPA 200.8	5.	000221/DA
Zinc	20.	ug/L	EPA 200.8	10	000221/DA

ND = None detected at RL (Reporting Limit). RL units same as result.

Sample filtered prior to metals analysis.

cc:

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3117-1
Client:
Calif. Reg. WQCB, San Diego
Diane S. Welch
9771 Claremont Mesa Blvd.,Ste A

San Diego,CA 92124-1324

Client I.D.: 69TH SD(8)6
Site:
Description: Stormwater

Matrix: wastewater

Page: 1 of 1
Lab No.: L65995-004

Date Reported: 03/08/00

Collected By:
Date: 02/21/00
Time: 1335
Submitted By: UPS
Date: 02/23/00
Time: 0915

Constituent	Result		Method	RL	Date / Analyst
Total Hardness	100	mg/L	EPA 200.7	3.	000229/LT
Calcium	24.	mg/L	EPA 200.7	1.	000229/LT
Magnesium	11.	mg/L	EPA 200.7	1.	000229/LT
Ammonia-Nitrogen	ND	mg/L	SM4500-NH3 H	0.1	000225/KS
Specific Conductance	510	umho/cm	EPA 120.1	1.0	000223/DU
Total Dissolved Solids	320	mg/L	EPA 160.1	10	000225/BW
Total Suspended Solids	22.	mg/L	EPA 160.2	5.	000228/KMS
Chemical Oxygen Demand	36.	mg/L	EPA 410.4	10	000227/KDS
Oil & Grease	ND	mg/L	EPA 1664	5.	000304/JKB
Total Phosphorus	0.37	mg/L	SM 4500-PB&E	0.05	000225/RK
Kjeldahl Nitrogen	1.2	mg/L	EPA 351.2	0.1	000301/BW
Antimony	ND	ug/L	EPA 200.8	10	000228/LT
Arsenic	ND	ug/L	EPA 200.8	5.	000228/LT
Cadmium	ND	ug/L	EPA 200.8	2.	000228/LT
Total Chromium	ND	ug/L	EPA 200.8	20	000228/LT
Copper	ND	ug/L	EPA 200.8	10	000228/LT
Lead	ND	ug/L	EPA 200.8	10	000228/LT
Nickel	ND	ug/L	EPA 200.8	20	000228/LT
Selenium	8.	ug/L	EPA 200.8	5.	000228/LT
Zinc	54.	ug/L	EPA 200.8	10	000228/LT

ND = None detected at RL (Reporting Limit). RL units same as result.

cc:

E. S. Babcock & Sons Inc.

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3117-1
Client:
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Diane S. Welch
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San Diego,CA 92124-1324

Client I.D.: 69TH SD(8)6
Site:
Description: Stormwater-Dissolved

Matrix: wastewater

Page: 1 of 1
Lab No.: L65995-008

Date Reported: 03/08/00

Collected By:
Date: 02/21/00
Time: 1335
Submitted By: UPS
Date: 02/23/00
Time: 0915

Constituent	Result		Method	RL	Date / Analyst
Antimony	ND	ug/L	EPA 200.8	10	000228/LT
Arsenic	ND	ug/L	EPA 200.8	5.	000228/LT
Cadmium	ND	ug/L	EPA 200.8	2.	000228/LT
Total Chromium	ND	ug/L	EPA 200.8	20	000228/LT
Copper	ND	ug/L	EPA 200.8	10	000228/LT
Lead	ND	ug/L	EPA 200.8	10	000228/LT
Nickel	ND	ug/L	EPA 200.8	20	000228/LT
Selenium	8	ug/L	EPA 200.8	5.	000228/LT
Zinc	30.	ug/L	EPA 200.8	10	000228/LT

ND = None detected at RL (Reporting Limit). RL units same as result.

Sample filtered for dissolved metals.

cc:

E. S. Babcock & Sons Inc.

Storm Water Quality Data

SD(8)1

STATION	METHOD	PARAMETER	UNITS	SAMPLE DATE 2/12/00	2/20/00	3/5/00
		GRAB SAMPLES				
		GENERAL/PHYSICAL/ORGANIC				
SD8		Field pH	UNITS	7.9	8.6	8.3
SD8	EPA 413.2	OIL AND GREASE	MG/L	1.92	2.04	1.48
SD8	SM 2510-B	ELECTRICAL CONDUCTIVITY	UMHOS/CM	186	187	185
		BACTERIOLOGICAL				
SD8	SM 9223	TOTAL COLIFORM	MPN/100ML	500	> 1600	> 1600
SD8	SM 9221	FECAL COLIFORM	MPN/100ML	< 2.0	> 1600	> 1600
SD8	SM 9230	FECAL STREPTOCOCCI	MPN/100ML	< 2.0	> 1600	> 1600
		COMPOSITE SAMPLES				
		INORGANIC - WET CHEM				
SD8	SM 4500 NH_3-C	AMMONIA AS NITROGEN	MG/L	1.65	< .1	0.21
SD8	SM 5210-B	BOD	MG/L	7.8	2.54	6.1
SD8	SM 5220-C	CHEMICAL OXYGEN DEMAND	MG/L	41	104	57.0
SD8	SM 4500 P-E	DISSOLVED PHOSPHOROUS	MG/L	0.33	.26	0.22
SD8	SM 4500 P-E	TOTAL PHOSPHORUS	MG/L	0.46	.33	0.6
SD8	SM 4500 NO_3-E	NITRATE-N	MG/L	3.22	1.04	3.10
SD8	SM 4500 NO_2-B	NITRITE-N	MG/L	0.086	< .05	< 0.05
SD8	SM 4500 H-B	pH	UNITS	7.52	6.9	7.2
SD8	SM 2340-B	TOTAL HARDNESS	MG CaCO3/L	40.9	35.1	45.5
SD8	SM 4500 NH_3-C	TOTAL KJELDAHL NITROGEN	MG/L	2.98	3.1	2.36
SD8	SM 2540-C	TOTAL DISSOLVED SOLIDS	MG/L	120	111	140
SD8	SM 2540-D	TOTAL SUSPENDED SOLIDS	MG/L	457	62.0	200
SD8	SM 2130 B	TURBIDITY	NTU	50.0	27.0	38.0
SD8	SM 5540-C	SURFACTANTS (MBAS)	MG/L	0.35	0.22	0.13
		INORGANIC - TOTAL METALS				
SD8	EPA 200.7	ANTIMONY	MG/L	< 0.0015	< .0015	< 0.0015
SD8	EPA 206.2	ARSENIC	MG/L	< 0.001	0.007	0.005
SD8	EPA 200.7	CADMIUM	MG/L	< 0.00025	0.002	< 0.00025
SD8	EPA 200.7	CHROMIUM	MG/L	< 0.005	< 0.005	< 0.005
SD8	EPA 200.7	COPPER	MG/L	0.029	0.016	0.014
SD8	EPA 200.7	LEAD	MG/L	0.015	< 0.001	< 0.001
SD8	EPA 200.7	NICKEL	MG/L	< 0.005	< 0.005	< 0.005
SD8	EPA 270.2	SELENIUM	MG/L	< 0.001	< 0.001	< 0.001
SD8	EPA 200.7	ZINC	MG/L	0.096	0.05	0.08
		INORGANIC - DISSOLVED METALS				
SD8	EPA 200.7	ANTIMONY	MG/L	< 0.0015	< 0.0015	< 0.0015
SD8	EPA 206.2	ARSENIC	MG/L	< 0.001	0.005	< 0.001
SD8	EPA 200.7	CADMIUM	MG/L	< 0.00025	< 0.00025	< 0.00025
SD8	EPA 200.7	CHROMIUM	MG/L	< 0.005	< 0.005	< 0.005
SD8	EPA 200.7	COPPER	MG/L	< 0.005	< 0.005	< 0.005
SD8	EPA 200.7	LEAD	MG/L	< 0.001	< 0.001	< 0.001
SD8	EPA 200.7	NICKEL	MG/L	< 0.005	< 0.005	< 0.005
SD8	EPA 270.2	SELENIUM	MG/L	< 0.001	< 0.001	< 0.001
SD8	EPA 200.7	ZINC	MG/L	0.019	0.028	0.008
		ORGANOPHOSPHATE PESTICIDES				
SD8	EPA 8141	DIAZINON	UG/L	0.27*	0.35**	0.20**
SD8	EPA 8141	CHLORPYRIFOS	UG/L	< 0.50	< 0.50	0.04*

* indicates an estimated value that is below quanitification limit.

** indicates the percent difference between primary and confirmation columns is greater than 40%.

SD(8)4 – South Branch (Caltrans Monitoring)			
Constituent	**Reporting Limit**	**2/12/00**	**2/23/00**
Total Metals			
Antimony	1.0 ug/l	<1	<1
Zinc	1.0 ug/l	327	81
Total Nickel	2.0 ug/l	18.3	10.3
Aluminum	25.0 ug/l	17,300	13,800
Iron	20 ug/l	24,100	14,700
Lead	1.0 ug/l	83	25.9J
Manganese	2.0 ug/l	541	235
Cadmium	0.2 ug/l	1.3	0.7
Copper	1.0 ug/l	33	19
Thallium	1.0 ug/l	<1	<1
Selenium	2.0 ug/l	<2	<2
Silver	0.2 ug/l	0.3	<0.2
Chromium	1.0 ug/l	23	17
Mercury	0.2 ug/l	<0.2	0.3
Dissolved Metals			
Antimony	1.0 ug/l	<1	<1
Zinc	1.0 ug/l	16.8	42
Nickel	2.0 ug/l	5	6.1
Aluminum	25.0 ug/l	3,020	7,460
Iron	20.0 ug/l	1,760	6,800
Lead	1.0 ug/l	3.6	10.5J
Manganese	2.0 ug/l	49	77
Cadmium	0.2 ug/l	<0.2	0.3
Copper	1.0 ug/l	5.3	9.6
Thallium	1.0 ug/l	<1	<1
Selenium	2.0 ug/l	<2	<2
Silver	0.2 ug/l	<0.2	<0.2
Chromium	1.0 ug/l	2.1	9
Mercury	0.2 ug/l	<0.2	0.3
Conventionals/ Nutrients			
Ammonia as N	0.01 mg/l	0.13	0.08
Nitrate as N	0.01 mg/l	0.67	0.4
Nitrite as N	0.01 mg/l	0.09	0.05
Dissolved Phosphorus	0.002 mg/l	0.3	0.35
Total Phosphorus	0.002 mg/l	0.85	0.44
Orthophosphate as P	0.002 mg/l	0.25	0.29
Turbidity	1 NTU	157	310
Total Dissolved Solids	10 mg/l	190	232
Total Suspended Solids	1.0 mg/l	946	416
Conductivity	1 umho/cm	234	202
pH	0.1 units	7.7	8
Total Cyanide	0.005 mg/l	<0.005	<0.005
Hydrocarbons			
Oil & Grease	5 mg/l	19	7
Microbiological			
Total Coliform	2 MPN/100m	>160,000	>160,000
Fecal Coliform	2 MPN/100ml	>160,000	160,000
Minerals			
Fluoride	0.02 mg/l	0.18	0.1
Semi Volatile Organics			
2-Chlorophenol	10 ug/l	<10	<10
Phenol	10 ug/l	<10	<10
2-Methylphenol	10 ug/l	<10	<10
4-Methylphenol	10 ug/l	<10	<10
2,4-Dichlorophenol	10 ug/l	<10	<10
2,4-Dimethylphenol	10 ug/l	<10	<10
4-Chloro-3-	10 ug/l	<10	<10

methylphenol			
2,4,6-Trichlorophenol	10 ug/l	<10	<10
2,4,5-Trichlorophenol	10 ug/l	<10	<10
2,4-Dinitrophenol	10 ug/l	<10	<10
4-Nitrophenol	10 ug/l	<10	<10
4,6-Dinitro-2-methylphenol	10 ug/l	<10	<10
Pentachlorophenol	10 ug/l	<10	<10
Benzo(a)pyrene	2 ug/l	<2	<2
Hexachlorobenzene	2 ug/l	<2	<2
Benzo(a)anthracene	2 ug/l	<2	<2
Chrysene	2 ug/l	<2	<2
bis(2-ethylhexyl) phthalate	2 ug/l	<2	<2
Pesticides: Herbicides			
2,3,7,8-TCDD	1.0 ug/l	<1	<1
Glyphosate	5 ug/l	<5	<5
Thiobencarb	0.5 ug/l	<0.5	<0.5
Bromacil	1.0 ug/l	<1	<1
Diazinon	1.0 ug/l	<1	<1
Chlorpyrifos	1.0 ug/l	<1	<1
Diuron	1.0 ug/l	6.6	3.5
Bioassay			
Ceriodaphnia dubia NOEC Survival	NA	NA	100.00%
Tuc Survival	NA	NA	1.00
IC25 Survival	NA	NA	>100.00%
IC50 Survival	NA	NA	>100.00%
NOEC Reproduction	NA	NA	100.00%
Tuc Reproduction	NA	NA	1.00
IC25 Reproduction	NA	NA	>100.00%
IC50 Reproduction	NA	NA	>100.00%
Pimephales promelas NOEC Survival	NA	NA	100.00%
Tuc Survival	NA	NA	1.00
LC25 Survival	NA	NA	>100.00%
LC50 Survival	NA	NA	>100.00%
NOEC Growth	NA	NA	100.00%
Tuc Growth	NA	NA	1.00
LC25 Growth	NA	NA	>100.00%
LC50 Growth	NA	NA	>100.00%

The medians presented above have been evaluated by using a value of ½ the reporting limit for all data reported as equal to or less than the reporting limit_

AQUA-Science

Environmental Toxicology Consultants

Enzyme-Linked Immunosorbant Assay (ELISA) Results

Client: ***Woodward Clyde***

Project: ***Woodward 00-01***

Type of ELISA: ***Diazinon***

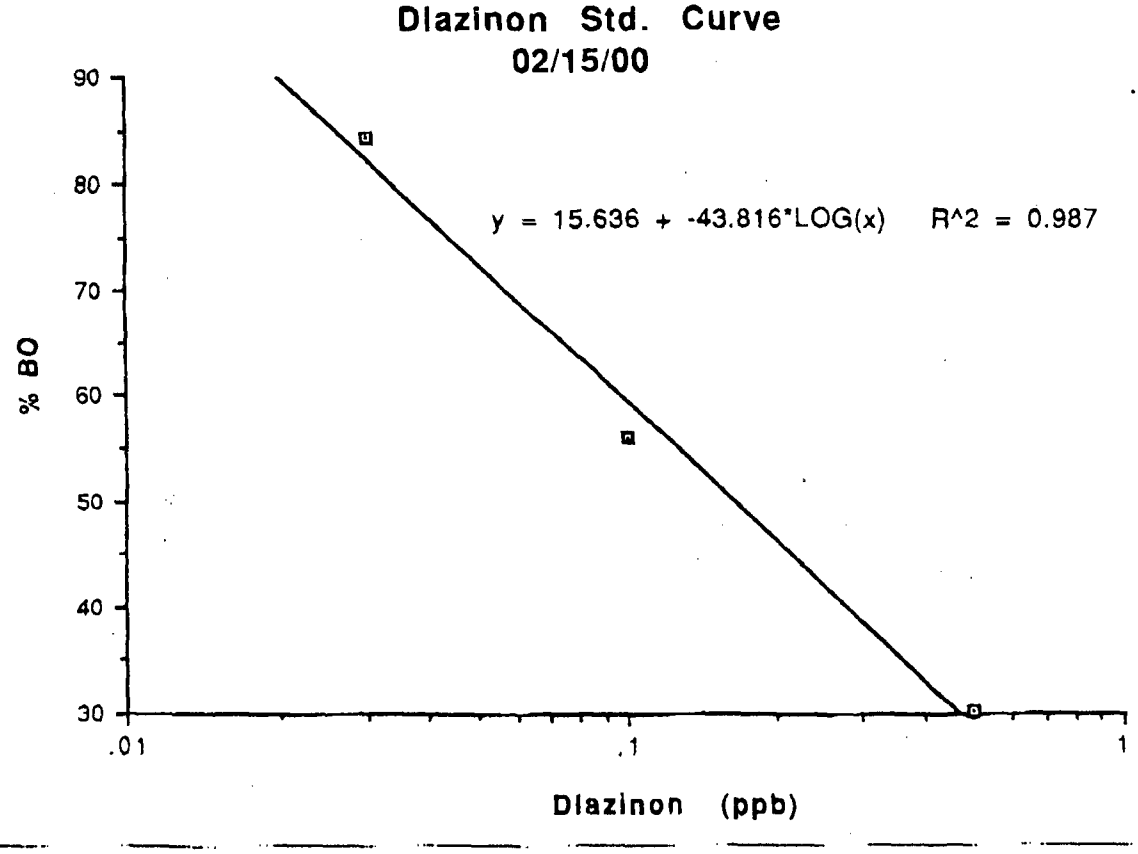
Source: ***Beacon Analytical***

Model: ***Insite™ Plate Kit***

Lot No.: ***#32849***

Date: ***2/15/00***

STANDARD CURVE	Avg.%Bo	Log ppb	Diazinon (ppb)
0.03 ppb	84.4	-1.5685	0.0270
0.10 ppb	56.0	-0.9203	0.1201
0.50 ppb	30.3	-0.3351	0.4622



MH 2/15/00

2/15/00

AQUA-Science

Environmental Toxicology Consultants

Enzyme-Linked Immunosorbant Assay (ELISA) Results

SAMPLE ID	Avg.%Bo	Log ppb	Diazinon (ppb)
E-STD	40.7	-0.5723	0.2678
SD 8 (4) 2/12/00 @ 100% SD(8)6	36.3	-0.4716	0.3376
SD 8 2/12/00 @ 100%	39.7	-0.5494	0.2822
SD 5 2/12/00 @ 100%	41.4	-0.5889	0.2577

MM 4/15/00
JM 4/20/00

AQUA-Science

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Environmental Toxicology Consultants

Enzyme-Linked Immunosorbant Assay Record

Date: 2/15/00

Beacon Anayliticat

Diazinon

Client: USR Woodward Clyde

Lot #32849

Exp. 4/01

Type of ELISA: Diazinon

A1/A2	Ultrapure control	B1/B2	E-STD
A3/A4	0.03 ppb Diazinon calibrator	B3/B4	SD8 (4)
A5/A6	0.1 ppb Diazinon calibrator	B5/B6	SD8
A7/A8	0.5 ppb Diazinon calibrator	B7/B8	SD5

	O.D.	Avg. O.D.	% CV	%Bo		O.D.	Avg. O.D.	% CV	%Bo
A1	1.278	1.247	3.57	100.00	B1	0.505	0.508	0.70	40.71
A2	1.215				B2	0.510			
A3	1.102	1.052	6.79	84.36	B3	0.470	0.453	5.47	36.30
A4	1.001				B4	0.435			
A5	0.680	0.698	3.55	55.96	B5	0.507	0.495	3.43	39.71
A6	0.715				B6	0.483			
A7	0.379	0.378	0.37	30.32	B7	0.534	0.517	4.79	41.44
A8	0.377				B8	0.499			

Technician: MH Date: 2/15/00

Study Director: [signature] Date: 2/20/00

AQUA-Science

Environmental Toxicology Consultants

Enzyme-Linked Immunosorbant Assay (ELISA) Results

Client: ***Woodward Clyde***

Project: ***Woodward 00-01***

Type of ELISA: ***Chlorpyrifos***

Source: ***Beacon Analytical***

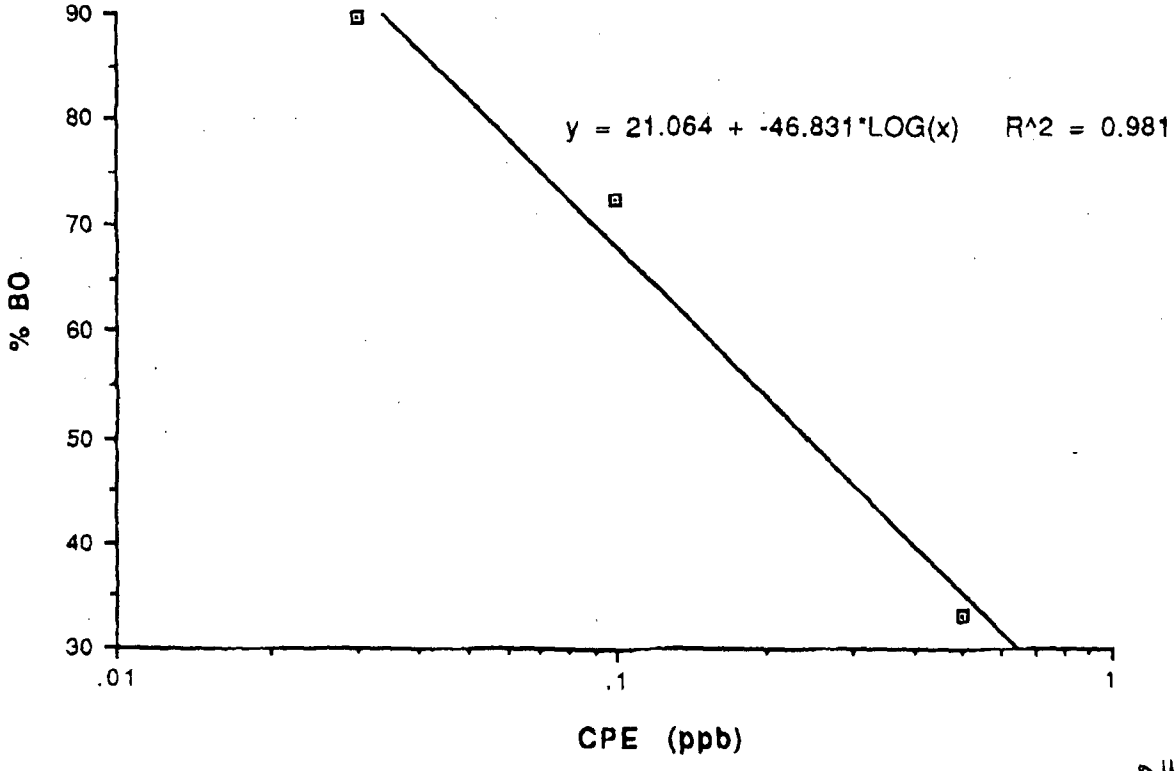
Model: ***Insite™ Plate Kit***

Lot No.: ***#12499***

Date: ***2/15/00***

STANDARD CURVE	Avg.%Bo	Log ppb	Chlorpyrifos (ppb)
0.03 ppb	89.7	-1.4660	0.0342
0.10 ppb	72.6	-1.0994	0.0795
0.50 ppb	33.2	-0.2585	0.5514

Chlorpyrifos Std. Curve
02/15/00



2/15/00
2/15/00

AQUA-Science

Environmental Toxicology Consultants

Enzyme-Linked Immunosorbant Assay (ELISA) Results

SAMPLE ID	Avg.%Bo	Log ppb	Chlorpyrifos (ppb)
E-STD	49.3	-0.6029	0.2495
~~SD 8 (4)~~ 2/12/00 @ 100% SD(8)6	74.7	-1.1447	0.0717
SD 8 2/12/00 @ 100%	75.1	-1.1532	0.0703
SD 5 2/12/00 @ 100%	72.6	-1.0994	0.0795

MM 2/15/00
JC 2/20/00

AQUA-Science

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Environmental Toxicology Consultants

Enzyme-Linked Immunosorbant Assay Record

Date: 2/15/00

Beacon Anaylitcal
Chlorpyrifos
Lot #12499
Exp. 6/00

Client: USR Woodward Clyde

Type of ELISA: Chlorpyrifos,ethyl (CPE)

A1/A2	Ultrapure control	B1/B2	E-STD
A3/A4	0.03 ppb CPE calibrator	B3/B4	SD8 (4)
A5/A6	0.1 ppb CPE calibrator	B5/B6	SD8
A7/A8	0.5 ppb CPE calibrator	B7/B8	SD5

	O.D.	Avg. O.D.	% CV	%Bo		O.D.	Avg. O.D.	% CV	%Bo
A1	1.256	1.250	0.74	100.00	B1	0.596	0.616	4.59	49.30
A2	1.243				B2	0.636			
A3	1.109	1.121	1.51	89.72	B3	0.943	0.933	1.52	74.67
A4	1.133				B4	0.923			
A5	0.900	0.907	1.01	72.55	B5	0.921	0.938	2.56	75.07
A6	0.913				B6	0.955			
A7	0.393	0.415	7.34	33.17	B7	0.878	0.907	4.45	72.55
A8	0.436				B8	0.935			

Technician: MM Date: 2/15/00

Study Director: Date: 2/20/00

AQUA-Science

Environmental Toxicology Consultants

Enzyme-Linked Immunosorbant Assay (ELISA) Results

Client: *SWQCB*

Project: *Chollas Ck. 00-01*

Type of ELISA: *Chlorpyrifos (CPE)*

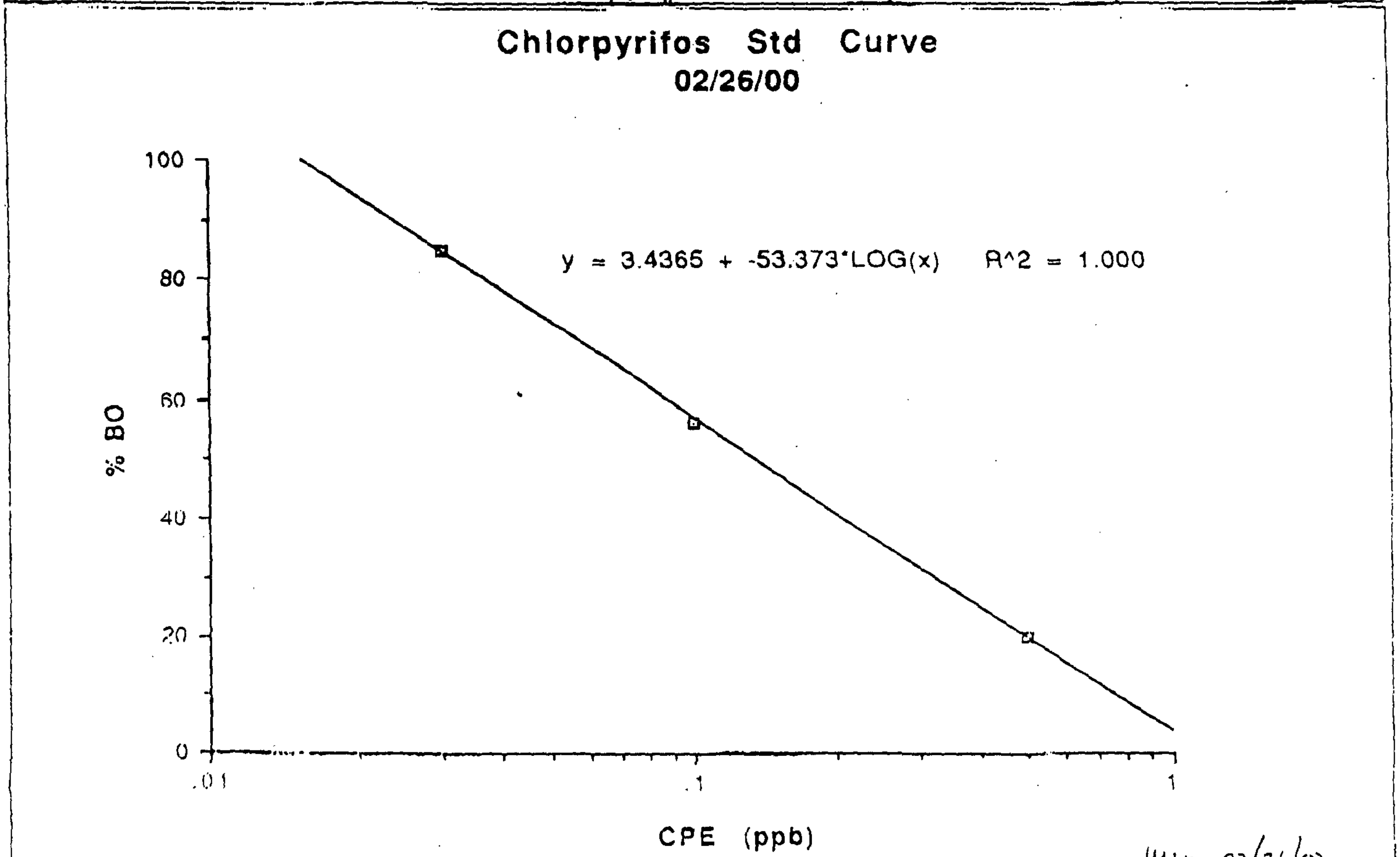
Source: *Beacon Analytical*

Model: *Insite™ Plate Kit*

Lot No.: *#42849*

Date: *2/26/00*

STANDARD CURVE	Avg.%Bo	Log ppb	CPE (ppb)
0.03 ppb	85.0	-1.5286	0.0296
0.10 ppb	56.3	-0.9901	0.1023
0.50 ppb	19.7	-0.3053	0.4951



02/26/00
2/27/00

AQUA-Science

Environmental Toxicology Consultants

Enzyme-Linked Immunosorbant Assay (ELISA) Results

SAMPLE ID	Avg.%Bo	Log ppb	CPE (ppb)
E-STD	51.8	-0.9063	0.1241
Chollas Ck. 02/21/00 @ Delevan SD(B)2	76.2	-1.3637	0.0433
Chollas Ck. 02/21/00 Federal @ Home SD(B)3	76.4	-1.3678	0.0429
Chollas Ck. 02/21/00 @ 69th SD(B)6	81.8	-1.4684	0.0340

Initial 02/26/00

AQUA-Science

Environmental Toxicology Consultants

Enzyme-Linked Immunosorbant Assay Record

Date: 2/26/00

Beacon Anaylitcal
Chlorpyrifos
Lot #20340
Exp. 7/01

Client: SRWQCB

Type of ELISA: Chlorpyrifos,ethyl (CPE)

A1/A2	Ultrapure control	B1/B2	E-STD
A3/A4	0.03 ppb CPE calibrator	B3/B4	Chollas Ck. -02/21/00 @ Delevan
A5/A6	0.1 ppb CPE calibrator	B5/B6	Chollas Ck. -02/21/00 Federal @ Home
A7/A8	0.5 ppb CPE calibrator	B7/B8	Chollas Ck. -02/21/00 @ 69th

	O.D.	Avg. O.D.	% CV	%Bo		O.D.	Avg. O.D.	% CV	%Bo
A1	1.714	1.655	5.04	100.00	B1	0.860	0.858	0.41	51.81
A2	1.596				B2	0.855			
A3	1.323	1.407	8.44	85.02	B3	1.284	1.262	2.52	76.22
A4	1.491				B4	1.239			
A5	0.987	0.932	8.43	56.28	B5	1.264	1.265	0.11	76.44
A6	0.876				B6	1.266			
A7	0.310	0.327	7.15	19.73	B7	1.246	1.354	11.28	81.81
A8	0.343				B8	1.462			

Technician: [signature] Date: 02/26/00

Study Director: [signature] Date: 2/27/00

AQUA-Science

Environmental Toxicology Consultants

Enzyme-Linked Immunosorbant Assay (ELISA) Results

Client: *SWQCB*

Project: *Chollas Ck. 00-01*

Type of ELISA: *Diazinon*

Source: *Beacon Analytical*

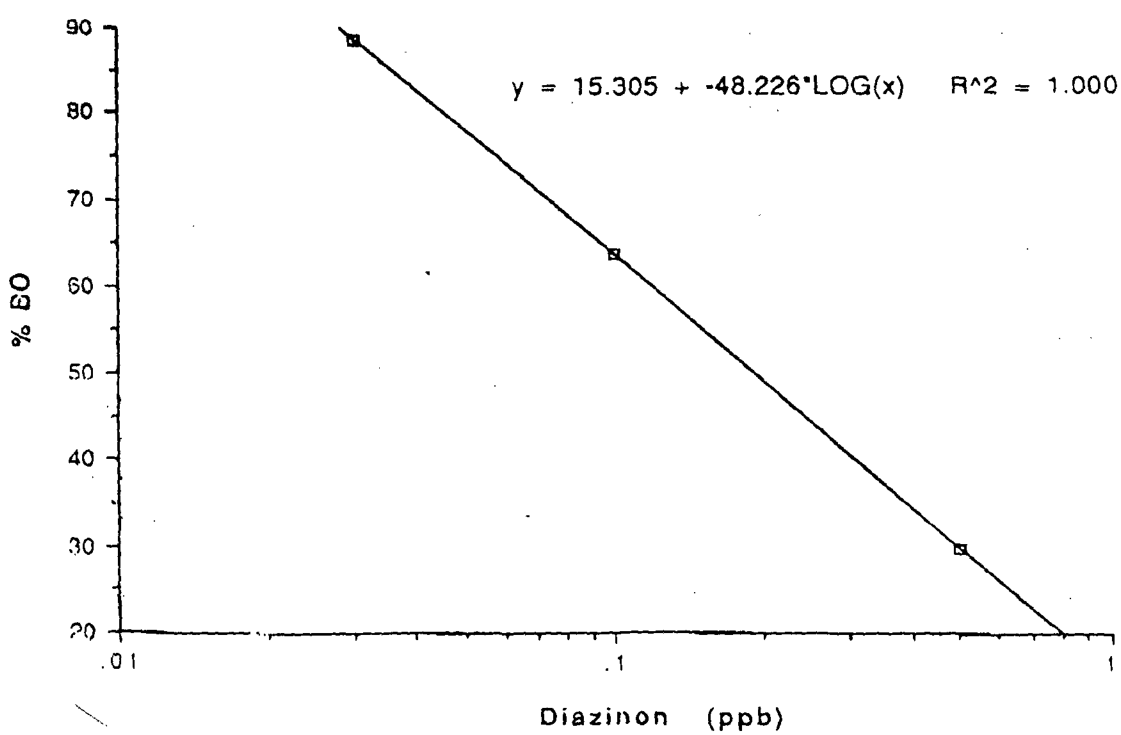
Model: *Insite™ Plate Kit*

Lot No.: *#32849*

Date: *02/26/2000*

STANDARD CURVE	Avg.%Bo	Log ppb	Diazinon (ppb)
0.03 ppb	88.7	-1.5217	0.0301
0.10 ppb	63.6	-1.0021	0.0995
0.50 ppb	29.8	-0.3001	0.5010

Diazinon Std Curve



Apm 02/26/00
2/27/00

AQUA-Science

Environmental Toxicology Consultants

Enzyme-Linked Immunosorbant Assay (ELISA) Results

SAMPLE ID	Avg.%Bo	Log ppb	Diazinon (ppb)
E.STD	38.5	-0.4810	0.3304
Chollas Ck. 02/21/00 @ Delevan SD(8)2	86.3	-1.4725	0.0337
Chollas Ck. 02/21/00 Federal @ Home SD(8)7	64.5	-1.0199	0.0955
Chollas Ck. 02/21/00 @ 69th SD(8)6	77.7	-1.2936	0.0509

AQUA-Science

Environmental Toxicology Consultants

Enzyme-Linked Immunosorbant Assay Record

Date: 2/26/00

Beacon Anayllical
Diazinon
Lot #32849
Exp. 4/01

Client: SWQCB

Type of ELISA: Diazinon

A1/A2	Ultrapure control	B1/B2	E-STD
A3/A4	0.03 ppb Diazinon calibrator	B3/B4	Chollas Ck. 02/21/00 @ Delevan
A5/A6	0.1 ppb Diazinon calibrator	B5/B6	Chollas Ck. 02/21/00 Federal @ Home
A7/A8	0.5 ppb Diazinon calibrator	B7/B8	Chollas Ck. 02/21/00 @ 69th

	O.D.	Avg. O.D.	% CV	%Bo		O.D.	Avg. O.D.	% CV	%Bo
A1	1.327	1.327	0.05	100.00	B1	0.532	0.511	5.81	38.52
A2	1.326				B2	0.490			
A3	1.174	1.177	0.30	88.69	B3	1.178	1.145	4.08	86.32
A4	1.179				B4	1.112			
A5	0.834	0.844	1.68	63.63	B5	0.874	0.856	3.06	64.49
A6	0.854				B6	0.837			
A7	0.399	0.395	1.43	29.78	B7	0.997	1.031	4.60	77.69
A8	0.391				B8	1.064			

Technician: [signature] Date: 02/26/00

Study Director: [signature] Date: 2/27/00

Chollas Creek

FINAL REPORT

1999 – 2000 CITY OF SAN DIEGO AND CO-PERMITTEE NPDES STORMWATER MONITORING PROGRAM REPORT

Prepared for
The City of San Diego
Engineering & Development Department
1010 Second Avenue, Suite 500
San Diego, CA 92101

August 10, 2000

URS Greiner Woodward Clyde

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San Diego, CA 92108-4314
619-294-9400 Fax: 619-293-7920

In association with:

APPL, Inc.
California Watersports
D-TEK Environmental Testing Laboratory
MBC Applied Environmental Sciences
MGD Technologies, Inc.
Motile Laboratory Services
University of Washington
Weatherwatch Services

Hedionda stations to identify water-borne pathogens. In addition, sediment samples were collected within a public access point in the lagoon to assess the bacteria trapped in the sediment and possibly available for resuspension. A new quality assurance/quality control procedure (QA/QC) was established and implemented for bacteria samples to assess possible contamination.

Finally, in response to TMDL issues concerning diazinon and chlorpyrifos in urban runoff, an Insecticide Use Survey was created and distributed to 5,000 households and posted on the County of San Diego web site to assess trends of purchase, use, and disposal.

1.3 OVERVIEW OF SCOPE OF WORK

URSGWC provided storm water monitoring services for the co-permittees during the seventh year of the wet-weather monitoring program (1999/2000). The 1999/2000 monitoring program consisted of the following sampling services:

- Pre- and post season sediment sampling at Chollas Creek and San Diego Bay locations. These locations have been monitored since wet-weather monitoring season 1994/95.
- Chemical water quality monitoring during three storm events at five mass loading stations throughout San Diego County, AH1-Agua Hedionda, SV1-Sorrento Valley, SD13-California, SD5-Tecolote, SD8-Chollas. The mass loading stations represent large areas of the County that drain into important receiving waters. Stations SD5-Tecolote and SD8-Chollas have been monitored since the start of the wet-weather monitoring program in 1993/94. Stations SD13-California and SV1-Sorrento Valley were added to the program in 1996/97. Station AH1-Agua Hedionda was added to the program in 1998/99, concurrently with the bacteria monitoring program.
- Bacteria monitoring during three storm events at two creek monitoring stations, AH-Co and AH-Re, and two stations representing direct inputs to the creeks, AH-Coc and AH-Rec, for a total of four stations in the Agua Hedionda watershed. Stations AH-Co and AH-Re were monitored for bacteria in 1998/99. Stations AH-Coc and AH-Rec were added to the program in 1999/2000.
- Pathogen monitoring during three storm events at four creek monitoring stations, AH-Os, AH-Co, AH-Re, and AH1, and two stations representing direct inputs to the creeks, AH-Coc and AH-Rec, for a total of six stations in the Agua Hedionda watershed. Two of the creek stations monitored for pathogens, AH-Co and AH-Re, and the two stations representing direct inputs to the creeks, AH-Coc and AH-Rec, were also monitored for bacteria. One of the creek stations, AH1, monitored for pathogens was also monitored as a mass loading station.
- Post storm event bacteria and pathogen monitoring at three sampling transect locations, AH-L, AH-Lc, and AH-Lm, in Agua Hedionda Lagoon. This monitoring was performed one day and seven days after the first and third storm events that bacteria monitoring in creek and creek input stations was performed. This monitoring was not conducted following the second bacteria monitoring event because rain occurred one day and seven days following the event. Station AH-L was monitored for bacteria in 1998/99. Stations AH-Lc and AH-Lm were added to the program in 1999/2000.

From Linda
3 Aug 01

Introduction:

Chollas Creek was placed on the 303(d) list of "Water Quality Limited" waterbodies in 1998 because metals and toxicity data indicate that beneficial uses in the creek may be impaired. According to data collected under the San Diego Municipal NPDES storm water permit, storm water runoff in Chollas Creek contains concentrations of cadmium, copper, lead and zinc which would be expected to impair aquatic life beneficial uses. Chollas Creek storm water runoff also causes toxicity to *Ceriodaphnia dubia.*

Metals

Existing EPA and/or ISWP water quality objectives for the protection of freshwater aquatic life were consistently achieved for all metals except cadmium, copper, lead and zinc. Measurements of total recoverable metals from Chollas Creek (SD8) indicate that chronic water quality objectives (4-day average) were commonly exceeded for cadmium, copper, lead and zinc. Acute water quality objectives (1 hour average) for copper, lead, and zinc were also frequently exceeded at SD-8 Chollas storm water mass loading station. SD-8 Chollas is located on the north fork of Chollas Creek near the intersection of 33rd and Durant Streets, just east of the Durant Street cul-de-sac in the City of San Diego. The Chollas Creek watershed is divided upstream into the north fork (9,276 acres) and the south fork (6,997 acres). Runoff from approx 57% of the entire watershed is sampled at the monitoring site. Watershed is highly urbanized and over 80% is developed. Land use is 67% residential, 7% industrial and 5% commercial.

- Copper

Mass Loading Station	Storm Date	Hardness (mg/l)	Total Copper (ug/l)	Water Quality Objective (Acute) 1 hour Average (ug/l)	Water Quality Objective (Chronic) 4 day Average (ug/l)	Exceedance Factor 1 hour Average	Exceedance Factor 4 day Average
SD8	11/10/94	150	36	26	17	1.38	2.12
	1/11/95	58	17	11	7.4	1.55	2.30
	2/14/95	100	40	18	12	2.22	3.33
	4/16/95	120	85	21	14	4.05	6.07
	11/1/95	91	46	16	10.9	2.84	4.22
	1993-98		33 +/- 19				

Mass Loading Station	Storm Date	Hardness (mg/l)	Dissolved Copper (ug/l)	Water Quality Objective 1 hour Average (ug/l)	Water Quality Objective 4 day Average (ug/l)	Exceedance Factor 1 hour Average	Exceedance Factor 4 day Average
SD8	11/10/94	150	13	22	14	0.59	0.93
	1/11/95	58	ND	9.0	6.3		
	2/14/95	100	5.4	15	10	0.36	0.54
	4/16/95	120	9.7	18	12	0.54	0.81
	11/1/95	91	NA	14	9.3		
	1/22/96	74.5	12	11	7.8	1.09	1.54
	1/31/96	52.2	8	8	5.8	1.00	1.38
	3/5/96	78.6	34	12	8.2	2.83	4.15
	12/9/96	57	10	10.1	7.1	1.00	1.41
	1/15/97	62	20	10.8	7.5	1.85	2.67

- Cadmium

Mass Loading Station	Storm Date	Hardness (mg/l)	Total Cadmium (ug/l)	Water Quality Objective (Acute) 1 hour Average (ug/l)	Water Quality Objective (Chronic) 4 day Average (ug/l)	Exceedance Factor 1 hour Average	Exceedance Factor 4 day Average
SD8	11/10/94	150	0.5	6.2	1.6	0.08	0.31
	1/11/95	58	0.8	2.1	0.74	0.38	1.08
	2/14/95	100	1.7	3.9	1.1	0.44	1.55
	4/16/95	120	2.5	4.8	1.3	0.52	1.92
	11/1/95	91	0.6	3.5	1.05	0.17	0.57
	1/22/96	74.5	NA	2.8	0.9		
	1/31/96	52.2	NA	1.9	0.68		
	3/5/96	78.6	NA	3.0	0.94		
	11/10/97	116	3.0	4.6	6.5	0.6	0
	12/6/97	39	<4.0	1.4	1.9	2.9	2.1
	3/14/98	96.4	<4.0	3.8	5.3	1.1	0.8

Water Quality Objective for protection of Aquatic Life are based on Total Hardness and calculated as: (exp(A*ln(TH)+B))

Mass Loading Station	Storm Date	Hardness (mg/l)	Dissolved Cadmium (ug/l)	Water Quality Objective 1 hour Average (ug/l)	Water Quality Objective 4 day Average (ug/l)	Exceedance Factor 1 hour Average	Exceedance Factor 4 day Average
SD8	11/10/94	150	0.2	5.3	1.3	0.04	0.15
	1/11/95	58	<0.2	1.8	0.63		
	2/14/95	100	<0.2	3.3	0.96		
	4/16/95	120	<0.2	4.1	1.1		
	11/1/95	91	NA	3.0	0.9		
	1/22/96	74.5	<0.25	2.4	0.77	0.1	0.33
	1/31/96	52.2	<0.25	1.6	0.58	0.16	0.43
	3/5/96	78.6	0.44	2.5	0.8	0.17	0.55
	12/9/96	57	0.5	2.0	0.7	0.25	0.71
	1/15/97	62	1.2	2.2	0.7	0.55	1.71

- Lead

Mass Loading Station	Storm Date	Hardness (mg/l)	Total Lead (ug/l)	Water Quality Objective (Acute) 1 hour Average (ug/l)	Water Quality Objective (Chronic) 4 day Average (ug/l)	Exceedance Factor 1 hour Average	Exceedance Factor 4 day Average
SD8	11/10/94	150	35	137	5.3	0.26	6.60
	1/11/95	58	44	41	1.6	1.07	27.5
	4/16/95	120	140	103	4.0	1.35	35
	11/1/95	91	22.9	72	2.8	0.32	8.18
	1/22/96	74.5	NA	56	2.2		
	1/31/96	52.2	NA	36	1.4		
	3/5/96	78.6	NA	60	2.3		

Mass Loading Station	Storm Date	Hardness (mg/l)	Dissolved Lead (ug/l)	Water Quality Objective 1 hour Average (ug/l)	Water Quality Objective 4 day Average (ug/l)	Exceedance Factor 1 hour Average	Exceedance Factor 4 day Average
SD8	11/10/94	150	2.6	68	1.3	0.04	2
	1/11/95	58	<1.0	20	0.4		
	2/14/95	100	<1.0	41	0.8		
	4/16/95	120	<1.0	51	1.0		
	11/1/95	91	NA	36	0.7		
	1/22/96	74.5	2	28	0.5	0.07	4

	1/31/96	52.2	2	18	0.3	0.11	6.67
	3/5/96	78.6	18	30	0.6	0.6	30
	12/9/96	57	15	35.1	1.4	0.43	10.7
	1/15/97	62	7	37.9	1.5	0.18	4.67

- Zinc

Mass Loading Station	Storm Date	Hardness (mg/l)	Total Zinc (ug/l)	Water Quality Objective (Acute) 1 hour Average (ug/l)	Water Quality Objective (Chronic) 4 day Average (ug/l)	Exceedance Factor 1 hour Average	Exceedance Factor 4 day Average
SD8	11/10/94	150	180	165	149	1.09	1.21
	1/11/95	58	150	74	67	2.03	2.24
	2/14/95	100	360	117	106	3.08	3.40
	4/16/95	120	560	137	124	4.09	4.52
	11/1/95	91	185	108	98	1.71	1.89
	1/22/96	74.5	NA	91	83		
	1/31/96	52.2	NA	67	61		
	3/5/96	78.6	NA	95	86		

Mass Loading Station	Storm Date	Hardness (mg/l)	Dissolved Zinc (ug/l)	Water Quality Objective 1 hour Average (ug/l)	Water Quality Objective 4 day Average (ug/l)	Exceedance Factor 1 hour Average	Exceedance Factor 4 day Average
SD8	11/10/94	150	70	140	127	0.5	0.55
	1/11/95	58	14	63	57	0.22	0.25
	2/14/95	100	12	99	90	0.12	0.13
	4/16/95	120	69	116	105	0.59	0.66
	11/1/95	91	NA	92	83		
	1/22/96	74.5	25	78	70	0.32	0.36
	1/31/96	52.2	32	57	52	0.56	0.62
	3/5/96	78.6	141	81	73	1.74	1.93
	12/9/96	57	80	71.5	65.3	1.12	1.23
	1/15/97	62	40	75.8	69.2	0.53	0.58

Toxicity to Aquatic Organisms

Stormwater runoff from Chollas Creek (SD8) demonstrated acute toxicity to aquatic test organisms (i.e., Ceriodaphnia). The major cause of toxicity to Ceriodaphnia could be in part due to the the pesticide diazinon (Hansen 1994, WCC 1995). This is an organophosphorous insecticide that is widely used in residential and landscaped areas and is common in stormwater runoff. Stormwater concentrations from 25 to 50% showed impairment of reproduction in Ceriodaphnia although acute toxicity to Ceriodaphnia typically masked chronic toxicity measurements. Fathead minnows showed greater chronic toxicity and storm water concentrations as low as 6.25% impaired growth of larval fathead minnows.

Test organism	Station	Event Date	LT 50 (hours)	96hr LC 50 (% sample)	7 day LC 50 (% sample)	7 day NOEC Survival %	7 day NOEC Repro/ Growth %	TUc
Fish	SD8	1/11/95			>100	>100	6.25	
Fish	SD8	2/14/95			>100	>100	<6.25	
Fish	SD8	1/22/96	>168	>100	>100	>100	50	2
Fish	SD8	2/1/96	>168	>100	>100	100	100	1
Fish	SD8	3/5/96	>168	>100	>100	30	30	3.33
Fish	SD8	12/9/97	>168	>100	>100	100	100	1
Fish	SD8	1/16/97	>168	>100	>100	100	100	1
Fish	SD8	11/10/97	>168	>100	>100	100	67%	1.5
Fish	SD8	12/6/97	>168	>100	>100	100	100	1
Ceriodaphia	SD8	11/11/94			17.7	12.5	25	
Ceriodaphia	SD8	1/11/95			50	25	50	
Ceriodaphia	SD8	2/14/95			35.4	25	50	
Ceriodaphia	SD8	4/16/95			37.5	25	50	
Ceriodaphia	SD8	11/1/95	5.5	35	35	25	25	4
Ceriodaphia	SD8	12/9/97	35	63	39	30	30	3.33
Ceriodaphia	SD8	1/16/97	43	63	54	44	<23	>4.3
Ceriodaphia	SD8	11/10/97	5.5	36	33	23	23	4.35
Ceriodaphia	SD8	12/6/97	80	82	54	44	44	2.27

LT 50 - The duration of exposure (in the original, 100% sample) that causes mortality in 50% of the organisms; the median time to lethality (Probit method).

LC 50 - Concentration that caused mortality of 50% of the organisms (the median lethal concentration) was calculated from the data for Day 4 (96hr LC 50) and for day 7.

NOEC - No Observed Effect Concentration; the highest dilution in which there was no significant difference between the test solution and the Control, as determined by hypothesis testing.

LOEC - Lowest Observed Effect Concentration; the lowest dilution in which there was no significant difference between the test solution and the Control, as determined by hypothesis testing.

Tuc - Chronic Toxicity Units, which equal 100/NOEC. A Tuc value of 1 indicates that no toxicity was observed.

There is insufficient data to determine the causes of the stormwater toxicity, or to even eliminate organic toxicants as the cause as analyses of specific organics at sufficiently low detection limits has not yet been done.

Sediment Chemistry

Samples from Chollas Creek contained considerably lower concentrations of detected constituents than the samples from San Diego Bay. The likely reason for this pattern is that the grain size in Chollas Creek and San Diego Bay are considerably different. San Diego Bay contains a higher fractio of fine particles by weight than Chollas Creek. With the greater surface area, and ability of clay particles to adsorb pollutants, the fines generally contain higher concentrations of pollutants.

Bacteria

Stormwater runoff from Chollas Creek (SD8) are characterized by high total coliform, high fecal coliform and high fecal streptococci which exceed Contact Water Recreation (REC-1) and Non Contact Water Recreation (REC-2) beneficial uses.

Station	Date	Total Coliform	Fecal Coliform	Fecal Streptococci
SD8	1996/97	16,000 to >160,000	8,000 to >24,000	equal to or > 16,000 MPN/100 ml
Ocean Plan	Contact Rec standard	1,000 MPN/100ml	200 MPN/100 ml	NA

Benthic Community Analysis - Naval Base 07

San Diego Bay at the mouth of Chollas Creek is on the 303(d) list for benthic community degradation and toxicity in the sediment. Sediment from three stations at the mouth of Chollas Creek at its confluence with San Diego Bay were analyzed under the Bay Protection and Toxic Cleanup Program (BPTC) and exhibited degraded benthic communities. This condition supported listing of this area on the 303(d) list and also the designation of this area as a candidate toxic hot spot in the Regional Toxic Hot Spot Cleanup Plan. Although the cause of the benthic community degradation is not known, chlordane is present in elevated concentrations at the three BPTC stations.

Station	ID #	ERM Q 90% confidence interval >0.85	PELQ 90% confidence interval >1.29	Benthic Community Degradation and Toxicity in the Sediment	Amphipod Survival for Solid Phase Test	Date
90006	155			benthic community not sampled	82 +/- 13	10/13/92
90006	865	1.056	1.487	benthic community degraded Chlordane >4x ERM or 5.9 x PEL	92 +/- 8	8/4/93
93170	783			benthic community not sampled	-	
93182	800			benthic community not sampled	67 +/- 26.8	5/26/93
93183	801			benthic community not sampled	57 +/- 25.1	5/26/93
93212	866	0.589	0.847	benthic community degraded Chlordane >4x ERM or 5.9 x PEL	91 +/- 10	8/4/93
93213	867	1.230	1.730	benthic community degraded Cis- Chlordane >4x ERM (24.1); Trans- Chlordane >5.9x PEL and 4x ERM (29.3)	94 +/- 8	8/4/93

Stations 866 and 867
Polychaetes
***Cossura candida
Dorvillea longicornis
**Eranno lagunae
***Leitoscoloplos pugettensis
Mediomastus californiensis
Nepthys cornuta
Odontosyllis phosphorea
Paraprionospio pinnata
***Prionospio heterobranchia
Scoletoma tetaura

Bivalve
Theora fragilis

Amphipoda
Monoculodes hartmanae

Gammaridea
Synchelidium rectipalmum

Substance	State of Florida		NOAA		San Diego Region	
	TEL	PEL	ERL	ERM	Probable Effects Level	Effects Range Median
Organics (ug/kg - dry weight)					59 times PEL	4 times ERM
Total PCBs	21.55	188.79	22.7	180	1114	720
PAHs	6.71	88.9	16	500	525	2000
Acenaphthene	5.87	127.89	44	640	755	2560
Acenaphthylene	46.85	245	85.3	1100	1446	4400
Anthracene	21.17	144.35	19	540	852	2160
2-methylnaphthalene	20.21	201.28	70	670	1188	2680
Naphthalene	34.57	390.64	160	2100	2305	8400
Phenanthrene	86.68	543.53	240	1500	3207	6000
Total LMW-PAHs	311.7	1442	552	3160	8508	12640
Benz(a)anthracene	74.83	692.53	261	1600	4086	6400
Benzo(a)pyrene	88.81	763.22	430	1600	4503	6400
Chrysene	107.71	845.98	384	2800	4991	11200
Dibenz(a,h)anthracene	6.22	134.61	63.4	260	794	1040
Fluoranthene	112.82	1493.54	600	5100	8812	20400
Pyrene	152.66	1397.6	665	2600	8246	10400
Total HMW-PAHs	655.34	6676.14	1700	9600	39389	38400
Total PAHs	1684.06	16770.54	4022	44792	98946	179168
Pesticides						
p,p'-DDE	2.07	374.17	2.2	27	2208	108
p,p'-DDT	1.19	4.77			28	
Total DDT	3.89	51.7	1.58	46.1	305	184.4
Lindane	0.32	0.99			6	
Chlordane	2.26	4.79	0.5	6	28	24
Dieldrin	0.715	4.3	0.02	8	25	32
Endrin			0.02	45		180
Metals (mg/kg - dry weight)						
Arsenic	7.24	41.6	8.2	70	245	280
Antimony			2	2.5		10
Cadmium	0.676	4.21	1.2	9.6	25	38.4
Chromium	52.3	160.4	81	370	946	1480
Copper	18.7	108.2	34	270	638	1080
Lead	30.24	112.18	46.7	218	662	872
Mercury	0.13	0.7	0.15	0.7	4	2.8
Nickel	15.9	42.8	20.9	51.6	253	206.4
Silver	0.733	1.77	1	3.7	10	14.8
Zinc	124	271	150	410	1599	1640

Sediments

During the 1994-95 stormwater monitoring program sampling, sediment samples were collected from Chollas Creek and in San Diego Bay at the mouth of the creek. Four locations were monitored. Bay stations increased in lead, zinc and PAH concentrations after the rainy season. Bay stations decreased in concentrations of chromium, copper, pesticides and PCBs concentrations after the rainy season.

Metals (mg/kg)	Date	1A/1B	2A/2B	3A/3B	Chollas
Arsenic	5/2/96	2.3	1.9	2.5	<1.0
	9/28/96	2.1	2.28	2.5	1.12
Cadmium	5/2/96	<0.5	<0.5	<0.5	<0.5
	9/28/96	<0.08	<0.08	<0.08	<0.08
Chromium	5/2/96	13.4	11.5	11.6	3.6
	9/28/96	18.8	14.6	15.2	6.42
Copper	5/2/96	32.7	35.7	40.0	3.1
	9/28/96	186	38.6	37.8	3.66
Lead	5/2/96	46.3	36.7	38.2	54.1
	9/28/96	54.5	55.5	36.8	23.2
Zinc	5/2/96	141	102	105	21.6
	9/28/96	137	118	97.2	24.2

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