

## **APPENDIX**

**Appendix 1.** Organochlorine compounds analyzed in reservoir sediment, streambed sediment, and fish tissue and typical laboratory reporting limits, in the Santa Ana River Basin, California

[mm, millimeter; µg/kg, microgram per kilogram; <, less than]]

<b>Reservoir sediment</b>					
<b>Constituent</b>	<b>Reporting units (dry weight)</b>	<b>Laboratory reporting limit</b>	<b>Constituent</b>	<b>Reporting units (dry weight)</b>	<b>Laboratory reporting limit</b>
Aldrin	µg/kg	1	Mirex	µg/kg	1
Chlordane	µg/kg	5	<i>p,p'</i> -DDD	µg/kg	1
Dieldrin	µg/kg	1	<i>p,p'</i> -DDE	µg/kg	1
Endosulfan I	µg/kg	1	<i>p,p'</i> -DDT	µg/kg	1
Endrin	µg/kg	1	PCB-1242	µg/kg	5
Heptachlor epoxide	µg/kg	1	PCB-1254	µg/kg	5
Heptachlor	µg/kg	1	PCB-1260	µg/kg	5
Lindane	µg/kg	1	Toxaphene	µg/kg	100
Methoxychlor	µg/kg	2			

  

<b>Streambed sediment</b>					
<b>Constituent</b>	<b>Reporting units (fraction &lt;2 mm, dry weight)</b>	<b>Laboratory reporting limit</b>	<b>Constituent</b>	<b>Reporting units (fraction &lt;2 mm, dry weight)</b>	<b>Laboratory reporting limit</b>
Aldrin	µg/kg	1	<i>o,p'</i> -Methoxychlor	µg/kg	5
alpha-HCH	µg/kg	1	<i>p,p'</i> -Methoxychlor	µg/kg	5
Hexachlorobenzene	µg/kg	1	Mirex	µg/kg	1
beta-HCH	µg/kg	1	<i>o,p'</i> -DDD	µg/kg	1
Chloroneb	µg/kg	5	<i>o,p'</i> -DDE	µg/kg	1
<i>cis</i> -Chlordane	µg/kg	1	<i>o,p'</i> -DDT	µg/kg	2
<i>cis</i> -Nonachlor	µg/kg	1	Oxychlordane	µg/kg	1
<i>cis</i> -Permethrin	µg/kg	5	<i>p,p'</i> -DDD	µg/kg	1
DCPA (Dacthal)	µg/kg	5	<i>p,p'</i> -DDE	µg/kg	1
Dieldrin	µg/kg	1	<i>p,p'</i> -DDT	µg/kg	2
Endosulfan I	µg/kg	1	PCB	µg/kg	50
Endrin	µg/kg	2	Pentachloroanisole	µg/kg	1
Heptachlor epoxide	µg/kg	1	Toxaphene	µg/kg	200
Heptachlor	µg/kg	1	<i>trans</i> -Chlordane	µg/kg	1
Isodrin	µg/kg	1	<i>trans</i> -Nonachlor	µg/kg	1
Lindane	µg/kg	1	<i>trans</i> -Permethrin	µg/kg	5

**Appendix 1.** Organochlorine compounds analyzed in reservoir sediment, streambed sediment, and fish tissue and typical laboratory reporting limits, in the Santa Ana River Basin, California—Continued

<b>Fish tissue</b>					
<b>Constituent</b>	<b>Reporting units (wet weight)</b>	<b>Laboratory reporting limit</b>	<b>Constituent</b>	<b>Reporting units (wet weight)</b>	<b>Laboratory reporting limit</b>
Aldrin	µg/kg	5.0	Heptachlor	µg/kg	5.0
alpha-HCH	µg/kg	5.0	Isodrin	µg/kg	5.0
Hexachlorobenzene	µg/kg	5.0	Lindane	µg/kg	5.0
beta-HCH	µg/kg	5.0	Lipids	percent	0.5
Chlorothalonil	µg/kg	5.0	Mirex	µg/kg	5.0
<i>cis</i> -Chlordane	µg/kg	5.0	<i>o,p'</i> -DDD	µg/kg	5.0
<i>cis</i> -Nonachlor	µg/kg	5.0	<i>o,p'</i> -DDE	µg/kg	5.0
DCPA (Dacthal)	µg/kg	5.0	<i>o,p'</i> -DDT	µg/kg	5.0
Delta-HCH	µg/kg	5.0	Oxychlordane	µg/kg	5.0
Dieldrin	µg/kg	5.0	<i>p,p'</i> -DDD	µg/kg	5.0
Endosulfan I	µg/kg	5.0	<i>p,p'</i> -DDE	µg/kg	5.0
Endosulfan II	µg/kg	5.0	<i>p,p'</i> -DDT	µg/kg	5.0
Endosulfan sulfate	µg/kg	5.0	PCB	µg/kg	50.0
Endrin aldehyde	µg/kg	5.0	Pentachloroanisole	µg/kg	5.0
Endrin ketone	µg/kg	5.0	Toxaphene	µg/kg	200.0
Endrin	µg/kg	5.0	<i>trans</i> -Chlordane	µg/kg	5.0
Heptachlor epoxide	µg/kg	5.0	<i>trans</i> -Nonachlor	µg/kg	5.0

**Appendix 2.** Semivolatile-organic compounds analyzed in reservoir and streambed sediment and typical laboratory reporting limits, in the Santa Ana River Basin, California

[µg/kg, microgram per kilogram; mm, millimeter; <, less than; —, no data]

<b>Reservoir sediment</b>					
<b>Constituent</b>	<b>Reporting units (dry weight)</b>	<b>Laboratory reporting limit</b>	<b>Constituent</b>	<b>Reporting units (dry weight)</b>	<b>Laboratory reporting limit</b>
1,2-Dimethylnaphthalene	µg/kg	10	Benzo(b)fluoranthene	µg/kg	10
1,6-Dimethylnaphthalene	µg/kg	10	Benzo(e)pyrene	µg/kg	10
1-Methyl-9H-fluorene	µg/kg	10	Benzo(ghi)perylene	µg/kg	10
1-Methylphenanthrene	µg/kg	10	Benzo(k)fluoranthene	µg/kg	10
1-Methylpyrene	µg/kg	10	Chrysene	µg/kg	10
2,3,6-Trimethylnaphthalene	µg/kg	10	Coronene	µg/kg	10
2,6-Dimethylnaphthalene	µg/kg	10	Dibenz[a,h]anthracene	µg/kg	10
2-Ethynaphthalene	µg/kg	10	Fluoranthene	µg/kg	10
2-Methylanthracene	µg/kg	10	Indeno[1,2,3-cd]pyrene	µg/kg	10
4,5-Methylene phenanthrene	µg/kg	10	Naphthalene	µg/kg	10
9H-Fluorene	µg/kg	10	<i>p</i> -Cresol	µg/kg	10
Acenaphthene	µg/kg	10	Perylene	µg/kg	10
Acenaphthylene	µg/kg	10	Phenanthrene	µg/kg	10
Anthracene	µg/kg	10	Phenol	µg/kg	10
Benz(a)anthracene	µg/kg	10	Pyrene	µg/kg	10
Benzo(a)pyrene	µg/kg	10			

**Appendix 2.** Semivolatile-organic compounds analyzed in reservoir and streambed sediment and typical laboratory reporting limits, in the Santa Ana River Basin, California—Continued

Streambed sediment					
Constituent	Reporting units (fraction <2 mm, dry weight)	Laboratory reporting limit	Constituent	Reporting units (fraction <2 mm, dry weight)	Laboratory reporting limit
2,2'-Biquinoline	µg/kg	50	Isoquinoline	µg/kg	50
3,5-Xylenol	µg/kg	50	4-Chloro- <i>m</i> -cresol	µg/kg	50
4-Bromophenyl phenyl ether	µg/kg	50	2,4,6-Trimethylphenol	µg/kg	—
4-Chlorophenyl phenyl ether	µg/kg	50	bis(2-Chloroethoxy)methane	µg/kg	50
4 <i>H</i> -Cyclopenta[def]phenathrene	µg/kg	50	1,2-Dimethylnaphthalene	µg/kg	50
9,10-Anthraquinone	µg/kg	50	1,6-Dimethylnaphthalene	µg/kg	50
1-Methyl-9 <i>H</i> -fluorene	µg/kg	50	2,3,6-Trimethylnaphthalene	µg/kg	50
9 <i>H</i> -Fluorene	µg/kg	50	2,6-Dimethylnaphthalene	µg/kg	50
Acenaphthene	µg/kg	50	2-Chloronaphthalene	µg/kg	50
Acenaphthylene	µg/kg	50	2-Ethyl-naphthalene	µg/kg	50
Acridine	µg/kg	50	Naphthalene	µg/kg	50
2-Methylanthracene	µg/kg	50	<i>p</i> -Cresol	µg/kg	50
Anthracene	µg/kg	50	1-Methylphenanthrene	µg/kg	50
Azobenzene	µg/kg	50	Phenanthrene	µg/kg	50
Benz(a)anthracene	µg/kg	50	Phenanthridine	µg/kg	50
1,2,4-Trichlorobenzene	µg/kg	50	2,3,5,6-Tetramethylphenol	µg/kg	50
<i>m</i> -Dichlorobenzene	µg/kg	50	2,4-Dichlorophenol	µg/kg	—
Nitrobenzene	µg/kg	50	2,4-Dinitrophenol	µg/kg	—
<i>o</i> -Dichlorobenzene	µg/kg	50	2-Methyl-4,6-dinitrophenol	µg/kg	—
<i>p</i> -Dichlorobenzene	µg/kg	50	Phenol	µg/kg	50
Pentachloronitrobenzene	µg/kg	50	C8-Alkylphenol	µg/kg	50
Benzo(a)pyrene	µg/kg	50	4-Nitrophenol	µg/kg	—
Benzo(b)fluoranthene	µg/kg	50	2-Chlorophenol	µg/kg	50
Benzo(ghi)perylene	µg/kg	50	2-Nitrophenol	µg/kg	—
Benzo(k)fluoranthene	µg/kg	50	Pentachlorophenol	µg/kg	—
Benzo[c]cinnoline	µg/kg	50	2,4,6-Trichlorophenol	µg/kg	—
bis(2-Chloroisopropyl)ether	µg/kg	—	bis(2-ethylhexyl)phthalate	µg/kg	50
bis(2-Chloroethyl)ether	µg/kg	50	Butylbenzyl phthalate	µg/kg	50
Hexchlorobutadiene	µg/kg	—	Dibutyl phthalate	µg/kg	50
Carbazole	µg/kg	50	Diethyl phthalate	µg/kg	50
Chrysene	µg/kg	50	Dimethyl phthalate	µg/kg	50
Hexachlorocyclopentadiene	µg/kg	—	Diethyl phthalate	µg/kg	50
Dibenz[a,h]anthracene	µg/kg	50	1-Methylpyrene	µg/kg	50
<i>N</i> -Nitrosodiphenylamine	µg/kg	50	Pyrene	µg/kg	50
<i>N</i> -Nitrosodi- <i>n</i> -propylamine	µg/kg	50	Quinoline	µg/kg	50
Hexachloroethane	µg/kg	—	Dibenzothiophene	µg/kg	50
Fluoranthene	µg/kg	50	2,4-Dinitrotoluene	µg/kg	50
Indeno[1,2,3- <i>cd</i> ]pyrene	µg/kg	50	2,6-Dinitrotoluene	µg/kg	50
Isophorone	µg/kg	50			

**Appendix 3.** Trace elements and major ions analyzed in reservoir sediment, streambed sediment, and fish tissue and typical laboratory reporting limits, in the Santa Ana River Basin, California

[mm, millimeter; µg/g; microgram per gram; pCi/g, picocuries per gram; <, less than; —, no data]

<b>Reservoir sediment</b>					
<b>Constituent</b>	<b>Reporting units (dry weight)</b>	<b>Laboratory reporting limit</b>	<b>Constituent</b>	<b>Reporting units (dry weight)</b>	<b>Laboratory reporting limit</b>
Calcium	µg/g	20	Lithium	µg/g	0.2
Magnesium	µg/g	.3	Manganese	µg/g	.2
Potassium	µg/g	20	Mercury	µg/g	.02
Sodium	µg/g	6	Molybdenum	µg/g	.1
Phosphorus	µg/g	8	Neodymium	µg/g	.02
Aluminum	µg/g	8	Nickel	µg/g	1
Antimony	µg/g	.02	Niobium	µg/g	2
Arsenic	µg/g	.1	Praseodymium	µg/g	.2
Barium	µg/g	.5	Rubidium	µg/g	.01
Beryllium	µg/g	.001	Samarium	µg/g	.005
Bismuth	µg/g	.005	Scandium	µg/g	.3
Cadmium	µg/g	.003	Selenium	µg/g	.2
Cerium	µg/g	.5	Silver	µg/g	3
Cesium	µg/g	.003	Strontium	µg/g	.05
Chromium	µg/g	.2	Tantalum	µg/g	.2
Cobalt	µg/g	.1	Terbium	µg/g	.02
Copper	µg/g	.5	Thallium	µg/g	.003
Dysprosium	µg/g	.02	Thorium	µg/g	.03
Erbium	µg/g	.006	Thulium	µg/g	.03
Europium	µg/g	.005	Titanium	µg/g	40
Gadolinium	µg/g	.04	Vanadium	µg/g	.4
Gallium	µg/g	.006	Ytterbium	µg/g	.2
Holmium	µg/g	.05	Yttrium	µg/g	.3
Iron	µg/g	50	Zinc	µg/g	5
Lanthanum	µg/g	.3	Uranium	µg/g	.02
Lead	µg/g	.2	Cesium-137	PCi/g	—

**Appendix 3.** Trace elements and major ions analyzed in reservoir sediment, streambed sediment, and fish tissue and typical laboratory reporting limits, in the Santa Ana River Basin, California—Continued

<b>Streambed sediment</b>					
<b>Constituent</b>	<b>Reporting units (fraction &lt;0.063 mm dry weight)</b>	<b>Laboratory reporting limit</b>	<b>Constituent</b>	<b>Reporting units (fraction &lt;0.063 mm, dry weight)</b>	<b>Laboratory reporting limit</b>
Calcium	percent	0.005	Lead	µg/g	1
Magnesium	percent	.005	Lithium	µg/g	1
Potassium	percent	.005	Manganese	µg/g	4
Sodium	percent	.005	Mercury	µg/g	.02
Sulfur	percent	.05	Molybdenum	µg/g	.5
Phosphorus	percent	.005	Neodymium	µg/g	1
Aluminum	percent	.005	Nickel	µg/g	2
Antimony	µg/g	.1	Niobium	µg/g	4
Arsenic	µg/g	.1	Scandium	µg/g	2
Barium	µg/g	1	Selenium	µg/g	.1
Beryllium	µg/g	.1	Silver	µg/g	.1
Bismuth	µg/g	1	Strontium	µg/g	2
Cadmium	µg/g	.1	Tantalum	µg/g	1
Cerium	µg/g	1	Thallium	µg/g	1
Cobalt	µg/g	1	Thorium	µg/g	1
Chromium	µg/g	1	Tin	µg/g	1
Copper	µg/g	1	Titanium	percent	.005
Europium	µg/g	1	Vanadium	µg/g	2
Gallium	µg/g	1	Ytterbium	µg/g	1
Gold	µg/g	1	Yttrium	µg/g	1
Holmium	µg/g	1	Zinc	µg/g	2
Iron	percent	.005	Uranium	µg/g	.1
Lanthanum	µg/g	1			
<b>Fish tissue</b>					
<b>Constituent</b>	<b>Reporting units (dry weight)</b>	<b>Laboratory reporting limit</b>	<b>Constituent</b>	<b>Reporting units (dry weight)</b>	<b>Laboratory reporting limit</b>
Water	percent	—	Lead	µg/g	0.1
Aluminum	µg/g	1.0	Manganese	µg/g	.1
Antimony	µg/g	.1	Mercury	µg/g	—
Arsenic	µg/g	.1	Molybdenum	µg/g	.1
Barium	µg/g	.1	Nickel	µg/g	.1
Beryllium	µg/g	.1	Selenium	µg/g	.1
Boron	µg/g	.2	Silver	µg/g	.1
Cadmium	µg/g	.1	Strontium	µg/g	.1
Chromium	µg/g	.5	Vanadium	µg/g	.1
Cobalt	µg/g	.1	Zinc	µg/g	.5
Copper	µg/g	.5	Uranium	µg/g	.1
Iron	µg/g	1.0			

**Appendix 4.** Organochlorine compounds detected in reservoir sediment core samples, in the Santa Ana River Basin, California, 1998

[Number below the compound is the data parameter code, which is a 5-digit number used in the USGS computerized data system, National Water Information System (NWIS), to uniquely identify a specific constituent or property; sediment-quality guidelines from McDonald and others (2000); PEC, probable-effect concentration ; TEC, threshold-effect concentration ; cm, centimeter; µg/kg, microgram per kilogram; E, estimated; <, less than; —, no data]

Station name	Depth of core segment (cm)	Estimated date of deposition	Porosity (percent)	Chlordane, total (µg/kg) 39351	Dieldrin (µg/kg) 39383	Heptachlor epoxide (µg/kg) 39423	Methoxy-chlor (µg/kg) 39481	p,p'-DDD (µg/kg) 39311	p,p'-DDE (µg/kg) 39321	p,p'-DDT (µg/kg) 39301	DDT, total (µg/kg)	PCB, total (µg/kg)
Sediment-quality guidelines (PEC)	—	—	—	17.6	61.8	16	—	28	31.3	62.9	572	676
Sediment-quality guidelines (TEC)	—	—	—	3.24	1.9	2.47	—	4.88	3.16	4.16	5.28	59.8
Hemet Lake (Site C)	0-2	—	.96	<5	<1.0	<1.0	<4	<1.0	1.1	<1.0	1.1	<15
	2-4	—	.92	<5	<1.0	<1.0	<4	<1.0	1.5	1.8	3.3	<15
	4-6	—	.91	<5	<1.0	<1.0	<4	<1.0	1.3	<1.0	1.3	<15
	8-10	—	.88	<5	<1.0	<1.0	<4	<1.0	1.8	<1.0	1.8	<15
	12-14	—	.87	<5	<1.0	<1.0	<4	<1.0	2.6	<1.0	2.6	<15
	16-18	—	.87	<10	<1.0	<1.0	<4	<1.0	1.6	<1.0	1.6	<30
	20-24	—	.88	<5	<1.0	<1.0	<4	<1.0	2.0	<1.0	2.0	<15
	32-35	—	.89	<15	<1.5	<1.5	<6	1.6	4.0	<1.5	5.6	<45
Canyon Lake (Site B)	0-4	1998	.88	9	<.5	<.5	<2	5.6	14	3.3	23	<15
	4-8	Late 1997	.88	7	1.2	<1.0	<4	3.2	21	<1.0	25	5
	8-12	Early 1997	.88	10	1.0	<1.0	<4	4.1	20	1.5	25	<15
	12-16	1996	.80	<5	<.5	<.5	<2	12	16	1.2	29	<15
	16-20	1995	.81	11	<1.0	<1.0	<4	8.2	25	1.5	34	6
	24-28	1993	.87	8	.8	<.5	<2	8.4	26	1.5	36	6
	32-36	1991	.80	9	<.5	<.5	<2	16	27	2.1	45	<15
	40-44	1990	.83	<5	<1.0	<1.0	<4	16	27	1.2	44	6
	48-52	1987	.80	<5	<1.0	<.5	<2	<.5	3.2	<.5	3.2	7
	56-60	1985	.77	11	<.5	<.5	<2	13	21	3.1	37	6
	68-72	1981	.75	6	.6	<.5	<2	13	71	1.9	86	18
	80-88	1976	.75	<5	<.5	<.5	<2	44	46	1.4	92	5
	104-112	1967	.75	6	<.5	<.5	<2	200	160	3.9	360	51
128-136	1958	.79	<5	<.5	<.5	<2	36	18	.8	55	6	
152-160	1950	.60	<5	<.5	<.5	<2	33	17	1.2	51	<15	
West Street Basin (Site A)	0-2	1998	.92	100	9	<1.2	18	17	41	16	74	57
	2-4	1996	.90	160	12	<1.5	<6	26	26	E49	100	70
	4-6	1995	.87	200	14	<1.5	49	31	41	E42	110	62
	6-8	1992	.85	190	13	<1.2	51	18	E29	23	70	73
	8-10	1990	.85	170	4	<1.5	24	8.2	17	28	53	42
	12-14	1986	.89	230	11	<1.2	56	17	33	E25	75	79
	16-18	1982	.89	1,000	<1.2	4.4	<5	68	88	<1.2	160	510
	20-22	1978	.85	210	7	<.5	<2	22	E15	18	55	56
	24-26	1973	.80	170	<1.0	<1.0	<2	16	E26	16	58	E260
	28-30	1967	.82	2,400	37	6.3	<7	300	200	14	510	580
	32-34	1960	.75	1,100	<1.0	4.7	<4	88	E56	E3.5	150	270
36-38	1952	.76	1,200	<1.0	4.8	<4	75	E100	3.1	180	550	

**Appendix 5.** Organochlorine compounds detected in streambed sediment or fish tissue in samples from the Santa Ana River Basin, California, 1998

[Number below the compound is the data parameter code, which is a 5-digit number used in the USGS computerized data system, National Water Information System (NWIS), to uniquely identify a specific constituent or property; sediment-quality guidelines from McDonald and others (2000); whole fish were analyzed; bed-sediment values (brown shading) for less than 2-millimeter fraction, dry weight; fish-tissue values (blue shading) in wet weight; E, estimated value; LRL, laboratory reporting limit; MWD, Metropolitan Water District; PEC, probable-effect concentration ; SAR, Santa Ana River; TEC, threshold-effect concentration; Cr, Creek; mo, month; yr, year; g, gram; g/kg, gram per kilogram; µg/kg, microgram per kilogram; mm, millimeter; <, less than; —, no data]

Station name	USGS station No.	Date (mo/yr)	Fish species	Number of fish	Range in total length (mm)	Mean total length (mm)	Range in standard length (mm)	Mean standard length (mm)	Range in weight (g)	Mean weight (g)
Sediment-quality guidelines (PEC)			—	—	—	—	—	—	—	—
Sediment-quality guidelines (TEC)			—	—	—	—	—	—	—	—
Tissue criteria, fish-eating wildlife <sup>1</sup>			—	—	—	—	—	—	—	—
Tissue criteria, fish-eating wildlife <sup>2</sup>			—	—	—	—	—	—	—	—
<b>Urban sites</b>										
SAR at Imperial Highway	11075600	9/98	Carp	6	300–335	323	240–270	260	344–477	399
SAR below Prado Dam	11074000	9/98	Carp	7	330–469	380	265–375	308	361–1,107	676
Chino Cr below Central Avenue	335825117411701	9/98	Carp	8	310–390	348	250–319	284	388–766	554
Mill Cr at Chino-Corona Road	335645117365301	9/98	Carp	8	285–365	322	225–295	261	245–508	376
SAR at Hamner Road	335645117332701	9/98	Carp	4	310–347	327	260–285	269	459–663	523
SAR at MWD Crossing	11066460	9/98	Yellow bulhead	5	105–215	135	88–180	113	14–122	40
Warm Cr near San Bernardino	11060400	11/98	—	—	—	—	—	—	—	—
San Jacinto River near Elsinore	11070500	9/98	Carp	5	261–306	282	210–240	224	197–273	230
<b>Nonurban sites</b>										
SAR at upper power house	340843117032501	9/98	Brown trout	5	194–237	209	159–198	174	71–125	94
		9/98	Rainbow trout	5	183–227	198	152–190	164	62–122	83
Bear Cr at Bear Cr Campground	340955117005301	9/98	Brown trout	5	229–255	241	188–218	203	116–162	137
South Fork of SAR	341014116494801	9/98	Brown trout	5	169–228	192	135–188	159	53–130	78
San Jacinto River near San Jacinto	11069500	9/98	—	—	—	—	—	—	—	—

See footnotes at end of table.

**Appendix 5.** Organochlorine compounds detected in streambed sediment or fish tissue in samples from the Santa Ana River Basin, California, 1998—Continued

Station name	Percentage of fish with external anomalies	Lipids (percent) 49289	Carbon, inorganic (g/kg) 49270	Carbon, inorganic + organic (g/kg) 49272	Carbon, organic (g/kg) 49271	<i>cis</i> -Chlordane (µg/kg) —	<i>cis</i> -Chlordane (µg/kg) 49320	<i>cis</i> -Nonachlor (µg/kg) —	<i>cis</i> -Nonachlor (µg/kg) 49316	Chlordane, total (µg/kg) —	Chlordane, total (µg/kg) —
Sediment-quality guidelines (PEC)	—	—	—	—	—	—	—	—	—	—	17.6
Sediment-quality guidelines (TEC)	—	—	—	—	—	—	—	—	—	—	3.24
Tissue criteria, fish-eating wildlife	—	—	—	—	—	—	—	—	—	500	—
Tissue criteria, fish-eating wildlife	—	—	—	—	—	—	—	—	—	100	—
<b>Urban sites</b>											
SAR at Imperial Highway	67	1.2	3.1	29	26	<5	3	<5	<1	5	10
SAR below Prado Dam	29	3.4	1.9	21	19	10	<1	5	<1	31	<LRL
Chino Cr below Central Avenue	62	2.8	43	86	43	<5	<1	<5	<1	<LRL	<LRL
Mill Cr at Chino-Corona Road	25	1.6	2.2	41	39	<5	<1	<5	<1	<LRL	<LRL
SAR at Hamner Road	25	5.5	1.5	19	18	6	<1	<5	<1	12	1
SAR at MWD Crossing	0	2.3	1.5	20	19	<5	<1	<5	1	7	2
Warm Cr near San Bernardino	—	—	10	38	28	—	<1	—	<1	—	1
San Jacinto River near Elsinore	20	4.7	4.2	62	58	<5	<2	<5	<2	<LRL	0
<b>Nonurban sites</b>											
SAR at upper power house	0	1.2	3.4	23	20	<5	<1	<5	<1	<LRL	<LRL
	0	8.6	—	—	—	<5	—	<5	—	5	—
Bear Cr at Bear Cr Campground	0	3.5	.5	25	25	<5	<1	<5	<1	<LRL	<LRL
South Fork of SAR	20	3.0	<.2	72	72	<5	<2	<5	<2	<LRL	<LRL
San Jacinto River near San Jacinto	—	—	<.2	62	62	—	<1	—	<1	—	<LRL

**Appendix 5.** Organochlorine compounds detected in streambed sediment or fish tissue in samples from the Santa Ana River Basin, California, 1998—Continued

Station name	DCPA (µg/kg) —	DCPA (µg/kg) 49324	Dieldrin (µg/kg) —	Dieldrin (µg/kg) 49331	Lindane (µg/kg) —	Lindane (µg/kg) 49345	<i>o,p'</i> -DDD (µg/kg) —	<i>o,p'</i> -DDD (µg/kg) 49325	<i>o,p'</i> -DDE (µg/kg) —	<i>o,p'</i> -DDE (µg/kg) 49327	<i>p,p'</i> -DDD (µg/kg) —	<i>p,p'</i> -DDD (µg/kg) 49326
Sediment-quality guidelines (PEC)	—	—	—	61.8	—	4.99	—	28.0	—	31.3	—	28.0
Sediment-quality guidelines (TEC)	—	—	—	1.90	—	2.37	—	4.88	—	3.16	—	4.88
Tissue criteria, fish-eating wildlife	—	—	120	—	—	—	—	—	—	—	—	—
Tissue criteria, fish-eating wildlife	—	—	100	—	100	—	—	—	—	—	—	—
<b>Urban sites</b>												
SAR at Imperial Highway	<5	<5	<5	<1	<5	<1	<5	1	<5	1	<5	6
SAR below Prado Dam	E76	<5	E5	1	<5	<1	<5	1	<5	<1	<5	4
Chino Cr below Central Avenue	<5	<5	<5	<1	E13	<1	<5	<1	<5	<1	<5	<1
Mill Cr at Chino-Corona Road	<5	<5	<5	<1	<5	<1	<5	<1	<5	<1	<5	1
SAR at Hamner Road	E110	34	E6	<1	E17	<1	<5	<1	<5	<1	<5	1
SAR at MWD Crossing	<5	<5	<5	<1	<5	<1	<5	<1	<5	<1	<5	<1
Warm Cr near San Bernardino	—	<5	—	<1	—	<1	—	<1	—	<1	—	<1
San Jacinto River near Elsinore	<5	<10	<5	<2	<5	<2	<5	<2	<5	<2	<5	<2
<b>Nonurban sites</b>												
SAR at upper power house	<5	<5	<5	<1	<5	<1	<5	<1	<5	<1	<5	<1
	<5	—	<5	—	<5	—	<5	—	<5	—	<5	—
Bear Cr at Bear Cr Campground	<5	<5	<5	<1	<5	<1	<5	<1	<5	<1	<5	<1
South Fork of SAR	<5	<10	<5	<2	<5	<2	<5	<2	<5	<2	<5	<2
San Jacinto River near San Jacinto	—	<5	—	<1	—	<1	—	<1	—	<1	—	<1

**Appendix 5.** Organochlorine compounds detected in streambed sediment or fish tissue in samples from the Santa Ana River Basin, California, 1998—Continued

Station name	<i>p,p'</i> -DDE (µg/kg) —	<i>p,p'</i> -DDE (µg/kg) 49328	<i>p,p'</i> -DDT (µg/kg) —	<i>p,p'</i> -DDT (µg/kg) 49330	DDT, total (µg/kg) —	DDT, total (µg/kg) —	PCB (µg/kg) —	PCB (µg/kg) 49459	<i>trans</i> - Chlordane (µg/kg) —	<i>trans</i> - Chlordane (µg/kg) 49321	<i>trans</i> - Nonachlor (µg/kg) —	<i>trans</i> - Nonachlor (µg/kg) 49317
Sediment-quality guidelines (PEC)	—	31.3	—	62.9	—	572	—	676	—	—	—	—
Sediment-quality guidelines (TEC)	—	3.16	—	4.16	—	5.28	—	59.8	—	—	—	—
Tissue criteria, fish-eating wildlife	—	—	—	—	200	—	110	—	—	—	—	—
Tissue criteria, fish-eating wildlife	—	—	—	—	1,000	—	500	—	—	—	—	—
<b>Urban sites</b>												
SAR at Imperial Highway	E70	17	<5	2	E70	29	<50	60	<5	1	E5	6
SAR below Prado Dam	E55	11	<5	<2	E55	16	80	<50	6	<1	10	<1
Chino Cr below Central Avenue	E45	<1	<5	<2	E45	<LRL	70	<50	<5	<1	<5	<1
Mill Cr at Chino-Corona Road	E32	5	<5	<2	E32	7	<50	<50	<5	<1	<5	<1
SAR at Hamner Road	E61	6	<5	5	E61	13	100	<50	<5	<1	6	1
SAR at MWD Crossing	E60	9	<5	4	E60	12	100	<50	<5	<1	7	1
Warm Cr near San Bernardino	—	3	—	17	—	20	—	<50	—	1	—	<1
San Jacinto River near Elsinore	E12	3	<5	<4	E12	3	<50	<100	<5	<2	<5	<2
<b>Nonurban sites</b>												
SAR at upper power house	E28	1	<5	2	E28	3	<50	<50	<5	<1	<5	<1
	E11	—	<5	—	E11	—	60	—	<5	—	E5	--
Bear Cr at Bear Cr Campground	E14	<1	<5	<2	E14	<LRL	70	<50	<5	<1	<5	<1
South Fork of SAR	E9	<2	<5	<4	E9	<LRL	<50	<100	<5	<2	<5	<2
San Jacinto River near San Jacinto	—	2	—	<2	—	2	—	<50	—	<1	—	<1

<sup>1</sup>Criteria for the protection of fish-eating wildlife from Newell and others (1987).<sup>2</sup>Criteria for the protection of fish-eating wildlife from National Academy of Science/National Academy of Engineers (1973).

**Appendix 6.** Semivolatile-organic compounds detected in sediment from reservoir cores, in the Santa Ana River Basin, California, November 1998

[Number below the compound is the data parameter code, which is a 5-digit number used in the USGS computerized data system, National Water Information System (NWIS), to uniquely identify a specific constituent or property; sediment-quality guidelines from McDonald and others (2000); cm, centimeter; µg/kg, microgram per kilogram; PAH, polycyclic-aromatic hydrocarbon; PEC, probable-effect concentration; TEC, threshold-effect concentration; compounds in yellow are PAHs; compounds in green are phenols; E, estimated; <, less than; —, no data]

Station name	Depth of core segment (cm)	Estimated year of deposition	1,2-Dimethyl-naphthalene (µg/kg) 62538	1,6-Dimethyl-naphthalene (µg/kg) 62539	1-Methyl-9H-Fluorene (µg/kg) 62540	1-Methyl-phenanthrene (µg/kg) 62541	1-Methyl-pyrene (µg/kg) 62542	2,3,6-Trimethyl-naphthalene (µg/kg) 62543	2,6-Dimethyl-naphthalene (µg/kg) 62544	2-Ethyl-naphthalene (µg/kg) 62545	2-Methyl-anthracene (µg/kg) 62546	4,5-Methylene-phenanthrene (µg/kg) 62547
Sediment-quality guidelines (PEC)	—	—	—	—	—	—	—	—	—	—	—	—
Sediment-quality guidelines (TEC)	—	—	—	—	—	—	—	—	—	—	—	—
Hemet Lake (Site C)	0–2	—	<10.0	34.2	E4.8	<10.0	<10.0	E2.7	178	<10.0	<10.0	E3.1
	2–4	—	<10.0	63.1	<10.0	<10.0	<10.0	<10.0	332	<10.0	<10.0	<10.0
	4–6	—	<10.0	53.8	<10.0	<10.0	<10.0	<10.0	295	<10.0	<10.0	<10.0
	8–10	—	<10.0	12.2	<10.0	E3.5	<10.0	<10.0	95.0	<10.0	<10.0	E2.9
	12–14	—	<10.0	14.4	<10.0	<10.0	<10.0	<10.0	112	<10.0	<10.0	E3.1
	16–18	—	E3.8	E9.6	E4.4	E5.3	<10.0	E3.5	59.7	E2.3	E4.0	E4.6
	20–24	—	<10.0	17.9	<10.0	E3.5	<10.0	<10.0	151	<10.0	<10.0	E4.7
	32–35	—	E5.6	15.8	E8.9	E9.2	E3.6	E5.0	79.9	E4.3	E4.2	E5.4
Canyon Lake (Site B)	0–4	1998	<10.0	15.4	<10.0	<10.0	<10.0	<10.0	173	<10.0	<10.0	E3.9
	4–8	Late 1997	<10.0	10.9	E3.3	<10.0	E3.2	<10.0	128	<10.0	E6.8	E7.8
	8–12	Early 1997	<10.0	32.1	<10.0	<10.0	E2.9	<10.0	318	<10.0	E4.6	E6.1
	12–16	1996	<10.0	E9.7	E1.9	E1.9	E1.9	<10.0	67.4	<10.0	E2.4	E3.4
	16–20	1995	<10.0	49.1	E4.3	<10.0	E3.3	E3.1	265	<10.0	<10.0	E8.3
	24–28	1993	<10.0	15.8	E2.6	<10.0	E1.8	<10.0	174	<10.0	<10.0	E6.2
	32–36	1991	<10.0	E3.9	<10.0	E2.1	E1.5	<10.0	38.1	<10.0	E2.6	E3.5
	40–44	1990	<10.0	42.6	E3.0	<10.0	E2.5	E3.3	260	<10.0	<10.0	E5.9
	48–52	1987	<10.0	38.7	<10.0	<10.0	<10.0	<10.0	208	<10.0	<10.0	<10.0
	56–60	1985	<10.0	E8.3	E2.1	E3.0	E2.0	<10.0	100	<10.0	E3.3	E6.3
	68–72	1981	E3.0	13.2	E6.7	15.9	E2.8	E5.9	76.7	E2.7	<10.0	E6.8
	80–88	1976	<10.0	15.9	E3.5	<10.0	E1.8	E2.6	108	<10.0	<10.0	E4.7
	104–112	1967	<10.0	54.3	E2.5	18.4	E2.5	E2.6	233	<10.0	21.9	E7.6
	128–136	1958	<10.0	19.1	E3.5	<10.0	E2.7	<10.0	150	<10.0	<10.0	E4.4
	152–160	1950	10.4	E2.1	E1.6	E2.2	E1.3	E1.6	E3.5	E1.8	E2.8	E1.5
West Street Basin (Site A)	0–2	1998	E79.3	E106	E107	E165	E115	E129	328	E54.5	E104	E136
	2–4	1996	E102	E186	E145	E223	E178	E117	695	E73.1	E108	E191
	4–6	1995	E89.4	E160	E160	E229	E173	E126	690	E81.0	E118	E216
	6–8	1992	E96.6	E137	E165	235	E175	E121	555	E66.3	E124	202
	8–10	1990	10.4	37.7	35.8	54.4	41.5	36.5	156	15.4	14.9	44.2
	12–14	1986	E90.5	E199	262	277	E170	261	775	E105	E107	E178
	16–18	1982	203	256	415	611	549	447	1,250	E194	224	824
	20–22	1978	294	1,500	446	443	E135	1,120	1,690	430	E94.4	238
	24–26	1973	65.1	242	176	111	E54.0	145	352	84.7	E38.6	87.0
	28–30	1967	E67.8	167	115	258	229	136	455	E76.7	E69.6	318
	32–34	1960	E185	320	335	832	621	494	924	E188	386	1,290
	36–38	1952	E170	E195	304	471	446	338	943	E160	E182	660

**Appendix 6.** Semivolatile-organic compounds detected in sediment from reservoir cores, in the Santa Ana River Basin, California, November 1998—Continued

Station name	Depth of core segment (cm)	9H-Fluorene (µg/kg) 62548	Acenaph-thene (µg/kg) 62549	Acenaph-thylene (µg/kg) 62550	Anthracene (µg/kg) 62551	Benz (a) anthracene (µg/kg) 62552	Benzo (a) pyrene (µg/kg) 62553	Benzo (b) fluoranthene (µg/kg) 62554	Benzo (e) pyrene (µg/kg) 62555	Benzo (g,h,i) perylene (µg/kg) 62556	Benzo (k) fluoranthene (µg/kg) 62557	Chrysene (µg/kg) 62558	
(PEC)	—	536	—	—	845	1,050	1,450	—	—	—	—	1,290	
(TEC)	—	77.4	—	—	57.2	108	150	—	—	—	—	166	
Hemet Lake (Site C)	0–2	E3.0	<10.0	E4.0	E3.6	E4.8	E4.3	E5.5	E7.1	—	E5.1	E7.0	
	2–4	<10.0	<10.0	E4.6	E3.5	E5.2	E4.8	E7.1	E9.0	E3.9	E5.8	E8.9	
	4–6	<10.0	<10.0	E3.7	<10.0	E3.8	<10.0	E5.8	E5.6	E3.9	E4.5	E7.4	
	8–10	<10.0	<10.0	E2.9	E3.1	E3.8	E4.0	E5.3	E6.5	E3.4	E5.2	E8.4	
	12–14	E3.9	<10.0	E3.6	E3.1	E4.2	E3.5	E6.7	E7.2	E3.4	E4.6	E7.9	
	16–18	11.2	<10.0	E3.4	E4.4	E4.7	E4.6	E4.9	E6.7	E3.8	E4.7	E7.3	
	20–24	E5.2	<10.0	<10.0	E3.3	E5.0	E3.8	E7.4	E7.0	E3.8	E5.9	E8.8	
	32–35	32.1	E2.0	E7.1	E5.9	E5.2	E5.0	E5.6	E6.7	E2.8	E5.0	E8.8	
	Canyon Lake (Site B)	0–4	E2.0	<10.0	E3.5	E4.4	E6.9	E7.4	10.1	13.2	E9.4	E8.3	13.3
		4–8	E4.0	E1.6	E2.9	E6.9	E8.6	12.8	15.3	15.7	E100	11.9	17.1
8–12		E3.2	<10.0	E4.9	E5.2	E6.4	E8.2	10.9	11.5	<10.0	E8.8	11.6	
12–16		E1.9	<10.0	E2.0	E2.9	E4.9	E6.6	E8.9	10.2	E5.5	E8.0	11.5	
16–20		E4.7	E2.3	E4.5	E6.3	E8.8	14.2	18.6	20.0	—	15.9	19.8	
24–28		E2.6	E1.2	E2.5	E4.0	E5.3	E5.1	E9.6	10.5	—	E8.6	11.1	
32–36		E1.6	<10.0	E1.6	E3.1	E4.4	E6.0	10.0	E7.5	E 5.9	E6.5	E9.0	
40–44		E2.8	E1.2	E4.1	E4.1	E5.5	E7.4	10.6	10.9	—	E7.5	11.1	
48–52		<10.0	<10.0	E2.3	E2.1	E2.9	E3.5	E3.2	E3.7	E3.3	E3.3	E3.4	
56–60		E2.7	<10.0	E1.9	E4.6	E6.2	E9.1	10.6	11.6	E14.1	10.0	13.8	
68–72		E5.7	E2.0	E2.5	11.1	E5.3	E6.3	E8.2	10.5	—	E7.5	11.4	
80–88		E2.8	E1.3	E2.0	E4.3	E4.1	E5.8	E5.7	E7.7	—	E5.5	E6.6	
104–112		E3.4	E1.5	E3.2	E5.5	E8.9	11.1	16.8	16.5	—	11.4	15.3	
128–136	E3.6	E1.4	E2.8	E4.0	E5.5	E4.9	E6.5	E6.5	E4.3	E5.5	E8.2		
152–160	E2.5	<5.0	E1.3	E2.0	E1.8	E1.9	E2.0	E2.5	E1.2	2.0	E2.8		
West Street Basin (Site A)	0–2	E92.2	<200	E67.4	E116	453	516	588	716	611	567	941	
	2–4	E142	E46.7	E82.4	E183	671	726	913	970	783	661	1,440	
	4–6	E147	E42.4	E59.8	E151	689	783	1,000	1,150	986	757	1,520	
	6–8	E133	E49.4	E70.4	E184	676	750	1,060	1,080	939	720	1,400	
	8–10	30.9	11.0	19.3	38.8	123	172	230	236	209	140	284	
	12–14	E192	E63.4	E73.7	E178	688	799	1,580	1,400	1,080	818	1,630	
	16–18	975	711	E117	572	2,360	2,820	2,930	3,310	1,740	3,130	4,910	
	20–22	338	E115	E62.8	E140	517	646	863	888	648	672	1,360	
	24–26	113	E39.2	E32.8	156	234	276	460	393	E113	325	528	
	28–30	243	131	E53.1	206	843	935	1,050	1,140	808	990	1,780	
	32–34	866	553	E89.5	1,880	4,290	4,050	2,880	3,400	2,210	3,960	5,980	
	36–38	788	521	E110	503	1,750	2,150	2,530	2,630	1,430	2,190	3,520	

**Appendix 6.** Semivolatile-organic compounds detected in sediment from reservoir cores, in the Santa Ana River Basin, California, November 1998—Continued

Station name	Depth of core segment (cm)	Coronene (µg/kg) 62559	Dibenzo (a,h) anthracene (µg/kg) 62560	Fluoranthene (µg/kg) 62561	Indeno (1,2,3-c,d) pyrene (µg/kg) 62562	Naphthalene (µg/kg) 62563	Perylene (µg/kg) 62565	Phenanthrene (µg/kg) 62566	Pyrene (µg/kg) 62568	Total PAH (µg/kg) —	p-Cresol (µg/kg) 62564	Phenol (µg/kg) 62567
(PEC)	—	—	—	2,230	—	561	—	1,170	1,520	22,800	—	—
(TEC)	—	—	33	423	—	176	—	204	195	1,610	—	—
Hemet Lake (Site C)	0–2	<10.0	<10.0	E7.7	E3.1	E5.6	33.2	E4.8	E9.5	372	198	75.3
	2–4	<10.0	<10.0	10.3	E4.7	E4.1	45.8	E5.1	10.5	665	84.8	25.4
	4–6	<10.0	<10.0	8.4	E3.9	E4.3	37.2	E5.0	9.3	512	89.2	17.3
	8–10	<10.0	<10.0	E7.7	E3.1	E5.4	93.0	E5.8	10.2	316	35.1	17.4
	12–14	<10.0	<10.0	E8.2	E3.4	E3.8	57.5	E5.0	E9.1	340	49.1	14.6
	16–18	E1.7	<10.0	12.0	E3.6	13.6	98.5	11.4	12.4	377	31.8	12.3
	20–24	<10.0	<10.0	E9.1	E4.8	E4.8	124	E6.0	12.2	441	26.1	15.8
	32–35	E1.2	<10.0	14.2	E3.4	28.2	62.4	27.4	14.0	741	42.3	20.2
Canyon Lake (Site B)	0–4	E2.0	<10.0	14.1	E8.1	E2.2	18.3	E6.3	17.5	519	16.3	E7.7
	4–8	E3.6	<10.0	21.1	263	E2.4	422	E9.0	24.7	758	716	18.4
	8–12	E3.3	E2.2	13.1	E9.9	E3.2	39.3	E7.3	17.0	626	979	37.7
	12–16	E1.1	<10.0	12.6	E5.8	E8	26.4	E5.4	14.7	293	E5.4	E6.1
	16–20	E3.3	<10.0	24.5	12.6	E5.2	91.0	10.2	28.6	696	47.6	21.1
	24–28	E2.0	E1.9	15.9	E5.8	E2.5	422	E5.2	18.7	384	10.9	18.8
	32–36	<10.0	<10.0	12.6	E5.4	E1.1	85	E4.1	13.4	210	E3.8	E7.1
	40–44	E2.8	<10.0	14.6	E7.8	E5.0	43.8	E5.3	18.8	560	36.3	17.5
	48–52	<10.0	<10.0	E5.3	<10.0	E1.8	42.6	E2.2	<10.0	308	E8.8	20.8
	56–60	E4.5	<10.0	20.9	E9.9	E1.5	199	E7.6	24.6	395	E4.2	34.6
	68–72	E1.1	E1.7	14.5	E5.0	E2.4	132	E7.3	16.4	553	E8.0	87.0
	80–88	<10.0	<10.0	E9.7	E4.6	E2.5	253	E3.5	13.2	285	E6.8	63.4
	104–112	E3.4	E5.6	20.8	E11.0	E3.1	137	E7.7	24.6	549	14.8	11.5
	128–136	<10.0	<10.0	E9.6	E5.0	E1.4	172	E3.3	12.6	428	11.2	65.1
	152–160	<5.0	E8	E3.4	E1.9	E8	32.4	E2.3	E3.4	115	E3.4	E4.4
West Street Basin (Site A)	0–2	E228	E118	1,060	485	E38.5	268	502	1,160	21,000	201	E99.4
	2–4	E271	E170	1,890	723	E64.9	359	912	1,960	33,700	E281	1,150
	4–6	E399	E197	1,850	819	E78.4	423	763	1,960	33,900	E216	E163
	6–8	E507	E181	1,770	794	E61.3	294	822	1,910	31,800	202	E99.3
	8–10	E104	16.4	392	162	19.5	66.2	171	398	8,930	112	38.7
	12–14	E315	220	1,760	919	E52.1	475	865	1,880	44,500	E181	E155
	16–18	E412	387	7,570	1,950	E141	996	3,220	6,620	106,000	288	E124
	20–22	E198	E122	2,270	648	E54.6	276	1,190	2,290	54,200	E111	E55.5
	24–26	E16.9	E19.6	822	E140	E35.5	157	468	794	15,700	66.2	258
	28–30	E423	136	3,570	714	E75.1	401	1,420	3,390	52,200	386	E78.6
	32–34	E614	606	12,500	2,570	E92.0	1,280	7,290	9,760	125,000	E81.1	E79.4
	36–38	E376	341	5,990	1,550	E102	793	2,760	6,200	85,000	E156	E92.0



**Appendix 7.** Semivolatile-organic compounds detected in streambed sediment, in the Santa Ana River Basin, California, 1998—Continued

Station name	Benzo(a) pyrene (µg/kg) 49389	Benzo(b) fluoranthene (µg/kg) 49458	Benzo(g,h,l) perylene (µg/kg) 49408	Benzo(k) fluoranthene (µg/kg) 49397	Bis(2- chloroethyl) ether (µg/kg) 49457	Carbazole (µg/kg) 49449	Chrysene (µg/kg) 49450	Dibenz(a,h) anthracene (µg/kg) 49461	Fluoranthene (µg/kg) 49466	Indeno(1,2,3- cd) pyrene (µg/kg) 49390	1,6-Dimethyl naphthalene (µg/kg) 49404	2,6-Dimethyl naphthalene (µg/kg) 49406
(PEC)	1,450	—	—	—	—	—	1,290	—	2,230	—	—	—
(TEC)	150	—	—	—	—	—	166	33	423	—	—	—
<b>Urban sites</b>												
SAR at Imperial Highway	E50	E40	E30	E40	<100	<100	E20	<100	E40	E20	<100	E70
SAR below Prado Dam	E20	E40	E30	E10	<50	<50	E30	E10	E30	E30	<50	90
Chino Cr below Central Avenue	160	320	120	100	<100	<100	260	<100	450	E100	E40	270
Mill Cr at Chino-Corona Road	E70	E90	<100	E50	<100	<100	E90	<100	110	<100	<100	450
SAR at Hamner Road	E20	E10	E10	E10	<50	<50	E10	<50	E40	E20	<50	E20
SAR at MWD Crossing	E20	E40	E30	E10	50	M	E30	<50	E50	E20	<50	E10
Warm Cr near San Bernardino	170	320	140	120	460	E50	260	E40	420	110	E10	110
San Jacinto River near Elsinore	<100	<100	<100	<100	—	<100	<100	<100	<100	<100	<100	E80
<b>Nonurban sites</b>												
SAR at upper power house	<50	<50	<50	<50	—	< 50	<50	<50	<50	<50	<50	<50
Bear Cr at Bear Cr Campground	<50	<50	<50	<50	—	< 50	<50	<50	<50	<50	<50	<50
South Fork of SAR	<100	<100	<100	<100	—	< 100	<100	<100	<100	<100	<100	<100
San Jacinto River near San Jacinto	<100	<100	<100	<100	—	< 100	<100	<100	M	<100	<100	<100

**Appendix 7.** Semivolatile-organic compounds detected in streambed sediment, in the Santa Ana River Basin, California, 1998—Continued

Station name	Naphthalene (µg/kg) 49402	1-Methyl-phenanthrene (µg/kg) 49410	Phenanthrene (µg/kg) 49409	1-Methylpyrene (µg/kg) 49388	Pyrene (µg/kg) 49387	PAH, total (µg/kg) —	<i>p</i> -Cresol (µg/kg) 49451	Phenol (µg/kg) 49413	Bis(2-ethylhexyl)-phthalate* (µg/kg) 49426	Butylbenzyl-phthalate (µg/kg) 49427	Dibutyl-phthalate* (µg/kg) 49381	Diethyl-phthalate (µg/kg) 49383	Dimethyl-phthalate (µg/kg) 49384	Diethyl-phthalate (µg/kg) 49382
(PEC)	561	—	1,170	—	1,520	22,800	—	—	—	—	—	—	—	—
(TEC)	176	—	204	—	195	1,610	—	—	—	—	—	—	—	—
<b>Urban sites</b>														
SAR at Imperial Highway	<100	<100	<100	<100	E40	420	1,400	E40	510	E40	M	<100	<100	<100
SAR below Prado Dam	<50	<50	E10	<50	E40	400	110	<50	440	E50	<50	M	M	<50
Chino Cr below Central Avenue	E20	E30	280	M	430	2,900	310	E70	4,400	430	E90	<100	290	360
Mill Cr at Chino-Corona Road	<100	<100	<100	<100	100	980	690	E60	1,200	<100	<100	<100	E20	170
SAR at Hamner Road	<50	<50	<50	<50	E40	280	300	E30	<50	<50	<50	<50	<50	<50
SAR at MWD Crossing	<50	<50	E20	<50	50	380	550	50	180	<50	<50	<50	M	E50
Warm Cr near San Bernardino	M	<50	230	M	390	3,100	11,000	190	2,500	310	E30	M	M	470
San Jacinto River near Elsinore	<100	<100	<100	<100	<100	80	<100	E20	<50	<100	E10	<100	<100	<100
<b>Nonurban sites</b>														
SAR at upper power house	<50	<50	<50	<50	<50	<LRL	770	<50	<50	<50	E10	<50	<50	<50
Bear Cr at Bear Cr Campground	<50	<50	<50	<50	<50	<LRL	490	<50	<50	<50	E10	<50	<50	50
South Fork of SAR	<100	<100	<100	<100	<100	20	340	290	<50	<100	E10	<100	<100	<100
San Jacinto River near San Jacinto	<100	<100	<100	<100	M	10	1,400	E30	<50	E30	<50	<100	<100	<100

**Appendix 8.** Trace elements and major ions detected in sediment cores from West Street Basin, in the Santa Ana River Basin, California, November 1998

[Number below the compound is the data parameter code, which is a 5-digit number used in the USGS computerized data system, National Water Information System (NWIS), to uniquely identify a specific constituent or property; sediment-quality guidelines from McDonald and others (2000); cm, centimeter; µg/g, micrograms per gram; PEC, probable-effect concentration; TEC, threshold-effect concentration; M, presence verified but not quantified; <, less than; —, no data]

Depth of core segment (cm)	Estimated year of deposition	Calcium (µg/g) 62456	Magnesium (µg/g) 62458	Potassium (µg/g) 62457	Sodium (µg/g) 62459	Phosphorus (µg/g) 00668	Carbon, total (per cent) 62463	Carbon, organic (per cent) 62461	Aluminum (µg/g) 01108	Antimony (µg/g) 01098	Arsenic (µg/g) 01003	Barium (µg/g) 01008	Beryllium (µg/g) 01013
Sediment-quality guidelines (PEC)		—	—	—	—	—	—	—	—	—	33	—	—
Sediment-quality guidelines (TEC)		—	—	—	—	—	—	—	—	—	9.79	—	—
0–2	1998	31,000	15,000	20,000	14,000	1,400	9.0	8.7	70,000	5	8	680	2
2–4	1996	35,000	16,000	20,000	13,000	1,400	7.9	7.5	72,000	5	8	660	2
4–6	1995	25,000	17,000	22,000	14,000	1,500	6.6	6.5	76,000	5	9	680	2
6–8	1992	24,000	14,000	21,000	16,000	1,400	9.0	8.9	73,000	6	8	740	2
8–10	1990	28,000	13,000	18,000	14,000	1,600	13	13	65,000	6	8	680	2
10–12	1988	20,000	13,000	20,000	15,000	1,300	11	11	68,000	6	8	700	2
12–14	1986	26,000	11,000	19,000	16,000	1,400	10	9.9	65,000	5	7	700	2
14–16	1984	42,000	13,000	20,000	14,000	1,400	9.8	9.1	66,000	5	8	710	2
16–18	1982	36,000	12,000	17,000	14,000	1,200	12	12	64,000	4	8	660	2
18–20	1981	32,000	12,000	22,000	18,000	1,300	10	10	74,000	6	10	860	2
20–22	1978	38,000	14,000	19,000	13,000	1,400	11	10	68,000	5	12	770	2
22–24	1976	25,000	14,000	22,000	15,000	1,300	7.1	6.9	74,000	2	9	1,100	2
24–26	1973	23,000	16,000	22,000	15,000	1,300	6.8	6.7	76,000	2	9	710	2
26–28	1970	21,000	12,000	21,000	17,000	1,300	8.4	8.4	70,000	3	8	730	2
28–30	1967	21,000	14,000	22,000	16,000	1,400	9.3	9.3	79,000	3	11	740	2
30–32	1964	20,000	14,000	20,000	15,000	1,200	11	11	70,000	3	10	670	2
32–34	1960	18,000	15,000	20,000	13,000	1,500	11	11	70,000	5	15	640	2
34–36	1956	20,000	13,000	19,000	12,000	1,600	13	13	65,000	5	16	630	2
36–38	1952	19,000	12,000	20,000	12,000	4,100	8.7	8.6	93,000	3	16	630	2

**Appendix 8.** Trace elements and major ions detected in sediment cores from West Street Basin, in the Santa Ana River Basin, California, November 1998—Continued

Depth of core segment (cm)	Estimated year of deposition	Bismuth (µg/g) 62465	Cadmium (µg/g) 01028	Cerium (µg/g) 62466	Cesium (µg/g) 62477	Chromium (µg/g) 01029	Cobalt (µg/g) 01038	Copper (µg/g) 01043	Dysprosium (µg/g) 62473	Erbium (µg/g) 62472	Europium (µg/g) 62467	Gadolinium (µg/g) 62474	Gallium (µg/g) 62468	Holmium (µg/g) 62469	Iron (µg/g) 01170
(PEC)		—	4.98	—	—	111	—	149	—	—	—	—	—	—	—
(TEC)		—	0.99	—	—	43.4	—	31.6	—	—	—	—	—	—	—
0–2	1998	0.3	2.7	64	3.9	73	17	140	5.3	4.0	1.4	5.8	19	1.2	44,000
2–4	1996	.3	2.4	68	4.0	74	17	120	5.6	4.1	1.4	6.1	21	1.2	47,000
4–6	1995	.3	2.1	74	4.3	81	19	99	6.1	4.4	1.5	6.8	22	1.3	51,000
6–8	1992	.3	2.6	70	3.5	75	16	130	5.6	4.0	1.4	6.2	20	1.2	43,000
8–10	1990	.5	3.6	61	3.2	73	14	170	4.8	3.5	1.2	5.5	17	1.1	39,000
10–12	1988	.4	4.0	64	3.3	78	14	200	5.2	3.8	1.3	5.7	18	1.1	39,000
12–14	1986	.3	3.5	59	2.8	70	12	150	4.3	3.2	1.2	5.0	16	.9	34,000
14–16	1984	.3	4.7	66	3.3	76	14	180	4.9	3.4	1.3	5.5	18	1.0	40,000
16–18	1982	.4	4.2	57	2.9	67	12	190	4.4	3.2	1.1	4.7	16	.9	35,000
18–20	1981	.5	5.2	66	3.1	80	14	180	4.8	3.5	1.3	5.4	19	1.0	38,000
20–22	1978	.5	5.2	63	3.5	110	16	220	5.1	3.6	1.3	5.5	19	1.1	42,000
22–24	1976	.4	2.9	71	3.5	82	15	120	5.3	3.8	1.4	6.0	20	1.1	40,000
24–26	1973	.3	3.3	71	3.8	83	17	100	5.8	4.2	1.4	6.2	22	1.2	45,000
26–28	1970	.3	3.5	61	2.9	69	12	130	4.8	3.4	1.3	5.3	18	1.0	35,000
28–30	1967	.4	4.6	75	3.6	81	15	180	6.2	4.4	1.5	6.8	21	1.3	42,000
30–32	1964	.4	3.4	63	3.3	85	14	140	5.0	3.5	1.3	5.6	19	1.1	40,000
32–34	1960	.6	7.0	63	3.5	110	16	130	5.3	3.8	1.3	5.7	20	1.1	45,000
34–36	1956	.6	10	58	3.2	130	16	270	4.8	3.4	1.2	5.2	18	1.0	43,000
36–38	1952	.5	7.1	59	3.2	100	16	190	4.9	3.5	1.2	5.3	22	1.0	42,000

**Appendix 8.** Trace elements and major ions detected in sediment cores from West Street Basin, in the Santa Ana River Basin, California, November 1998—Continued

Depth of core segment (cm)	Estimated year of deposition	Lanthanum (µg/g) 62470	Lead (µg/g) 30272	Lithium (µg/g) 30274	Manganese (µg/g) 30278	Mercury (µg/g) 30280	Molybdenum (µg/g) 30283	Neodymium (µg/g) 30285	Nickel (µg/g) 30287	Niobium (µg/g) 30289	Praseodymium (µg/g) 62478	Rubidium (µg/g) 62475	Samarium (µg/g) 62479	Scandium (µg/g) 30297	Selenium (µg/g) 30299
(PEC)		—	128	—	—	1.06	—	—	48.6	—	—	—	—	—	4.0 <sup>1</sup>
(TEC)		—	35.8	—	—	.18	—	—	22.7	—	—	—	—	—	2.5 <sup>1</sup>
0–2	1998	38	150	39	600	.32	16	29	38	26	8.3	110	5.4	14	1.2
2–4	1996	39	450	41	640	.34	16	31	37	27	8.8	110	5.6	15	1.1
4–6	1995	44	110	45	690	.19	12	34	37	30	9.7	120	6.2	16	.8
6–8	1992	41	140	37	590	.32	14	31	35	26	9.1	110	5.9	14	1.0
8–10	1990	36	210	32	540	.50	19	28	37	22	7.9	94	5.1	12	1.1
10–12	1988	38	230	33	510	.53	28	29	39	24	8.3	98	5.2	12	1.3
12–14	1986	37	220	28	470	.58	23	27	33	20	7.8	90	4.7	11	1.3
14–16	1984	38	250	34	520	.85	35	29	37	22	8.2	97	5.1	12	1.6
16–18	1982	33	240	30	460	1.0	57	25	35	20	7.2	89	4.5	11	1.5
18–20	1981	40	450	32	510	1.1	34	28	42	24	8.4	100	5.0	12	1.5
20–22	1978	38	480	38	560	1.9	24	29	47	24	8.3	100	5.2	14	1.9
22–24	1976	64	320	36	570	1.1	7	39	37	24	12	110	5.6	13	1.1
24–26	1973	46	440	40	600	.90	5	34	44	28	9.7	120	5.7	15	1.0
26–28	1970	37	690	30	460	.55	5	28	37	23	8.0	100	5.0	11	1.0
28–30	1967	45	810	35	490	.65	7	34	46	26	9.9	110	6.2	14	1.2
30–32	1964	38	1,300	35	500	.73	5	29	44	25	8.2	100	5.2	13	1.3
32–34	1960	37	2,300	38	530	.88	7	29	57	25	8.3	100	5.4	14	1.6
34–36	1956	35	3,300	34	510	1.0	7	27	67	23	7.6	95	4.9	13	2.4
36–38	1952	34	1,900	37	510	.79	5	27	53	24	7.7	97	5.1	14	2.3

See footnote at end of table.

**Appendix 8.** Trace elements and major ions detected in sediment cores from West Street Basin, in the Santa Ana River Basin, California, November 1998—Continued

Depth of core segment (cm)	Estimated year of deposition	Silver (µg/g) 30301	Strontium (µg/g) 30305	Tantalum (µg/g) 30309	Terbium (µg/g) 62480	Thallium (µg/g) 34480	Thorium (µg/g) 30312	Thulium (µg/g) 62471	Titanium (µg/g) 01153	Vanadium (µg/g) 30322	Ytterbium (µg/g) 30325	Yttrium (µg/g) 30327	Zinc (µg/g) 30329	Uranium (µg/g) 30320
(PEC)		—	—	—	—	—	—	—	—	—	—	—	459	—
(TEC)		—	—	—	—	—	—	—	—	—	—	—	121	—
0–2	1998	<3	280	M	0.9	0.69	12	0.7	6,200	110	3	24	800	9.0
2–4	1996	<3	290	M	1.0	.73	12	.7	6,800	120	3	25	730	9.4
4–6	1995	<3	260	M	1.1	.76	14	.8	7,200	120	3	27	670	9.0
6–8	1992	4	290	M	1.0	.69	12	.7	6,400	110	3	25	780	8.2
8–10	1990	<3	280	M	.8	.61	10	.6	5,500	98	3	22	950	8.9
10–12	1988	<3	260	M	.9	.63	11	.6	5,600	100	3	22	930	9.4
12–14	1986	<3	290	M	.8	.58	10	.5	5,300	92	2	20	850	9.4
14–16	1984	<3	330	M	.9	.63	11	.6	5,600	100	3	21	890	11
16–18	1982	<3	310	M	.8	.60	9	.5	4,800	95	2	21	900	13
18–20	1981	<3	350	M	.8	.65	10	.6	5,400	100	3	23	1,100	14
20–22	1978	<3	310	M	.9	.63	12	.6	5,900	110	3	24	1,000	13
22–24	1976	<3	290	M	.9	.67	11	.6	5,600	100	3	24	570	5.9
24–26	1973	<3	280	M	1.0	.72	12	.7	6,700	120	3	27	650	6.1
26–28	1970	<3	290	M	.8	.62	11	.6	5,400	92	3	22	650	6.7
28–30	1967	<3	320	M	1.1	.68	13	.7	6,100	110	3	29	830	8.1
30–32	1964	4	280	M	.9	.64	11	.6	5,800	100	3	23	790	7.6
32–34	1960	3	250	M	.9	.66	11	.6	6,400	120	3	25	1,100	9.5
34–36	1956	<3	250	M	.8	.61	11	.6	6,000	120	3	22	1,400	12
36–38	1952	<3	260	M	.8	.59	11	.6	6,000	120	3	23	1,000	9.4

<sup>1</sup>Selenium sediment guidelines from Van Derveer and Canton (1997).

**Appendix 9.** Trace elements and major ions detected in sediment cores from Canyon Lake, in the Santa Ana River Basin, California, November 1998

[Number below the compound is the data parameter code, which is a 5-digit number used in the USGS computerized data system, National Water Information System (NWIS), to uniquely identify a specific constituent or property; sediment-quality guidelines from McDonald and others (2000); cm, centimeter; µg/g, micrograms per gram; M, presence verified but not quantified; PEC, probable-effect concentration; TEC, threshold-effect concentration; <, less than; —, no data]

Depth of core segment (cm)	Estimated year of deposition	Calcium (µg/g) 62456	Magnesium (µg/g) 62458	Potassium (µg/g) 62457	Sodium (µg/g) 62459	Phosphorus (µg/g) 00668	Carbon, total (µg/g) 62463	Carbon, organic (µg/g) 62461	Aluminum (µg/g) 01108	Antimony (µg/g) 01098	Arsenic (µg/g) 01003	Barium (µg/g) 01008
Sediment-quality guidelines (PEC)		—	—	—	—	—	—	—	—	—	33	—
Sediment-quality guidelines (TEC)		—	—	—	—	—	—	—	—	—	9.79	—
0–2	Later 1998	22,000	19,000	21,000	4,600	1,400	2.9	2.8	98,000	1	13	720
2–4	Mid 1998	28,000	19,000	20,000	4,100	1,400	3.3	2.9	94,000	1	13	700
4–6	Early 1998	33,000	18,000	20,000	4,200	1,500	3.6	3.2	93,000	1	14	710
6–8	Later 1997	29,000	19,000	21,000	4,200	1,600	3.3	3.0	94,000	1	13	750
10–12	Early 1997	25,000	19,000	22,000	4,200	1,500	2.6	2.4	95,000	1	13	760
14–16	1996	16,000	21,000	24,000	4,700	1,400	1.6	1.6	94,000	1	9	780
18–20	1995	42,000	16,000	19,000	4,400	1,100	3.7	2.9	83,000	2	14	740
22–24	1994	47,000	16,000	18,000	4,700	1,000	4.1	3.2	79,000	2	16	750
32–34	1992	18,000	20,000	22,000	5,100	1,300	1.5	1.4	93,000	M	9	740
42–44	1989	20,000	20,000	20,000	5,500	1,300	1.9	1.7	98,000	M	11	710
52–54	1987	20,000	22,000	22,000	6,400	1,100	1.6	1.3	100,000	M	10	730
62–64	1983	17,000	20,000	22,000	4,600	1,300	2.0	1.9	100,000	1	12	690
72–74	1980	28,000	17,000	19,000	5,800	870	2.6	2.2	93,000	2	15	800
76–78	1979	28,000	18,000	19,000	5,500	860	2.3	1.9	94,000	2	15	790
84–88	1976	22,000	19,000	21,000	5,100	890	1.6	1.3	97,000	2	12	800
96–100	1972	17,000	23,000	28,000	7,500	1,200	1.3	1.2	100,000	M	8	770
104–108	1968	19,000	20,000	25,000	5,000	1,300	1.8	1.5	100,000	1	9	730
124–128	1961	51,000	16,000	19,000	5,000	820	2.9	1.8	82,000	1	10	680
144–148	1954	21,000	24,000	26,000	5,500	1,200	1.7	1.4	100,000	M	9	690
164–168	Prereservoir soil	16,000	21,000	22,000	4,800	1,200	1.7	1.6	100,000	M	10	740

**Appendix 9.** Trace elements and major ions detected in sediment cores from Canyon Lake, in the Santa Ana River Basin, California, November 1998—Continued

Depth of core segment (cm)	Estimated year of deposition	Beryllium (µg/g) 01013	Bismuth (µg/g) 62465	Cadmium (µg/g) 01028	Cerium (µg/g) 62466	Cesium (µg/g) 62477	Chromium (µg/g) 01029	Cobalt (µg/g) 01038	Copper (µg/g) 01043	Dysprosium (µg/g) 62473	Erbium (µg/g) 62472	Europium (µg/g) 62467	Gadolinium (µg/g) 62474	Gallium (µg/g) 62468	Holmium (µg/g) 62469
(PEC)		—	—	4.98	—	—	111	—	149	—	—	—	—	—	—
(TEC)		—	—	.99	—	—	43.4	—	31.6	—	—	—	—	—	—
0–2	Later 1998	2	0.2	.6	78	6.9	69	22	340	6.4	4.5	1.4	6.8	25	1.4
2–4	Mid 1998	2	.2	.6	78	6.5	64	21	340	6.2	4.4	1.3	6.7	25	1.4
4–6	Early 1998	2	.2	.6	81	6.5	63	20	350	6.4	4.5	1.3	6.9	25	1.4
6–8	Later 1997	2	.2	.6	84	6.7	66	21	340	6.4	4.6	1.5	7.2	25	1.4
10–12	Early 1997	2	.3	.5	88	6.9	66	24	160	6.8	4.9	1.4	7.3	27	1.5
14–16	1996	2	.2	.5	86	7.4	70	25	85	6.7	4.7	1.4	7.2	28	1.5
18–20	1995	2	.2	.6	78	6.4	62	19	260	6.2	4.6	1.3	6.9	23	1.3
22–24	1994	2	.2	.6	79	6.0	61	17	420	6.1	4.4	1.4	6.7	23	1.3
32–34	1992	2	.3	.4	100	7.1	63	23	210	6.9	4.8	1.5	7.9	29	1.5
42–44	1989	2	.3	.5	91	6.4	63	20	130	6.5	4.6	1.4	7.3	26	1.4
52–54	1987	2	.3	.4	87	7.1	67	25	66	6.4	4.6	1.4	7.2	27	1.4
62–64	1983	2	.3	.5	85	6.7	69	23	120	7.0	4.9	1.4	7.4	26	1.5
72–74	1980	2	.3	.8	73	6.2	68	18	290	6.7	4.7	1.5	7.1	23	1.5
76–78	1979	2	.3	.7	74	6.3	68	19	240	6.6	4.7	1.5	7.1	23	1.4
84–88	1976	2	.3	.7	79	6.7	70	21	98	6.9	4.7	1.6	7.2	25	1.5
96–100	1972	2	.2	.4	87	8.3	70	28	62	7.2	5.2	1.5	7.9	29	1.6
104–108	1968	2	.2	.5	81	7.9	69	27	120	6.9	5.0	1.4	7.4	27	1.5
124–128	1961	2	.2	.6	69	5.8	58	19	160	5.6	4.0	1.2	6.1	21	1.2
144–148	1954	2	.2	.5	83	7.4	69	26	60	6.8	4.9	1.4	7.4	27	1.5
164–168	Prereservoir soil	2	.3	.4	87	6.4	70	22	60	7.1	5.1	1.5	7.6	27	1.6

**Appendix 9.** Trace elements and major ions detected in sediment cores from Canyon Lake, in the Santa Ana River Basin, California, November 1998—Continued

Depth of core segment (cm)	Estimated year of deposition	Iron (µg/g) 01170	Lanthanum (µg/g) 62470	Lead (µg/g) 30272	Lithium (µg/g) 30274	Manganese (µg/g) 30278	Mercury (µg/g) 30280	Molybdenum (µg/g) 30283	Neodymium (µg/g) 30285	Nickel (µg/g) 30287	Niobium (µg/g) 30289	Praseodymium (µg/g) 62478	Rubidium (µg/g) 62475	Samarium (µg/g) 62479	Scandium (µg/g) 30297
(PEC)		—	—	128	—	—	1.06	—	—	48.6	—	—	—	—	—
(TEC)		—	—	35.8	—	—	.18	—	—	22.7	—	—	—	—	—
0–2	Later 1998	70,000	43	27	61	1,200	.06	4	33	33	21	9.4	130	6.2	22
2–4	Mid 1998	69,000	44	26	60	1,300	.06	5	33	30	20	9.5	120	6.1	20
4–6	Early 1998	67,000	45	26	60	1,400	.05	6	34	30	20	9.8	120	6.3	20
6–8	Later 1997	70,000	48	27	62	1,500	.06	5	35	31	21	10	120	6.6	21
10–12	Early 1997	76,000	48	28	65	1,300	.05	7	37	31	22	10	130	7.1	22
14–16	1996	76,000	47	27	66	1,200	.06	3	36	31	24	10	140	6.7	23
18–20	1995	60,000	43	33	56	1,100	.08	5	33	31	20	9.5	110	6.2	18
22–24	1994	62,000	44	38	55	1,200	.07	9	33	30	19	9.5	110	6.0	19
32–34	1992	74,000	57	30	67	1,200	.06	3	42	30	23	12	140	7.6	22
42–44	1989	69,000	53	33	65	1,100	.06	3	38	32	22	11	120	6.7	22
52–54	1987	73,000	49	26	63	1,200	.08	2	36	33	23	10	130	6.8	23
62–64	1983	72,000	48	46	61	1,200	.07	2	36	31	22	10	130	6.8	23
72–74	1980	56,000	41	70	54	920	.06	2	33	33	20	9.2	110	6.4	20
76–78	1979	58,000	41	52	56	910	.06	3	32	33	20	9.1	110	6.3	20
84–88	1976	61,000	45	35	57	880	.06	2	35	34	21	9.7	120	6.8	21
96–100	1972	77,000	49	26	61	1,000	.06	1	38	32	27	11	170	7.2	24
104–108	1968	73,000	46	33	62	1,400	.06	3	35	32	24	9.9	160	6.6	23
124–128	1961	56,000	38	29	54	820	.06	3	29	28	18	8.1	110	5.3	18
144–148	1954	75,000	47	21	61	1,100	.05	4	36	31	24	10	150	6.7	23
164–168	Prereservoir soil	73,000	51	20	64	960	.06	3	38	30	22	11	130	7.3	24

**Appendix 9.** Trace elements and major ions detected in sediment cores from Canyon Lake, in the Santa Ana River Basin, California, November 1998—Continued

Depth of core segment (cm)	Estimated year of deposition	Selenium (µg/g) 30299	Silver (µg/g) 30301	Strontium (µg/g) 30305	Tantalum (µg/g) 30309	Terbium (µg/g) 62480	Thallium (µg/g) 34480	Thorium (µg/g) 30312	Thulium (µg/g) 62471	Titanium (µg/g) 01153	Vanadium (µg/g) 30322	Ytterbium (µg/g) 30325	Yttrium (µg/g) 30327	Zinc (µg/g) 30329	Uranium (µg/g) 30320
(PEC)		4.0 <sup>1</sup>	—	—	—	—	—	—	—	—	—	—	—	459	—
(TEC)		2.5 <sup>1</sup>	—	—	—	—	—	—	—	—	—	—	—	121	—
0–2	Later 1998	1.4	<3	170	M	1.1	0.87	15	0.8	8,200	170	4	30	220	4.3
2–4	Mid 1998	1.2	<3	190	M	1.1	.86	15	.8	7,900	160	4	29	210	4.3
4–6	Early 1998	1.5	<3	210	M	1.1	.84	15	.8	7,800	160	4	30	200	4.7
6–8	Later 1997	1.4	<3	200	M	1.1	.86	16	.8	8,100	160	4	31	210	4.6
10–12	Early 1997	1.2	<3	200	M	1.2	.89	16	.8	8,700	170	4	31	210	4.9
14–16	1996	.6	<3	180	M	1.2	.97	16	.8	9,500	170	4	30	210	4.0
18–20	1995	2.4	<3	270	M	1.1	.81	14	.8	7,200	150	4	29	180	5.1
22–24	1994	2.4	<3	290	M	1.1	.76	15	.8	7,000	160	3	29	180	6.1
32–34	1992	.7	<3	210	M	1.2	.94	19	.9	9,200	160	4	32	190	4.4
42–44	1989	1.5	<3	200	M	1.1	.80	17	.8	8,200	160	4	30	180	4.4
52–54	1987	1.0	<3	210	M	1.1	.90	17	.8	9,100	160	4	30	180	4.2
62–64	1983	1.5	<3	180	M	1.2	.88	17	.8	8,600	170	4	33	190	4.1
72–74	1980	2.9	<3	220	M	1.1	.82	14	.8	7,000	160	4	31	180	4.2
76–78	1979	2.5	<3	220	M	1.1	.84	14	.8	7,100	160	4	31	180	4.4
84–88	1976	1.2	<3	200	M	1.2	.90	16	.8	7,500	160	4	32	180	3.7
96–100	1972	.4	<3	200	M	1.2	1.2	19	.9	11,000	170	4	34	190	4.1
104–108	1968	1.3	<3	180	M	1.1	1.1	17	.8	9,700	160	4	33	180	4.7
124–128	1961	3.7	<3	330	M	.9	.78	13	.7	7,000	140	3	27	140	6.2
144–148	1954	.8	<3	190	M	1.1	1.0	18	.8	9,500	160	4	32	180	5.0
164–168	Prereservoir soil	.6	<3	180	M	1.2	.88	17	.9	8,500	170	4	34	180	10

<sup>1</sup>Selenium sediment guidelines from Van Derveer and Canton (1997).

**Appendix 10.** Trace elements and major ions detected in sediment cores from Hemet Lake, in the Santa Ana River Basin, California, November 1998

[Number below the compound is the data parameter code, which is a 5-digit number used in the USGS computerized data system, National Water Information System (NWIS), to uniquely identify a specific constituent or property; sediment-quality guidelines from McDonald and others (2000); cm, centimeter; µg/g, microgram per gram; M, presence verified but not quantified; PEC, probable-effect concentration; TEC, threshold-effect concentration; <, less than; —, no data]

Depth of core segment (cm)	Estimated date of deposition	Calcium (µg/g) 62456	Magnesium (µg/g) 62456	Potassium (µg/g) 62456	Sodium (µg/g) 62456	Phosphorus (µg/g) 62456	Carbon, total (µg/g) 62456	Carbon, organic (µg/g) 62456	Aluminum (µg/g) 01108	Antimony (µg/g) 01098	Arsenic (µg/g) 01098	Barium (µg/g) 01098	Beryllium (µg/g) 01098
Sediment-quality guidelines (PEC)		—	—	—	—	—	—	—	—	—	33	—	—
Sediment-quality guidelines (TEC)		—	—	—	—	—	—	—	—	—	9.79	—	—
0–1	—	17,000	13,000	17,000	8,300	1,700	5.6	5.6	94,000	M	17	1,000	2
1–2	—	17,000	15,000	18,000	8,700	2,000	4.5	4.5	99,000	M	10	1,100	2
2–3	—	19,000	14,000	18,000	8,400	2,000	4.6	4.5	98,000	M	12	1,100	2
4–5	—	24,000	13,000	17,000	7,500	1,500	5.2	4.9	96,000	M	18	1,000	2
5–6	—	20,000	15,000	18,000	7,900	1,700	4.7	4.6	98,000	M	15	1,000	2
6–7	—	17,000	15,000	18,000	7,600	1,900	4.5	4.4	100,000	M	14	1,100	2
8–9	—	16,000	15,000	19,000	7,700	1,400	4.1	4.1	100,000	M	12	1,000	2
9–10	—	16,000	15,000	19,000	7,500	1,400	4.0	3.9	100,000	M	13	1,000	2
10–11	—	16,000	15,000	18,000	7,500	1,600	4.0	4.0	100,000	M	13	1,000	2
12–13	—	16,000	15,000	18,000	7,700	1,600	4.0	4.0	100,000	M	15	1,100	2
13–14	—	15,000	15,000	18,000	7,000	1,300	3.7	3.7	100,000	M	14	1,000	2
14–15	—	17,000	15,000	18,000	7,500	1,400	3.9	3.8	100,000	M	13	1,000	2
16–18	—	18,000	15,000	19,000	8,600	1,200	4.1	4.0	100,000	M	10	1,100	2
18–20	—	20,000	15,000	18,000	8,700	1,200	3.8	3.6	99,000	M	9	1,000	2
20–22	—	20,000	15,000	18,000	8,500	1,200	3.9	3.8	100,000	M	10	1,000	2
24–26	—	16,000	15,000	18,000	7,500	1,300	3.6	3.5	100,000	M	10	1,000	2
26–28	—	18,000	15,000	18,000	7,800	1,500	3.8	3.7	100,000	M	11	1,000	2
28–30	—	18,000	15,000	18,000	8,000	1,400	3.7	3.6	99,000	M	12	980	2
32–34	—	20,000	14,000	17,000	8,400	1,400	4.4	4.2	96,000	M	11	1,000	2
34–35	—	26,000	14,000	17,000	9,700	1,400	6.1	5.9	91,000	M	9	1,100	2

**Appendix 10.** Trace elements and major ions detected in sediment cores from Hemet Lake, in the Santa Ana River Basin, California, November 1998—Continued

Depth of core segment (cm)	Bismuth (µg/g) 62465	Cadmium (µg/g) 01028	Cerium (µg/g) 62466	Cesium (µg/g) 62477	Chromium (µg/g) 01029	Cobalt (µg/g) 01038	Copper (µg/g) 01043	Dysprosium (µg/g) 62473	Erbium (µg/g) 62472	Europium (µg/g) 62467	Gadolinium (µg/g) 62474	Gallium (µg/g) 62468	Holmium (µg/g) 62469	Iron (µg/g) 01170
(PEC)	—	4.98	—	—	111	—	149	—	—	—	—	—	—	—
(TEC)	—	.99	—	—	43.4	—	31.6	—	—	—	—	—	—	—
0–1	0.4	.4	140	5.0	40	17	100	9.3	6.7	1.8	11	25	2.0	67,000
1–2	.4	.4	140	5.4	42	17	85	9.2	6.6	1.8	12	26	2.0	69,000
2–3	.4	.3	140	5.5	42	16	89	9.2	6.7	1.9	11	26	1.9	69,000
4–5	.4	.3	140	5.3	41	17	110	9.1	6.8	1.9	12	26	1.9	66,000
5–6	.4	.4	140	5.5	43	17	100	9.3	6.8	1.9	12	27	2.0	69,000
6–7	.4	.4	150	5.6	45	18	100	9.7	7.1	1.9	12	27	2.1	71,000
8–9	.5	.4	160	5.9	47	18	80	10	7.2	2.0	12	28	2.1	70,000
9–10	.5	.4	160	6.0	47	18	76	10	7.4	2.1	13	28	2.2	71,000
10–11	.5	.4	150	5.8	46	18	90	9.6	7.3	2.0	12	27	2.1	70,000
12–13	.5	.4	150	5.9	46	18	110	9.7	7.1	2.0	12	28	2.1	70,000
13–14	.5	.4	130	6.1	48	18	75	8.8	6.5	1.7	11	27	1.9	67,000
14–15	.5	.4	140	5.9	46	17	81	8.9	6.5	1.8	11	28	1.9	66,000
16–18	.4	.4	130	5.8	45	17	65	8.4	6.3	1.7	10	27	1.8	66,000
18–20	.4	.3	130	5.7	44	16	74	8.2	6.0	1.6	10	27	1.7	67,000
20–22	.4	.3	130	5.6	43	16	92	8.5	6.3	1.8	10	27	1.8	67,000
24–26	.4	.4	140	5.7	46	17	65	9.0	6.5	1.8	11	28	1.9	66,000
26–28	.4	.4	130	5.7	46	17	66	8.8	6.4	1.8	11	27	1.9	65,000
28–30	.4	.4	130	5.7	45	17	70	8.4	6.3	1.7	10	27	1.8	62,000
32–34	.3	.4	130	5.3	41	16	81	8.0	5.8	1.7	10	26	1.7	59,000
34–35	.3	.4	120	4.7	37	15	82	7.5	5.5	1.6	9.6	24	1.6	57,000

**Appendix 10.** Trace elements and major ions detected in sediment cores from Hemet Lake, in the Santa Ana River Basin, California, November 1998—Continued

Depth of core segment (cm)	Lanthanum (µg/g) 62470	Lead (µg/g) 30272	Lithium (µg/g) 30274	Manganese (µg/g) 30278	Mercury (µg/g) 30280	Molybdenum (µg/g) 30283	Neodymium (µg/g) 30285	Nickel (µg/g) 30287	Niobium (µg/g) 30289	Praseodymium (µg/g) 62478	Rubidium (µg/g) 62475	Samarium (µg/g) 62479	Scandium (µg/g) 30297	Selenium (µg/g) 30299
(PEC)	—	128	—	—	1.06	—	—	48.6	—	—	—	—	—	4.0 <sup>1</sup>
(TEC)	—	35.8	—	—	.18	—	—	22.7	—	—	—	—	—	2.5 <sup>1</sup>
0–1	82	23	61	2,000	.09	2	61	24	28	18	100	11	17	0.7
1–2	84	23	63	2,200	.10	1	62	25	30	19	110	11	18	.6
2–3	84	23	63	2,100	.29	2	62	24	30	19	110	11	18	.5
4–5	84	24	62	1,600	.06	3	62	27	28	19	110	11	17	.8
5–6	85	24	63	1,800	.07	2	63	26	31	19	110	11	18	1.0
6–7	91	25	65	1,900	.08	2	66	29	32	20	110	12	19	.9
8–9	95	24	68	1,600	.06	2	68	24	32	21	120	12	19	.8
9–10	96	24	69	1,500	.07	2	71	25	33	22	120	12	20	.6
10–11	91	24	66	1,700	.06	2	67	26	31	20	120	11	19	.7
12–13	89	25	66	1,600	.07	2	66	26	31	20	120	11	20	.8
13–14	81	24	72	1,300	.07	2	58	30	33	18	120	9.9	20	.6
14–15	82	24	70	1,400	.08	2	60	29	32	18	120	10	19	.6
16–18	78	25	68	1,200	.07	2	57	28	33	17	120	9.6	18	.6
18–20	77	24	66	1,200	.08	1	56	29	32	17	120	9.6	18	.5
20–22	79	25	67	1,200	.06	2	58	30	32	18	110	10	18	.6
24–26	84	26	70	1,100	.06	3	61	34	33	18	110	10	19	.5
26–28	81	25	69	1,200	.07	3	59	24	31	18	110	10	19	.6
28–30	78	24	65	1,100	.06	2	57	27	31	17	110	9.6	18	.5
32–34	77	28	62	1,000	.06	2	56	29	29	17	110	9.5	17	.7
34–35	73	30	55	1,000	.06	2	53	28	26	16	100	9.2	16	.5

See footnote at end of table.

**Appendix 10.** Trace elements and major ions detected in sediment cores from Hemet Lake, in the Santa Ana River Basin, California, November 1998—Continued

Depth of core segment (cm)	Silver (µg/g) 30301	Strontium (µg/g) 30305	Tantalum (µg/g) 30309	Terbium (µg/g) 62480	Thallium (µg/g) 34480	Thorium (µg/g) 30312	Thulium (µg/g) 62471	Titanium (µg/g) 01153	Vanadium (µg/g) 30322	Ytterbium (µg/g) 30325	Yttrium (µg/g) 30327	Zinc (µg/g) 30329	Uranium (µg/g) 30320
(PEC)	—	—	—	—	—	—	—	—	—	—	—	459	—
(TEC)	—	—	—	—	—	—	—	—	—	—	—	121	—
0–1	< 3	190	M	1.7	0.81	22	1.1	7,900	110	5	39	170	5.2
1–2	< 3	200	M	1.8	.86	23	1.1	8,400	120	5	40	170	4.6
2–3	< 3	200	M	1.7	.86	22	1.1	8,400	120	5	39	170	5.1
4–5	< 3	200	M	1.7	.84	22	1.0	8,100	120	5	38	170	5.8
5–6	< 3	200	M	1.8	.84	23	1.1	8,400	120	5	40	170	5.3
6–7	< 3	190	M	1.9	.87	24	1.1	8,600	120	5	41	180	5.9
8–9	< 3	190	M	1.9	.93	26	1.2	8,700	120	5	43	180	6.5
9–10	< 3	190	M	2.0	.94	26	1.2	8,700	120	5	43	180	6.6
10–11	< 3	190	M	1.9	.90	25	1.2	8,400	120	5	42	180	5.9
12–13	< 3	200	M	1.8	.89	24	1.1	8,500	120	5	41	180	5.9
13–14	< 3	180	M	1.6	.88	23	1.1	8,000	120	5	42	180	5.9
14–15	< 3	180	M	1.7	.98	23	1.1	8,200	120	5	40	180	5.9
16–18	< 3	200	M	1.6	.89	22	1.0	8,700	120	4	38	180	4.8
18–20	< 3	200	M	1.6	.88	21	1.0	8,600	120	4	38	170	4.2
20–22	< 3	210	M	1.6	.84	22	1.0	8,600	120	4	38	170	5.5
24–26	< 3	190	M	1.7	.82	23	1.1	8,600	120	5	41	170	6.1
26–28	< 3	190	M	1.6	.85	22	1.0	8,300	120	5	40	170	5.3
28–30	< 3	200	M	1.6	.84	21	1.0	8,100	120	5	39	170	5.0
32–34	< 3	210	M	1.5	.80	21	1.0	7,900	110	4	36	170	5.0
34–35	< 3	250	M	1.5	.75	19	.9	8,000	110	4	34	170	4.7

<sup>1</sup>Selenium sediment guidelines from Van Derveer and Canton (1997).

**Appendix 11.** Trace elements and major ions detected in streambed sediment or fish tissue, in the Santa Ana River Basin, California, 1998

[Number below the compound is the data parameter code, which is a 5-digit number used in the USGS computerized data system, National Water Information System (NWIS), to uniquely identify a specific constituent or property; sediment-quality guidelines from McDonald and others (2000); bed sediment values (brown shading) for less than 63 micron fraction, dry weight; fish tissue values (blue shading) in dry weight; SAR, Santa Ana River; Cr, Creek; MWD, Metropolitan Water District; PEC, probable-effect concentration; TEC, threshold-effect concentration; mo, month; yr, year; mm, millimeter; g, gram; µg/g, microgram per gram; µm, micrometer; <, less than; —, no data]

Station name	USGS station No.	Date (mo/yr)	Fish species	Tissue	Number of fish	Range in total length (mm)	Mean total length (mm)	Range in standard length (mm)	Mean standard length (mm)	Range in weight (g)	Mean weight (g)
Sediment-quality guidelines (PEC)			—	—	—	—	—	—	—	—	—
Sediment-quality guidelines (TEC)			—	—	—	—	—	—	—	—	—
<b>Urban sites</b>											
SAR at Imperial Highway	11075600	9/98	Common carp	Liver	5	325–470	380	268–375	307	472–1,079	681
SAR below Prado Dam	11074000	9/98	Large-mouth bass	Liver	20	132–193	166	107–160	138	30–98	61
Chino Cr below Central Avenue	335825117411701	9/98	Common carp	Liver	8	293–370	332	240–300	268	345–728	503
Mill Cr at Chino-Corona Road	335645117365301	9/98	Common carp	Liver	8	273–379	319	220–305	259	282–573	395
SAR at Hamner Road	335645117332701	9/98	Yellow bullhead	Whole body	7	88–112	102	80–95	85	10–18	14
SAR at MWD Crossing	11066460	9/98	Yellow bullhead	Whole body	8	78–104	87	64–83	72	6–13	8
Warm Cr near San Bernardino	11060400	11/98	—	—	—	—	—	—	—	—	—
San Jacinto River near Elsinore	11070500	9/98	Common carp	Whole body	5	286–325	304	225–260	241	246–367	285
<b>Nonurban sites</b>											
SAR at upper power house	340843117032501	9/98	Brown trout	Liver	8	170–427	236	145–367	200	44–769	179
		9/98	Rainbow trout	Liver	19	164–242	181	136–200	151	46–145	66
Bear Cr at Bear Cr Campground	340955117005301	9/98	Brown trout	Liver	17	193–436	235	157–378	196	70–760	148
South Fork of SAR	341014116494801	9/98	Brown trout	Liver	5	153–174	165	129–146	138	30–54	43
San Jacinto River near San Jacinto	11069500	9/98	—	—	—	—	—	—	—	—	—

**Appendix 11.** Trace elements and major ions detected in streambed sediment or fish tissue, in the Santa Ana River Basin, California, 1998—Continued

Station name	Percentage of fish with external anomalies	Water in tissue (percent) 49273	Calcium (percent) 34830	Magnesium (percent) 34900	Potassium (percent) 34940	Sodium (percent) 34960	Sulfur (µg/g) 34970	Phosphorus (percent) 34935	Carbon, inorganic (percent) 49269	Carbon, inorganic + organic (percent) 49267	Carbon, organic (percent) 49266	Bed material (percent < 0.063 µm) 80164
(PEC)	—	—	—	—	—	—	—	—	—	—	—	—
(TEC)	—	—	—	—	—	—	—	—	—	—	—	—
<b>Urban sites</b>												
SAR at Imperial Highway	20	80	3.0	2.0	2.0	1.2	0.11	0.160	0.32	2.7	2.4	82
SAR below Prado Dam	20	80	3.1	1.8	2.0	1.6	.09	.170	.25	1.9	1.6	60
Chino Cr below Central Avenue	50	78	13	1.6	1.4	1.3	.29	.210	3.1	8.4	5.2	10
Mill Cr at Chino-Corona Road	25	78	3.6	1.2	1.6	2.0	.32	.270	.22	5.4	5.2	12
SAR at Hamner Road	0	79	3.2	2.1	2.2	1.4	<.05	.140	.23	2.4	2.2	37
SAR at MWD Crossing	0	76	2.9	1.9	2.0	1.4	<.05	.130	.19	2.1	1.9	46
Warm Cr near San Bernardino	—	—	8.2	1.3	1.4	1.4	.31	.240	2.0	7.3	5.3	10
San Jacinto River near Elsinore	0	79	2.3	1.5	1.4	.840	.29	.420	.14	5.4	5.3	31
<b>Nonurban sites</b>												
SAR at upper power house	0	78	2.9	1.8	2.2	1.8	<.05	.160	.05	1.5	1.4	41
	0	75	—	—	—	—	—	—	—	—	—	—
Bear Cr at Bear Cr Campground	6	79	2.4	.510	2.5	2.6	<.05	.084	.05	.96	.91	30
South Fork of SAR	0	76	2.0	1.1	1.9	1.6	.09	.140	.03	8.6	8.6	9
San Jacinto River near San Jacinto	—	—	2.4	1.2	1.7	1.7	<.05	.130	.02	3.6	3.6	41

**Appendix 11.** Trace elements and major ions detected in streambed sediment or fish tissue, in the Santa Ana River Basin, California, 1998—Continued

Station name	Aluminum (µg/g) 49232	Aluminum (percent) 34790	Antimony (µg/g) 49246	Antimony (µg/g) 34795	Arsenic (µg/g) 49247	Arsenic (µg/g) 34800	Barium (µg/g) 49238	Barium (µg/g) 34805	Beryllium (µg/g) 49248	Beryllium (µg/g) 34810	Boron (µg/g) 49239
(PEC)	—	—	—	—	—	33.0	—	—	—	—	—
(TEC)	—	—	—	—	—	9.79	—	—	—	—	—
<b>Urban sites</b>											
SAR at Imperial Highway	63	9.0	.3	0.9	0.5	8.2	0.6	690	<.3	2.1	0.7
SAR below Prado Dam	1.6	8.7	.2	.8	.5	6.0	<.1	740	<.2	2.2	1.0
Chino Cr below Central Avenue	12	5.3	.2	3.4	.3	8.1	.2	650	<.2	1.4	.8
Mill Cr at Chino-Corona Road	2.9	7.2	<.2	.5	.4	2.2	<.1	750	<.2	1.7	.9
SAR at Hamner Road	280	9.5	<.2	.5	.2	4.9	8.3	690	<.2	2.3	1.5
SAR at MWD Crossing	200	8.7	<.2	.5	<.2	4.7	7.2	660	<.2	2.2	.8
Warm Cr near San Bernardino	—	5.7	—	2.8	—	8.3	—	660	—	1.6	—
San Jacinto River near Elsinore	130	8.4	<.2	1.0	.4	45	35	870	<.2	1.5	1.5
<b>Nonurban sites</b>											
SAR at upper power house	5.9	9.2	<.2	.2	.8	2.8	.1	650	<.2	2.3	.6
	13	—	<.2	—	.7	—	.1	—	<.2		1.2
Bear Cr at Bear Cr Campground	11	9.2	<.2	.1	.7	1.9	6.6	610	<.2	3.5	.5
South Fork of SAR	64	7.6	<.2	.2	.2	2.1	1.0	580	<.2	2.1	4.7
San Jacinto River near San Jacinto	—	11	—	.2	—	4.5	—	770	—	2.0	—

**Appendix 11.** Trace elements and major ions detected in streambed sediment or fish tissue, in the Santa Ana River Basin, California, 1998—Continued

Station name	Cadmium (µg/g) 49249	Cadmium (µg/g) 34825	Cerium (µg/g) 34835	Chromium (µg/g) 49240	Chromium (µg/g) 34840	Cobalt (µg/g) 49250	Cobalt (µg/g) 34845	Copper (µg/g) 49241	Copper (µg/g) 34850	Europium (µg/g) 34855	Gallium (µg/g) 34860
(PEC)	—	4.98	—	—	111	—	—	—	149	—	—
(TEC)	—	.99	—	—	43.4	—	—	—	31.6	—	—
<b>Urban sites</b>											
SAR at Imperial Highway	2.1	0.7	84	0.7	72	0.5	20	22	63	2	25
SAR below Prado Dam	<.2	.5	97	.5	65	1.4	18	22	51	2	23
Chino Cr below Central Avenue	.3	2.8	55	<.5	63	<.2	12	41	86	1	13
Mill Cr at Chino-Corona Road	.3	.5	73	<.5	48	<.2	11	61	31	1	18
SAR at Hamner Road	<.2	.2	120	1.7	69	.3	23	2.4	55	2	28
SAR at MWD Crossing	<.2	.2	110	1.9	71	.3	22	2.7	54	2	28
Warm Cr near San Bernardino	—	1.4	120	—	52	—	12	—	62	2	16
San Jacinto River near Elsinore	<.2	.6	76	3.0	47	1.9	22	2.1	65	1	21
<b>Nonurban sites</b>											
SAR at upper power house	<.2	.1	140	.6	46	.5	17	300	32	2	23
	<.2	—	—	.5	—	.3	—	160	—	—	—
Bear Cr at Bear Cr Campground	.3	<.1	110	.6	11	<.2	4	230	11	1	24
South Fork of SAR	<.2	0	220	1.5	57	<.2	12	1.7	19	2	19
San Jacinto River near San Jacinto	—	.2	120	—	18	—	10	—	15	1	30

**Appendix 11.** Trace elements and major ions detected in streambed sediment or fish tissue, in the Santa Ana River Basin, California, 1998—Continued

Station name	Holmium (µg/g) 34875	Iron (µg/g) 49242	Iron (percent) 34880	Lanthanum (µg/g) 34885	Lead (µg/g) 49251	Lead (µg/g) 34890	Lithium (µg/g) 34895	Manganese (µg/g) 49243	Manganese (µg/g) 34905	Mercury (µg/g) 49258	Mercury (µg/g) 34910
(PEC)	—	—	—	—	—	128	—	—	—	—	1.06
(TEC)	—	—	—	—	—	35.8	—	—	—	—	.18
<b>Urban sites</b>											
SAR at Imperial Highway	1	1,400	5.5	48	<0.3	39	40	4.0	1,200	0.1	0.07
SAR below Prado Dam	2	620	4.9	56	<.2	34	30	6.5	820	.1	.06
Chino Cr below Central Avenue	<1	650	3.0	30	.4	91	19	3.1	520	.1	.20
Mill Cr at Chino-Corona Road	1	1,000	3.3	41	<.2	21	16	2.1	570	.1	.05
SAR at Hamner Road	2	240	6.0	67	.3	31	36	54	1,200	.1	.04
SAR at MWD Crossing	2	210	5.9	64	.3	36	35	42	1,100	.1	.05
Warm Cr near San Bernardino	1	—	3.7	66	—	100	20	—	760	—	.08
San Jacinto River near Elsinore	2	250	7.4	42	<.2	21	46	25	3,800	.3	.08
<b>Nonurban sites</b>											
SAR at upper power house	2	400	4.8	80	<.2	20	25	6.2	810	.7	.03
	—	1,000	—	—	<.2	—	—	6.7	—	.4	—
Bear Cr at Bear Cr Campground	1	690	1.8	64	<.2	26	45	5.4	540	.6	<.02
South Fork of SAR	2	170	3.8	120	<.2	20	22	4.3	700	.1	.07
San Jacinto River near San Jacinto	<1	—	4.6	80	—	24	62	—	730	—	.04

**Appendix 11.** Trace elements and major ions detected in streambed sediment or fish tissue, in the Santa Ana River Basin, California, 1998—Continued

Station name	Molybdenum (µg/g) 49252	Molybdenum (µg/g) 34915	Neodymium (µg/g) 34920	Nickel (µg/g) 49253	Nickel (µg/g) 34925	Niobium (µg/g) 34930	Scandium (µg/g) 34945	Selenium (µg/g) 49254	Selenium (µg/g) 34950	Silver (µg/g) 49255	Silver (µg/g) 34955
(PEC)	—	—	—	—	48.6	—	—	—	4.0 <sup>1</sup>	—	—
(TEC)	—	—	—	—	22.7	—	—	—	2.5 <sup>1</sup>	—	—
<b>Urban sites</b>											
SAR at Imperial Highway	0.6	1.2	37	<0.3	38	15	16	6.2	1.2	<0.3	0.9
SAR below Prado Dam	1.1	1.1	45	<.2	32	15	15	5.2	.4	<.2	.9
Chino Cr below Central Avenue	.9	4.3	25	<.2	39	8	9	6.3	1.1	.7	1.2
Mill Cr at Chino-Corona Road	.6	1.7	34	<.2	19	12	10	5.4	.6	.8	.7
SAR at Hamner Road	<.2	1.2	52	.8	36	18	19	2.0	.2	<.2	1.4
SAR at MWD Crossing	<.2	1.1	50	.6	35	18	18	2.4	.2	<.2	1.1
Warm Cr near San Bernardino	—	2.3	53	—	26	16	9	—	.4	—	1.0
San Jacinto River near Elsinore	<.2	3.5	35	.5	22	10	18	2.6	2.7	<.2	.7
<b>Nonurban sites</b>											
SAR at upper power house	.8	.7	66	<.2	24	17	18	19	.2	2.2	.8
	.9	—	—	<.2	—	—	—	10	—	1.4	—
Bear Cr at Bear Cr Campground	.8	<.5	46	<.2	4	18	6	14	<.1	1.4	.9
South Fork of SAR	<.2	2.1	95	.2	22	10	13	2.6	1.6	<.2	.6
San Jacinto River near San Jacinto	—	.7	44	—	7	8	10	—	.2	—	.5

See footnote at end of table.

**Appendix 11.** Trace elements and major ions detected in streambed sediment or fish tissue, in the Santa Ana River Basin, California, 1998—Continued

Station name	Strontium (µg/g) 49244	Strontium (µg/g) 34965	Tantalum (µg/g) 34975	Thorium (µg/g) 34980	Tin (µg/g) 34985	Titanium (µg/g) 49274	Vanadium (µg/g) 49465	Vanadium (µg/g) 35005	Ytterbium (µg/g) 35015	Yttrium (µg/g) 35010	Zinc (µg/g) 49245	Zinc (µg/g) 35020	Uranium (µg/g) 49257	Uranium (µg/g) 3500
(PEC)	—	—	—	—	—	—	—	—	—	—	—	459	—	—
(TEC)	—	—	—	—	—	—	—	—	—	—	—	121	—	—
<b>Urban sites</b>														
SAR at Imperial Highway	1.2	280	1	14	5	0.560	1.1	110	2	25	1,000	180	<0.3	3.0
SAR below Prado Dam	.6	320	2	15	4	.570	.5	100	3	28	91	150	<.2	3.1
Chino Cr below Central Avenue	.9	460	<1	7	9	.360	.5	85	2	18	540	550	<.2	3.1
Mill Cr at Chino-Corona Road	1.0	460	1	8	3	.490	.6	80	2	20	1,100	180	<.2	1.9
SAR at Hamner Road	89	300	2	19	4	.630	1.6	120	3	33	78	160	<.2	4.8
SAR at MWD Crossing	84	310	2	18	4	.580	1.4	120	3	34	79	160	<.2	5.0
Warm Cr near San Bernardino	—	460	1	20	6	.470	—	84	3	29	—	520	—	5.7
San Jacinto River near Elsinore	330	190	1	12	3	.480	1.1	140	4	34	240	160	<.2	3.4
<b>Nonurban sites</b>														
SAR at upper power house	.5	280	2	22	4	.600	.3	100	3	35	120	92	<.2	6.6
	.4	—	—	—	—	—	.3	—	—	—	100	—	<.2	—
Bear Cr at Bear Cr Campground	.5	300	2	24	3	.250	.3	26	2	23	110	63	.3	13
South Fork of SAR	26	210	1	43	4	.450	.6	77	2	29	77	74	.7	170
San Jacinto River near San Jacinto	—	340	<1	19	3	.500	—	74	1	14	—	140	—	4.3

<sup>1</sup>Selenium sediment guidelines from Van Derveer and Canton (1997).