APPENDIX S

Field and Laboratory Operations

FIELD AND LABORATORY OPERATIONS

Sample Collection

Sample collections were obtained using a Smith-Root Model VII and Model XIA Portable Electrofishers; a Smith-Root SR-16E electrofishing boat; variable mesh, woven, and monofilament gill nets; baited hoop nets measuring three feet in diameter with one inch square mesh; or beach seines of varying lengths, widths, and material. Collected fish were kept in clean stainless steel buckets until they could be double-wrapped in extra-heavy duty aluminum foil (dull side inward), labeled, and packed in dry ice where they were frozen.

Laboratory Analysis

A detailed description of procedures and techniques discussed below can be found in the Department of Fish and Game's (DFG) Laboratory Quality Assurance Program Plan (DFG 1990). The following is a summary of the 1991 Quality Assurance/Quality Control (QA\QC) results provided by the DFG's Water Pollution Control Laboratory. Copies of the Laboratory Quality Assurance Program Plan and QA\QC results are available upon request.

Trace Elements Analytical Techniques in Tissues

A Varian Model Spectra 30 atomic absorption spectrophotometer and a Varian Model VGA-76 Hydride Generator were used for techniques employing conventional (flame) atomic absorption spectrophotometry (copper and zinc), hydride generation (arsenic and selenium), and cold vapor technique for mercury (Adrian 1971; Uthe et al. 1974; and Evans et al. 1986). A Perkin-Elmer Model 3030 Zeeman atomic absorption spectrophotometer equipped with a HGA-600 graphite furnace and an AS-60 autosampler was used for techniques requiring a graphite furnace (cadmium, chromium, nickel, lead, and silver). All analytical values were corrected using procedural blanks. Trace element analytical and digestion techniques along with their detection limits are presented in Table S-1. All digestion techniques, except for mercury, are the same as those used since 1988.

Samples were weighed into pre-cleaned 200mm x 25mm glass tubes which had been checked for trace element contamination. Digestion of the sample was accomplished by adding concentrated nitric acid and heating the tube in an aluminum block to reflux the acid. The acid was allowed to reflux until the evolution of NO_x (brown fumes) were no longer apparent (about 2 hours). The block temperature was increased to reduce the volume in the tube by evaporation. When the volume in the tube reached about 0.5 ml the tube was removed and allowed to cool. The digestate was diluted to 40.0 ml with Type II water. The digestate was mixed on a vortex mixer and transferred to a clean polyethylene bottle.

In addition to routine trace element analyses, 10 percent of the samples were analyzed in duplicate to determine precision. The results of duplicate laboratory sample analyses are presented in Table S-2. To protect sample integrity, all materials contacting samples during laboratory operations were analyzed for trace element content. To ensure accuracy, reference materials from the National Institute of Standards and Technology (NIST) and the National Research Council of Canada were analyzed (Table S-3).

Synthetic Organic Compounds Analytical Techniques in Tissues

A 10 gram sample of the flesh-water (1:1) paste was spiked with nonachlorobiphenyl (PCB congener No. 206) and extracted twice with acetonitrile by shaking for two minutes. The sample extracts were combined, filtered, and partitioned with petroleum ether. An aliquot of the petroleum ether extract was eluted through a Florisil^{R} column. The Florisil^{R} columns were eluted with petroleum ether (Fraction 1), six percent ethyl ether (Fraction 2), and 15 percent ethyl ether (Fraction 3). Fractions 2 and 3 were spiked with nonachlorobiphenyl and all of the fractions were concentrated to an appropriate volume in a Zymark^{R} Turbovap concentrator prior to analysis by gas chromatography. The nonachlorobiphenyl was used as an internal standard to determine relative retention times and gas chromatograph operation. A mixture of synthetic standards was eluted through the Florisil^{R} column to determine the recovery and separation characteristics of the column. The distribution of synthetic organic compounds in the three fractions is listed in Table S-4. The detection levels for synthetic organics in flesh are presented in Table S-5.

At stations where the TSMP had previously detected endosulfan, samples were analyzed for endosulfan I, endosulfan II and endosulfan sulfate. This required an additional elution through Florisil^{R} with 50 percent ethyl ether in petroleum ether (Fraction 4, Table S-4). All other stations were initially analyzed for endosulfan I only. This fraction was also spiked with nonachlorobiphenyl prior to the concentration step. Due to the high lipid content of the fraction all of the 50 percent extracts were diluted with iso-octane by a factor of ten prior to analysis by gas chromatography.

As part of quality control, 10 percent of the samples were duplicated in the laboratory (Table S-6). All materials and solutions contacting the sample after initial extraction were analyzed for organic contamination. To preclude errors due to contamination, a vertical solvent blank was passed through each set of glassware and analyzed before introducing a new sample.

Instrument and Analytical Conditions for Chlorinated Hydrocarbons

1991

Chlorinated hydrocarbons were determined with a Varian Model 3500 gas chromatograph equipped with a model 8035 autosampler, temperature programmable on-column injector, and dual Ni^{63} electron capture detectors. A 30 meter J&W DB1 fused silica capillary column is connected to the temperature programmable injector, the column effluent is split using a press-fit "Y" connector to a 30 meter J&W DB5 and a 30 meter J&W DB17 column. The DB5 and DB17 columns are connected to the electron capture detectors. All three columns have a 0.25 mm ID and a 25 um liquid phase thickness. Helium was used as the carrier gas at a linear velocity of 35 cm/sec and nitrogen was used as the detector makeup gas at a flow of 25 ml/min. Chromatographic data was acquired and processed with a Perkin-Elmer Model 7700 professional computer using Chromatographics 3 software.

All samples were analyzed using a single injection for each extract under the following conditions:

Injector temperature program:	
	Initial temperature - 50 °C
	Program rate - 300 °C/min
	Final temperature - 280°C
	Final temperature hold time - 57 min
Column temperature program:	
	Initial temperature - 50°C
	Program rate 1 - 15°C/min to 210°C
	Program rate 2 - 2°C/min to 280°C
	Final temperature hold time - 0 min
Detector temperature:	330°C

Analytical Techniques for Polynuclear Aromatic Hydrocarbon Compounds (PAHs) in Flesh

Sample extraction procedures for PAHs were similar to those used for chlorinated hydrocarbons and are described below. A 10 gram sample of the flesh water (1:1) paste was homogenized with acetonitrile in an all-glass blender with stainless steel blades and filtered.

Sample extracts were analyzed using a Varian Saturn II Ion Trap GC-MS. One microliter of sample extract was injected into a J&W Scientific DB-5, 30 meter x 0.25 mm I.D. fused silica capillary column having a 0.25 um film thickness. The GC oven temperature was initially held at 70°C for two minutes. The temperature ramp was 15°C per minute until the oven reached 150°C. The second temperature ramp was 2°C per minute to a final temperature of 280°C and held for 5 minutes. Initial injector temperature was 70° and was programmed to 280° at 300°/min immediately after injection. The GC carrier gas was helium at a linear velocity of 37 cm/sec. Detection limits of the PAHs are reported in Table S-7.

Procedure for Lipid Determination

As synthetic organic concentrations in organisms may vary with lipid content, it is customary to provide lipid data when reporting tissue concentrations. A thoroughly homogenized sample weighing approximately 5 g (wet weight) is macerated and dried with anhydrous granular Na_2SO_4. The dried sample is transferred to a blender with 150 ml of petroleum ether and blended for two minutes at high speed. The liquid is vacuum-filtered into a 250 ml filter flask through a 10 cm Buchner funnel containing Whatman #1 filter paper. The sample is blended once more with an additional 150 ml of petroleum ether and filtered. The filtrate is concentrated to approximately 25 ml with heat (steam bath) and nitrogen steam. The remaining filtrate is then quantitatively transferred into a 50 ml pre-weighed planchet. The petroleum ether is evaporated, the planchet containing the residue is reweighed, and the percent lipid is calculated.

TABLE S-1

Toxic Substances Monitoring Program

1991 Digestion Techniques and Detection Limits in Fish Tissue

Element	Digestion Techniques	Instrumental Analysis	Detection Limits (ug/g wet weight)
Arsenic	Dry Ash w/$Mg(NO_3)_2 \cdot 6H_2O$	$NaBH_4$ Reduction A.A.	0.05
Mercury	HNO_3 reflux	Cold Vapor A.A.	0.02
Copper	HNO_3 reflux	Flame A.A.	0.02
Zinc	$HN0_3$ reflux	Flame A.A.	0.05
Cadmium	HNO_3 reflux	Graphite Furnace (Ammonium phosphate/magnesium nitrate)	0.01
Chromium	HNO_3 reflux	Graphite Furnace	0.02
Lead	HNO_3 reflux	Graphite Furnace (Ammonium phosphate/magnesium nitrate)	0.10
Nickel	HNO_3 reflux	Graphite Furnace	0.10
Selenium	Dry Ash w/$Mg(NO_3)_2 \cdot 6H_2O$	$NaBH_4$ Reduction A.A.	0.05
Silver	HNO_3 reflux	Graphite Furnace	0.02

TABLE S-2

Toxic Substances Monitoring Program

Results of Duplicate Sample Analysis: 1991 Trace Metal Quality Control

(ug/g wet weight)

Station Number	Station Name	Code*	Species	Tissue	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Zinc
515.40.31	Feather River/D/S Oroville Res.		SKR	F						0.31				
515.40.31	Feather River/D/S Oroville Res.		SKR	F						0.30				
515.40.31	Feather River/D/S Oroville Res.		SKR	F						0.34				
515.40.31	Feather River/D/S Oroville Res.		SKR	F						0.35				
519.22.04	Sacramento R/U/S I-5 Overcross		PACI	F						0.09				
519.22.04	Sacramento R/U/S I-5 Overcross		PACI	F						0.08				
510.00.30	Sacramento River/Hood		PACI	F	0.20							0.14		
510.00.30	Sacramento River/Hood		PACI	F	0.18							0.14		
510.00.30	Sacramento River/Hood		PACI	F		0.05	0.02	11.	<0.1		<0.1		0.02	14.
510.00.30	Sacramento River/Hood		PACI	F		0.05	0.02	11.	<0.1		<0.1		0.02	14.
510.00.30	Sacramento River/Hood		WCF	F						0.54				
510.00.30	Sacramento River/Hood		WCF	F						0.54				
723.10.02	New River/Westmorland		CCF	F								1.0		
723.10.02	New River/Westmorland		CCF	F								1.0		
723.10.58	New River/International Boundary		CP	F						0.47				
723.10.58	New River/International Boundary		CP	F						0.46				
728.00.90	Salton Sea/South		ORC	L	2.0	<0.01	<0.02	18.	<0.1		<0.1		0.08	34.
728.00.90	Salton Sea/South		ORC	L	2.1	<0.01	<0.02	17.	<0.1		<0.1		0.08	34.
309.82.08	Lake Nacimiento/Las Tablas		WHB	F						1.3				
309.82.08	Lake Nacimiento/Las Tablas		WHB	F						1.3				
111.63.14	Lake Pillsbury		LMB	L	0.07									
111.63.14	Lake Pillsbury		LMB	L	0.07									
402.10.02	Ventura River		CP	W	<0.05	0.05	0.07	0.82	<0.1		<0.1	0.54	<0.02	43.
402.10.02	Ventura River		CP	W	<0.05	0.06	0.08	0.83	<0.1		<0.1	0.55	<0.02	41.
405.21.16	Los Angeles R/Sepulveda Basin		GF	F						0.08		0.51		
405.21.16	Los Angeles R/Sepulveda Basin		GF	F						0.08		0.51		

* Tables 2, 3, and 4 list code names for species. L = Liver. F = Filet. W = Whole Body.

TABLE S-2

Toxic Substances Monitoring Program

Results of Duplicate Sample Analysis: 1991 Trace Metal Quality Control

(ug/g wet weight)

Station Number	Station Name	Code*	Species	Tissue	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Zinc
903.12.06	Keys Creek		GSF	F								0.60		
903.12.06	Keys Creek		GSF	F								0.61		
903.17.07	San Luis Rey River/HWY 15		LMB	F						0.08				
903.17.07	San Luis Rey River/HWY 15		LMB	F						0.07				
204.30.11	Alameda Creek/Niles Canyon Road		SCP	W		0.01	0.12	1.9	<0.1		0.2		<0.02	17.
204.30.11	Alameda Creek/Niles Canyon Road		SCP	W		0.01	0.10	2.6	<0.1		0.1		<0.02	17.
728.00.03	Reservation Main Drain		TLZ	F								0.20		
728.00.03	Reservation Main Drain		TLZ	F								0.21		
405.52.01	Puddingstone Reservoir		LMB	L	0.67	0.15	<0.02	6.5	<0.1		<0.1		<0.02	19.
405.52.01	Puddingstone Reservoir		LMB	L	0.66	0.15	<0.02	6.9	<0.1		<0.1		<0.02	19.
105.50.35	Beaughton Creek/D/S HWY 97 Bridge		BN	F						<0.02				
105.50.35	Beaughton Creek/D/S HWY 97 Bridge		BN	F						<0.02				
207.10.90	Suisun Bay		WST	L	1.5	1.	0.05	51.	<0.1		1.2		0.80	63.
207.10.90	Suisun Bay		WST	L	1.5	1.	0.05	52.	<0.1		1.2		0.77	63.
403.11.91	Mugu Lagoon		GSS	F								0.39		
403.11.91	Mugu Lagoon		GSS	F								0.39		
403.11.91	Mugu Lagoon		GSS	L	21.	3.5	0.02	3.4	<0.1		<0.1		0.67	14.
403.11.91	Mugu Lagoon		GSS	L	21.	3.5	0.02	3.3	<0.1		<0.1		0.67	15.
114.32.00	Lake Mendocino		LMB	F						0.32				
114.32.00	Lake Mendocino		LMB	F						0.33				
801.11.96	Peters Canyon Channel		PRS	W	0.10							1.2		
801.11.96	Peters Canyon Channel		PRS	W	0.10							1.3		
110.00.90	McDaniel Slough		STB	W	0.36	<0.01	0.22	3.6	<0.1		0.4	0.22	0.03	37.
110.00.90	McDaniel Slough		STB	W	0.36	<0.01	0.16	3.5	<0.1		0.4	0.22	0.03	38.
205.50.94	Stevens Creek		RBT	F								0.88		
205.50.94	Stevens Creek		RBT	F								0.88		
635.20.04	Donner Lake		KOK	L		0.04	<0.02	120.	<0.1		<0.1		0.49	41.
635.20.04	Donner Lake		KOK	L		0.04	<0.02	130.	<0.1		<0.1		0.52	41.

* Tables 2, 3, and 4 list code names for species. L = Liver. F = Filet. W = Whole Body.

TABLE S-2

Toxic Substances Monitoring Program

Results of Duplicate Sample Analysis: 1991 Trace Metal Quality Control

(ug/g wet weight)

Station Number	Station Name	Code*	Species	Tissue	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Zinc
304.12.90	Schwann Lake		LMB	W	0.08							0.15		
304.12.90	Schwann Lake		LMB	W	0.08							0.14		
603.20.41	Sabrina Lake		BN	F						0.10				
603.20.41	Sabrina Lake		BN	F						0.11				
603.20.24	Bishop Creek Canal/D/S Bishop		BN	F						0.12				
603.20.24	Bishop Creek Canal/D/S Bishop		BN	F						0.10				
603.20.24	Bishop Creek Canal/D/S Bishop		BN	L	0.13	0.02	0.02	230.	<0.1		<0.1		0.38	32.
603.20.24	Bishop Creek Canal/D/S Bishop		BN	L	0.14	0.01	0.02	240.	<0.1		<0.1		0.39	33.
603.30.05	Haiwee Reservoir		SMB	F						0.12				
603.30.05	Haiwee Reservoir		SMB	F						0.13				
626.80.03	Little Rock Creek Reservoir		BLB	F						0.31		0.07		
626.80.03	Little Rock Creek Reservoir		BLB	F						0.28		0.06		
626.80.03	Little Rock Creek Reservoir		BLB	L	<0.05	<0.01	<0.02	2.5	<0.1		<0.1		<0.02	20.
626.80.03	Little Rock Creek Reservoir		BLB	L	<0.05	0.01	<0.02	2.3	<0.1		<0.1		<0.02	20.
628.20.02	Silverwood Lake		LMB	F								0.39		
628.20.02	Silverwood Lake		LMB	F								0.39		
405.12.00	Alamitos Bay		CCB	F						0.05				
405.12.00	Alamitos Bay		CCB	F						0.05				
304.13.92	Aptos Creek		PCP	W		0.03	0.06	0.98	<0.1	0.14	<0.1		<0.02	17
304.13.92	Aptos Creek		PCP	W		0.03	0.07	0.98	<0.1	0.13	<0.1		<0.02	17.
309.82.08	Lake Nacimiento/Las Tablas		Sed		4.1	0.41	63.	18.	12.	0.48	67.	0.34	0.07	53
309.82.08	Lake Nacimiento/Las Tablas		Sed		4.1	0.56	68.	18.	13.	0.48	68.	0.32	0.08	54.
309.82.08	Lake Nacimiento/Las Tablas		Sed			0.52	69.	20.	13.		67.		0.07	58.
309.82.04	Lake Nacimiento/Dip Creek		Sed			0.37	44.	10.	14.	0.09	39.		<0.04	36.
309.82.04	Lake Nacimiento/Dip Creek		Sed			0.36	46.	15.	15.	0.10	38.		<0.04	38.
309.82.04	Lake Nacimiento/Dip Creek		Sed			0.37	45.	11.	15.		37.		<0.04	35.
307.00.01	Carmel Lagoon		Sed			0.23	4.0	2.3	0.57	0.03	2.5		<0.04	8.0
307.00.01	Carmel Lagoon		Sed			0.16	3.6	2.0	0.76	0.03	2.4		<0.04	8.6
307.00.01	Carmel Lagoon		Sed			0.19	4.3	2.7	0.74		3.6		<0.04	8.9
106.40.12	Carrville Pond		Sed			0.07	320.	62.	0.90	0.11	790.		0.06	25.
106.40.12	Carrville Pond		Sed			0.07	320.	59.	0.90	0.10	750.		0.07	25.
106.40.12	Carrvelle Pond		Sed			<0.03	330.	62.	0.79		760.		0.05	27.

* Tables 2, 3, and 4 list code names for species. L = Liver. F = Filet. W = Whole Body.

TABLE S-3
Toxic Substances Monitoring Program
1991 Trace Metal Analysis of Reference Materials (ug/g dry weight)*

REFERENCE MATERIAL**	AG	AS	CD	CR	CU	HG	NI	PB	SE	ZN
NBS-1577a (Bovine Liver)		0.047±0.015 (0.047±0.006)							0.73±0.10 (0.71±0.07)	
DOLT-1 (Dogfish Liver)			4.47±0.56 (4.18±0.28)	0.44±0.24 (0.40±0.07)	20.3±1.5 (20.8±1.2)		0.27±0.14 (0.26±0.06)	1.40±0.68 (1.36±0.29)		94.1±5.2 (92.5±2.3)
DORM-1 (Dogfish Muscle)		17.2±0.36 (17.7±2.1)	0.106±0.037 (0.086±0.012)	3.92±1.7 (3.60±0.40)	4.57±1.5 (5.22±0.33)	0.787±0.11 (0.798±0.07)	1.20±0.32 (1.20±0.30)	0.37±0.18 (0.40±0.12)	1.61±0.19 (1.62±0.12)	19.5±1.2 (21.3±1.0)
NBS 1566a (Oyster)	1.50±0.40 (1.63±0.15)		4.23±0.67 (4.15±0.38)	1.16±0.50 (1.43±0.46)	63.1±2.3 (66.3±4.3)		2.19±0.75 (2.25±0.44)	0.315±0.100 (0.371±0.014)		835±48. (830±57)

* Sample values are given first, followed by reference values in parentheses, both values include 95% confidence interval.

** NBS refers to the National Bureau of Standards; DOLT-1 and DORM-1 are from the National Research Council of Canada; NIES 6 is from the National Institute for Environmental Studies of Japan.

TABLE S-4

Toxic Substances Monitoring Program
Distribution of Synthetic Organic Compounds Among
Four Fractions of a Standard Florisil[R] Column

(0%) Fraction 1	(6%) Fraction 2	(15%) Fraction 3
HCH, alpha*	HCH, alpha*	dacthal
aldrin	HCH, beta	diazinon
chlordene, alpha	HCH, gamma	dichlorobenzophenone, p,p'
chlordene, gamma	HCH, delta	dieldrin
DDE, o,p'	chlorbenside	endosulfan I
DDE, p,p'	cis-chlordane	endrin
DDMU, p,p'	trans-chlordane	malathion
DDT, o,p'	chlorpyrifos	oxadiazon
DDT, p,p'*	DDD, o,p'	parathion, ethyl
heptachlor	DDD, p,p'	parathion, methyl
hexachlorobenzene	DDMS, p,p'	tetradifon (tedion)
trans-nonachlor	DDT, p,p'*	
PCB 1248	dicofol (kelthane)	
PCB 1254	ethion	
PCB 1260	heptachlor epoxide	
	methoxychlor	(50%) Fraction 4
	cis-nonachlor	
	oxychlordane	endosulfan II
	toxaphene	endosulfan sulfate

* Found in both 0% and 6% fractions.

TABLE S-5

Toxic Substances Monitoring Program
Synthetic Organic Compounds Analyzed
and Their Detection Limits in Flesh

Compound (ng/g, ppb wet weight)	Detection Limit
aldrin	5
chlorbenside	50
cis-chlordane	5
trans-chlordane	5
chlordene, alpha	5
chlordene, gamma	5
chlorpyrifos	10
dacthal	5
DDD, o,'p	10
DDD, p,p'	10
DDE, o,p'	10
DDE, p,p'	5
DDMS, p,p'	30
DDMU,p,p'	15
DDT, o,p'	10
DDT, p,p'	10
diazinon	50
dichlorobenzophenone-p,p'	30
dicofol (Kelthane)	100
dieldrin	5
endosulfan I	5
endosulfan II	70
endosulfan sulfate	85
endrin	15
ethion	20
HCH, alpha	2
HCH, beta	10
HCH, gamma	2
HCH, delta	5
heptachlor	5
heptachlor epoxide	5
HCB	2
methoxychlor	15
cis-nonachlor	5
trans-nonachlor	5
oxadiazon	5
oxychlordane	5
parathion, ethyl	10
parathion, methyl	10
PCB 1248	50
PCB 1254	50
PCB 1260	50
pentachlorophenol*	2
2,3,5,6-tetrachlorophenol*	2
tetradifon (Tedion)	10
toxaphene	100

* Analyzed only when requested.

TABLE S-6

Toxic Substances Monitoring Program

Results of Duplicate Sample Analysis: 1991 Synthetic Organic Compounds Quality Control

(ng/g wet weight)

Station Name	Newport Bay		Calleguas Creek		Conejo Creek		Alameda Creek/ Niles Canyon Road	
Station No.	801.11.97		403.12.06		403.12.07		204.30.11	
Species*	SSB		GF		GAM		SCP	
REPLICATE	1	2	1	2	1	2	1	2
COMPOUNDS								
cis-chlordane							8.2	7.2
cis-nonachlor							9.3	8.6
gamma-chlordene								
oxychlordane					13.	14.		
trans-chlordane								
trans-nonachlor			5.9	9.2	37.	45.	<5.0	7.3
chlorpyrifos					<10.	10.		
dacthal			30.	24.	120.	120.		
DDD, o,p'			12.	11.	10.	12.		
DDD, p,p'	12.	18.	100.	84.	95.	95.		
DDE, o,p'					29.	17.		
DDE, p,p'	98.	95.	950.	1100.	1700.	1800.	10.	13.
DDT, o,p'			20.	26.	56.	56.		
DDT, p,p'			88.	91.	480.	450.		
DDMU,p,p'			<15.	26.	52.	54.		
diazinon					64.	70.		
dieldrin	<5.0	6.2			39.	34.		
endosulfan I								
endosulfan II								
endosulfan sulfate					210.	210.		
hexachlorobenzene								
alpha-HCH								
gamma-HCH					7.9	8.4		
heptachlor epoxide								
oxadiazon	<5.0	9.5					21.	26.
PCB 1248					<50.	54.		
PCB 1254	78.	71.	<50.	79.	302.	130.		
PCB 1260	57.	53.			54.	53.		
toxaphene			440.	340.	2000.	1700.		
percent moisture	76.4	76.5	80.0	79.9	76.2	76.8	77.3	77.0
percent lipid	1.52	1.64	0.397	0.295	4.04	4.02	4.42	4.86

* Tables 2, 3, and 4 list code names for species.

< Below detection limit.

TABLE S-6 (continued)
Toxic Substances Monitoring Program
Results of Duplicate Sample Analysis: 1991 Synthetic Organic Compounds Quality Control
(ng/g wet weight)

Station Name	Suisun Bay		Huntington Harbor/ Anaheim Bay		Lost River/Tule Lake		Donner Lake	
Station No.	207.10.90		801.11.00		105.92.01		635.20.04	
Species*	WST		WCK		TC		KOK	
REPLICATE	1	2	1	2	1	2	1	2
COMPOUNDS								
cis-chlordane			10.	10.			<5.0	5.0
cis-nonachlor			11.	12.			10.	11.
gamma-chlordene								
oxychlordane							7.8	9.0
trans-chlordane			6.8	6.9				
trans-nonachlor			15.	15.			8.4	8.4
chlorpyrifos								
dacthal								
DDD, o,p'								
DDD, p,p'			28.	32.				
DDE, o,p'								
DDE, p,p'	31.	19.	340.	390.	<5.0	5.5	23.	26.
DDT, o,p'								
DDT, p,p'								
DDMU,p,p'								
dieldrin								
endosulfan I								
endosulfan II								
endosulfan sulfate								
hexachlorobenzene								
alpha-HCH								
gamma-HCH								
heptachlor epoxide								
oxadiazon								
PCB 1254			120.	150.			100.	110.
PCB 1260	<50.	60.	140.	160.			65.	74.
toxaphene								
percent moisture	81.8	81.5	75.9	76.2	79.5	79.4	78.0	78.1
percent lipid	0.270	0.229	3.73	3.54	3.00	3.17	3.03	3.15

* Tables 2, 3, and 4 list code names for species.
< Below detection limit.

TABLE S-6 (continued)
Toxic Substances Monitoring Program
Results of Duplicate Sample Analysis: 1991 Synthetic Organic Compounds Quality Control
(ng/g wet weight)

Station Name	Santa Maria River/ Mouth	
Station No.	312.10.00	
Species*	Sed	
REPLICATE	1	2
COMPOUNDS		
cis-chlordane		
cis-nonachlor		
gamma-chlordene		
oxychlordane		
trans-chlordane		
trans-nonachlor		
chlorpyrifos		
dacthal		
DDD, o,p'		
DDD, p,p'		
DDE, o,p'		
DDE, p,p'		
DDT, o,p'		
DDT, p,p'		
DDMU,p,p'		
dieldrin		
endosulfan I		
endosulfan II		
endosulfan sulfate		
hexachlorobenzene		
alpha-HCH		
gamma-HCH		
heptachlor epoxide		
oxadiazon		
PCB 1254		
PCB 1260		
toxaphene		
percent moisture	68.3	69.4
percent lipid		

* Tables 2, 3, and 4 list code names for species.

TABLE S-7

Toxic Substances Monitoring Program
Polynuclear Aromatic Hydrocarbons (PAHs) Analyzed
and Their Detection Limits in Flesh

Compound	Detection Limit (ng/g, ppb wet weight) 1991
naphthalene	100
1-methylnaphthalene	100
2-methylnaphthalene	100
biphenyl	100
2,6-dimethylnaphthalene	100
acenaphthylene	100
acenaphthene	100
2,3,5-trimethylnaphthalene	100
fluorene	100
phenanthrene	100
anthracene	100
1-methylphenanthrene	100
fluoranthene	100
pyrene	100
benz[a]anthracene	100
chrysene	100
benzo[b]fluoranthene	100
benzo[k]fluoranthene	100
benzo[e]pyrene	100
benzo[a]pyrene	100
perylene	100
indeno[1,2,3-cd]pyrene	100
dibenz[a,h]anthracene	100
benzo[ghi]perylene	100