SEDIMENT ASSESSMENT STUDY FOR THE MOUTHS OF CHOLLAS AND PALETA CREEK, SAN DIEGO

PHASE I DRAFT REPORT: APPENDIX A - F

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Table of Contents

APPENDIX A: SEDIMENT CHEMISTRY DATA 1
A1 - Sediment Chemistry Data Tables 1
A2 - Sediment Chemistry Data Plots 19
APPENDIX B: BIOACCUMULATION TISSUE CHEMISTRY DATA 44
B1 - Bioaccumulation Tissue Chemistry Data Tables 44
APPENDIX C: SEDIMENT TOXICITY DATA 50
C1 - Whole Sediment Toxicity Data 50
C2 - BACKGROUND INFORMATION ON THE OCCURRENCE OF OUTLIER VALUES IN THE AMPHIPOD TOXICITY TEST RESULTS 55
C3 - Porewater Toxicity Data 58
C4 - Sediment-Water Interface Toxicity Data 63
APPENDIX D: BENTHIC ECOLOGY DATA 72
D1 - Benthic Ecology Data Tables 72
APPENDIX E: DEVELOPMENT OF REFERENCE AND BASELINE POOLS 89
E1 - Distance-from-shore approach to identify Bight'98 reference stations in San Diego Bay 89
E2 - Consensus Evaluation of Candidate Reference Stations for Use in Evaluating Data from the NASSCO/SWM Shipyard and Chollas/Paleta THS Areas 98
E3 - Comparison of stations included in the Reference or Baseline Pools 108
E4 - Using Percent Fines to Determine Trace Metal Enrichment in Chollas and Paleta Sediments 109
APPENDIX F: ASSESSMENT OF EFFECTS AND POTENTIAL IMPAIRMENT TO BENEFICIAL USES USING THE REFERENCE POOL 115
F1 - Reference Pool Characteristics 115
F2 - Assessment of Effects 125
F3 - Potential Impairment To Beneficial Uses 141

APPENDIX A: SEDIMENT CHEMISTRY DATA

A1 - SEDIMENT CHEMISTRY DATA TABLES

Table A- 1. Chollas Sediment Physical data.

Analyte	Size Range (mm)	C01*	C02	C03	C04	C05	C06	C07
Gravel	>2	0.04	1.55	1.07	1.47	0.12	0.97	0.85
Sand	<2 to 0.0625	34.92	37.090	36.91	55.38	41.52	35.45	89.92
Silt	<0.0625 to 0.0039	31.69	28.98	29.3	21.2	30.2	29.8	4.43
Clay	<0.0039	33.34	32.38	32.75	21.95	28.16	33.78	4.8
Fines	<0.0625	65.03	61.36	62.02	43.15	58.37	63.58	9.23
TOC		1.85	1.64	1.7300	1.1900	1.400	1.780	0.2200
Analyte	**Size Range (mm)**	**C08****	**C09**	**C10**	**C11**	**C12**	**C13**	**C14**
Gravel	>2	2.57	0.12	1.24	3.41	0.18	0	0.05
Sand	<2 to 0.0625	86.535	46.88	45.07	84.95	66.04	35.32	20.20
Silt	<0.0625 to 0.0039	5.46	26.15	25.16	5.89	18.41	35.09	40.12
Clay	<0.0039	5.435	26.85	28.53	5.76	15.37	29.59	39.62
Fines	<0.0625	10.895	53.00	53.69	11.65	33.78	64.68	79.74
TOC		0.345	1.35	1.54	0.610	1.170	3.040	6.08

***first value of lab duplicates**
****mean of field duplicates**

Table A- 2. Paleta Sediment Physical data.

Analyte	Size Range (mm)	P01*	P02	P03	P04	P05	P06
Gravel	>2	9.91	0.76	0.95	0.17	0	0.35
Sand	<2 to 0.0625	58.350	30.95	60.650	25.26	21.25	26.04
Silt	<0.0625 to 0.0039	15.70	29.8	15.63	33.5	34.7	32.9
Clay	<0.0039	16.04	38.52	22.77	41.07	44.06	40.72
Fines	<0.0625	31.740	68.300	38.400	74.560	78.750	73.600
TOC		0.420	1.290	0.9	1.4700	1.5900	1.540
Analyte	**Size Range (mm)**	**P07**	**P08**	**P09**	**P10**	**P11****	**P12**
Gravel	>2	0	0.92	7.77	2.35	1.435	0.48
Sand	<2 to 0.0625	20.85	61.56	60.61	56.92	53.54	50.37
Silt	<0.0625 to 0.0039	37.0	17.64	26.05	21.43	19.87	26.34
Clay	<0.0039	42.11	19.89	5.56	19.3	25.15	22.81
Fines	<0.0625	79.140	37.530	31.610	40.730	45.020	49.150
TOC		1.600	0.7000	0.09	0.830	1.12	1.240
Analyte	**Size Range (mm)**	**P13**	**P14**	**P15**	**P16**	**P17**	
Gravel	>2	2.76	0.07	0.57	0.25	1.07	
Sand	<2 to 0.0625	72.49	51.10	43.40	34.1	43.24	
Silt	<0.0625 to 0.0039	12.46	26.77	25.50	37.28	27.7	
Clay	<0.0039	12.29	22.06	30.52	28.36	27.99	
Fines	<0.0625	24.750	48.830	56.020	65.640	55.690	
TOC		0.620	1.320	1.47	2.110	2.00	

***first value of lab duplicates**
****mean of field duplicates**

Table A- 3. Chollas metal data.

Analyte	C01*		C02		C03		C04		C05		C06		C07	
Al	73800		73000		74300		69400		75600		72300		62500	
Sb	2.81	&	2.18	&	4.27	&	7.45	&	1.84	&	2.18	&	8.25	&
As	11.8		9.4		11.40		14.9		8.9		10.1		10.9	
Ba	483		510		510		566		533		498		579	
Be	1.28		1.26		1.32		1.15		1.31		1.18		0.93	
Cd	0.428		0.424		1.3		0.3960		0.5100		0.400		0.286	
Cr	56.0		52.7		101		44.6		52.3		57.9		22.5	
Cu	139		130		155		97.4		108		141		47.9	
Fe	41000		38400		40700		33800		39000		40300		21900	
Pb	77.3		73.7		148.00		67.7		73.3		78.4		43.1	
Ni	17.5		16.1		38.5		13.2		15.9		17.3		6.71	
Hg	0.419	&	0.526	&	0.541	&	0.273	&	0.395	&	0.433	&	0.104	&
Ag	0.703	&	0.720	&	0.962	&	0.5020	&	0.6310	&	0.741	&	0.170	&
Se	0.346		0.288	J	0.344		0.178	J	0.274	J	0.266	J	0.075	U
Zn	235		212		418		270		207		233		225	

Analyte	C08**		C09		C10		C11		C12		C13		C14	
Al	60800		73800		73900		64800		69900		73400		71700	
Sb	6.265	&	2.35	&	2.16	&	4.70	&	1.94	&	2.09	&	2.66	&
As	9.345		9.07		9.55		13.10		6.83		8.90		9.41	
Ba	534		537		517		502		605		516		477	
Be	0.9035		1.260		1.140		1.02		1.09		1.260		1.17	
Cd	0.321		0.446		0.38		1.07		0.499		0.956		1.370	
Cr	26.55		50.3		51.9		39.9		39.7		48.2		51.6	
Cu	68		119		314		104		78.5		103		94.9	
Fe	26650		37400		37700		34000		30900		39500		41900	
Pb	41.25		65.40		72.30		96.10		57.60		87.20		103.00	
Ni	8.145		15.5		15.3		13.1		10.8		16.2		22.8	
Hg	0.13	&	0.381	&	0.427	&	0.215	&	0.208	&	0.216	&	0.235	&
Ag	0.23	&	0.702	&	0.81	&	0.47	&	0.418	&	0.463	&	0.461	&
Se	0.1135	J	0.287	J	0.293	J	0.230	J	0.143	J	0.318		0.450	
Zn	204		206		217		273		166		248		347	

***first value of lab duplicates**
****mean of field duplicates**

All concentrations in mg/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as Minimum Detection Limit

Table A- 4. Paleta metal data.

Analyte	P01*		P02		P03		P04		P05		P06		P07		P08		P09	
Al	66300		81000		71000		83300		83400		80500		81400		76200		75900	
Sb	0.840		1.11		0.697		1.45		1.78		1.68		1.77		1.00		0.377	
As	6.69		10.2		6.75		10.0		10.9		11.3		11.3		5.98		2.82	
Ba	542		406		420		480		410		413		415		405		412	
Be	0.986		1.17		1.05		1.33		1.22		1.39		1.25		1.12		0.905	
Cd	0.144	&	0.172		0.00875	U	0.0672	J	0.0981		0.184		0.133		0.0857		0.00875	U
Cr	42.4		78.0		45.8		82.5		87.0		83.1		83.4		57.7		40.2	
Cu	80.2		170		98.1		203		227		247		237		106		22.1	
Fe	31000		48800		33800		53400		56300		52100		54100		42800		41900	
Pb	33.7		55.2		36.1		64.1		72.8		68.3		73.0		42.4		11.3	
Ni	13.7		19.2		13.4		20.1		21.0		20.8		21.2		14.6		11.7	
Hg	0.379		0.63		0.35		0.65		0.71		0.72		0.76		0.44		0.068	
Ag	0.572	&	0.810	&	0.468	&	0.9020	&	1.0800	&	1.130	&	1.150	&	0.7050	&	0.0597	J&
Se	0.131	J	0.3	J	0.174	J	0.263		0.3		0.35		0.352		0.131	J	0.0315	U
Zn	162		261		165		274		294		287		288		184		89	

Analyte	P10		P11**		P12		P13		P14		P15		P16		P17	
Al	73000		74750		79200		71700		80200		77400		78400		72800	
Sb	1.48		3.57		1.22		1.23		1.77		3.53		1.95		2.52	
As	5.36		6.53		5.86		4.20		6.64		7.86		7.61		19.8	
Ba	437		384.50		447		427		449		424		460		426	
Be	0.948		1.08		1.12		0.979		1.15		1.12		1.16		1.07	
Cd	0.351		1.39		0.195		0.173		0.569		1.59		0.894		1.27	
Cr	71.5		72.20		61.5		33.9		58.9		72.3		67.8		57.0	
Cu	105		127		134		71.9		138		157		181		157	
Fe	41600		42400		44500		28700		43100		44500		47700		40200	
Pb	44.37		115.95		52.26		40.68		67.21		159.10		91.42		102.8	
Ni	12.31		18.38		13.89		10.32		15.63		18.62		18.83		18	
Hg	0.304		1.08		0.34		0.250		0.46		0.61		0.56		0.60	
Ag	0.378	&	0.85	&	0.542	&	0.384	&	0.716	&	0.89	&	0.841	&	0.85	&
Se	0.119	J	0.22	J	0.135	J	0.076	J	0.163	J	0.273	J	0.227	J	0.2	J
Zn	242.4		303.90		180.1		174.4		246.4		373.6		313.8		369.5	

***first value of lab duplicates**
****mean of field duplicates**

All concentrations in mg/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as 1/2 Minimum Detection Limit

Table A- 5 Chollas PAH Data.

PAH Analyte	C01		C02		C03		C04		C05		C06		C07	
Naphthalene	10	&	31	&	73	&	7.2	&	9.2	&	14	&	7.6	&
C1-Naphthalenes	6.5		13		27		6.1		5.9		7.2		2.7	
C2-Naphthalenes	9.9		10		17		9.5		8.6		12		4.1	
C3-Naphthalenes	15		12		16		11		10		16		5	
C4-Naphthalenes	19		15		0.42	U	16		15		22		6.6	
Acenaphthylene	45		46		59		31		40		42		9.5	
Acenaphthene	9.2	&	6.9	&	26	&	9.3	&	6.1	&	14	&	7.7	&
Biphenyl	3		3.3		9.3		2.4		2.6		3		1	J
Fluorene	15	&	14	&	38	&	14	&	13	&	20	&	12	&
C1-Fluorenes	9.3	&	8.6	&	20	&	8.1	&	7.4	&	11	&	4	&
C2-Fluorenes	15		15		16		14		11		21		5	
C3-Fluorenes	55		43		78		38		40		54		14	
Anthracene	130	&	130	&	150	&	100	&	130	&	140	&	32	&
Phenanthrene	110	&	100	&	250	&	98	&	94	&	130	&	58	&
C1-Phenanthrenes/anthracenes	81		76		94		66		69		88		32	
C2-Phenanthrenes/anthracenes	81		67		88		67		65		93		27	
C3-Phenanthrenes/anthracenes	77		63		78		56		65		89		23	
C4-Phenanthrenes/anthracenes	180		170		190		140		150		200		49	
Dibenzothiophene	8.6	&	6.8	&	18	&	7.3	&	6.3	&	10	&	4.5	&
C1-Dibenzothiophenes	12		9.9		16		10		9.7		13		5.2	
C2-Dibenzothiophenes	30		26		38		25		25		41		11	
C3-Dibenzothiophenes	50		37		42		35		41		60		13	
Fluoranthene	360	&	270	&	400	&	340	&	260	&	420	&	170	&
Pyrene	520	&	470	&	610	&	460	&	510	&	510	&	240	&
C1-Fluoranthenes/pyrenes	390		370		440		310		350		420		130	
C2-Fluoranthenes/pyrenes	240		240		350		190		250		270		71	
C3-Fluoranthenes/pyrenes	160		160		220		120		160		170		42	
Benzo[a]anthracene	260		230		240		220		200		280		92	
Chrysene	440	&	420	&	420	&	320	&	390	&	470	&	120	&
C1-Chrysenes	210		230		250		170		210		230		56	
C2-Chrysenes	190		190		230		140		190		190		43	
C3-Chrysenes	180		170		210		130		180		180		42	
C4-Chrysenes	120		120		140		89		120		120		30	
Benzo[b]fluoranthene	930	D&	1100	D&	1400	D&	720	D&	860	&	1000	D&	220	
Benzo[k]fluoranthene	290	&	230	&	420	&	200	&	200	&	260	&	79	&
Benzo[e]pyrene	480		510		610		350		440		480		110	
Benzo[a]pyrene	510		560		860	D	380		470		530		130	
Perylene	150		160		160		110		140		150		38	
Indeno[1,2,3,-c,d]pyrene	350		370		480		250		310		360		80	
Dibenzo[a,h]anthracene	94		100		130		67		83		96		20	
Benzo[g,h,i]perylene	360		370		460		250		320		370		76	
Total PAH	7105		7094		9260		5510		6385		7482		2089	
Priority Polutant PAH	4433		4448		6016		3467		3895		4656		1354	
Low Molecular Weight PAH	326		341		623		266		298		367		130	
High Molecular Weight PAH	2184		2050		2660		1787		1913		2306		772	

All concentrations in ug/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as 1/2 Minimum Detection Limit

PAH Analyte	C08		C09		C10		C11		C12		C13		C14	
Naphthalene	3.6	&	10	&	8.5	&	3	&	38	&	20	&	35	&
C1-Naphthalenes	2.1		26		6.5		2.3		67		20		30	
C2-Naphthalenes	3.3		150		9.8		4.2		71		75		71	
C3-Naphthalenes	4.1		97		14		6.3		100		98		120	
C4-Naphthalenes	6.6		36		16		13		110		100		130	
Acenaphthylene	13		82		51		14		280		87		34	
Acenaphthene	4.5	&	320	&	6.8	&	5.7	&	220	&	160	&	93	&
Biphenyl	0.88	J	22		3.8		1.2		26		12		16	
Fluorene	6.3	&	310	&	14	&	7.4	&	270	&	160	&	120	&
C1-Fluorenes	3.2	&	64	&	8.7	&	4.4	&	140	&	80	&	60	&
C2-Fluorenes	4.5		39		13		8		140		120		130	
C3-Fluorenes	16		73		47		28		300		240		280	
Anthracene	34	&	300	&	150	&	35	&	4600	D&	910	D&	300	&
Phenanthrene	52	&	2000	D&	95	&	53	&	2000	D&	650	D&	600	&
C1-Phenanthrenes/anthracenes	28		400		86		31		1500		490		370	
C2-Phenanthrenes/anthracenes	26		230		77		40		1000		500		530	
C3-Phenanthrenes/anthracenes	23		120		66		56		440		350		510	
C4-Phenanthrenes/anthracenes	56		240		160		90		1300		610		560	
Dibenzothiophene	3.7	&	100	&	6.5	&	3.8	&	120	&	97	&	59	&
C1-Dibenzothiophenes	4.3		44		10		6.5		150		85		87	
C2-Dibenzothiophenes	10		49		28		18		190		160		230	
C3-Dibenzothiophenes	15		50		38		41		170		210		350	
Fluoranthene	150	&	1600	D&	290	&	190	&	15000	D&	4400	D&	1800	D&
Pyrene	240	&	1500	D&	460	&	370	D&	8400	D&	3100	D&	1500	D&
C1-Fluoranthenes/pyrenes	130		900		430		190		4800		1800		720	
C2-Fluoranthenes/pyrenes	82		370		260		110		1400		700		520	
C3-Fluoranthenes/pyrenes	52		190		160		72		490		340		400	
Benzo[a]anthracene	81		810	D	280		100		5100	D	1300	D	520	
Chrysene	130	&	1000	D&	680	D&	170	&	5200	D&	1700	D&	840	&
C1-Chrysenes	64		400		270		95		1300		630		510	
C2-Chrysenes	55		230		210		69		540		410		550	
C3-Chrysenes	58		150		160		63		250		330		570	
C4-Chrysenes	39		93		100		42		140		210		400	
Benzo[b]fluoranthene	270	&	1400	D&	1200	D&	250	&	3500	D&	1600	D&	850	&
Benzo[k]fluoranthene	65	&	370	&	280	&	92	&	1000	D&	500	&	210	&
Benzo[e]pyrene	130		740	D	550		130		1500	D	810	D	510	
Benzo[a]pyrene	150		980	D	730	D	160		2100	D	960	D	450	
Perylene	44		220		180		52		680		300		190	
Indeno[1,2,3,-c,d]pyrene	91		470		400		86		720	D	470		340	
Dibenzo[a,h]anthracene	24		130		120		23		260		140		84	
Benzo[g,h,i]perylene	91		440		390		88		690		500		480	
Total PAH	2233		16512		7983		2755		65672		24882		15433	
Priority Polutant PAH	1405		11722		5155		1647		49378		16657		8256	
Low Molecular Weight PAH	116		3048		332		120		7475		2007		1212	
High Molecular Weight PAH	775		6020		2560		1013		36060		11600		5194	

All concentrations in ug/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as 1/2 Minimum Detection Limit

Table A- 6. Paleta PAH Data.

PAH Analyte	P01		P02		P03		P04		P05		P06	
Station ID	**NA**		**NA**		**NA**		**NA**		**NA**		**NA**	
Naphthalene	2.4	&	5.9	&	4	&	6	&	17	&	6.8	&
C1-Naphthalenes	1.4	&	3.2	&	2.5	&	3.2	&	8.5	&	4.2	&
C2-Naphthalenes	2	&	5.6	&	4.1	&	5.2	&	8.4	&	7.7	&
C3-Naphthalenes	2.3	&	6.6	&	5.9	&	6.2	&	7.3	&	7.9	&
C4-Naphthalenes	0.175	U&	0.29	U&	7.7	&	0.24	U&	0.25	U&	0.235	U&
Acenaphthylene	28	&	55	&	40	&	80	&	120	&	110	&
Acenaphthene	1.2	&	2.8	&	2.3	&	3.1	&	5.8	&	4.3	&
Biphenyl	0.56	J&	1.4	&	1.1	&	1.4	&	2.7	&	1.8	&
Fluorene	3.1	&	9.6	&	7	&	9.2	&	14	&	11	&
C1-Fluorenes	0.07	U&	0.12	U&	0.075	U&	0.1	U&	0.1	U&	0.095	U&
C2-Fluorenes	0.14	U&	0.12	U&	0.075	U&	0.1	U&	0.1	U&	0.095	U&
C3-Fluorenes	0.14	U&	0.12	U&	0.075	U&	0.1	U&	0.1	U&	0.095	U&
Anthracene	56		130		88		160		230		230	
Phenanthrene	16		51		33		49		69		62	
C1-Phenanthrenes/anthracenes	14		51		32		49		68		64	
C2-Phenanthrenes/anthracenes	12		40		26		35		50		45	
C3-Phenanthrenes/anthracenes	9		26		22		29		42		37	
C4-Phenanthrenes/anthracenes	22		82		53		73		120		120	
Dibenzothiophene	1.4		3.6		2.5		3.3		4.8		4	
C1-Dibenzothiophenes	1.8		4		3.7		4.4		5.7		7.8	
C2-Dibenzothiophenes	6.2		14		11		13		18		20	
C3-Dibenzothiophenes	6.5		17		17		21		25		33	
Fluoranthene	51		190		110		140		200		170	
Pyrene	56		240		130		220		320		320	
C1-Fluoranthenes/pyrenes	69		270		150		250		400		400	
C2-Fluoranthenes/pyrenes	60		160		93		150		250		260	
C3-Fluoranthenes/pyrenes	36		88		54		98		150		170	
Benzo[a]anthracene	39		160		93		140		240		200	
Chrysene	79		320		180		300		580	D	520	D
C1-Chrysenes	46		150		93		160		290		280	
C2-Chrysenes	46		110		64		130		210		220	
C3-Chrysenes	24		77		52		82		120		130	
C4-Chrysenes	16		46		28		56		88		93	
Benzo[b]fluoranthene	310	D&	790	D&	410	D&	700	D&	1100	D&	1200	D&
Benzo[k]fluoranthene	96		270	D	120	D	220	D	320	D	370	D
Benzo[e]pyrene	140		440	D	230	D	400	D	610	D	680	D
Benzo[a]pyrene	180		510	D	250	D	440	D	690	D	760	D
Perylene	31		120		73		130		200		200	
Indeno[1,2,3,-c,d]pyrene	110		310		180		320	D	460	D	490	D
Dibenzo[a,h]anthracene	27		84		45		89		140		140	
Benzo[g,h,i]perylene	110		300		180		290	D	410	D	430	D
Total PAH	1696		5106		2864		4825		7541		7745	
Priority Polutant PAH	1165		3428		1872		3166		4916		5024	
Low Molecular Weight PAH	108		258		177		311		464		428	
High Molecular Weight PAH	432		1504		808		1329		2170		2110	

All concentrations in ug/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).

E Estimated result exceeds highest level calibration response by greater than 10%

D Concentration reported from dilution analysis

B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.

I Estimated result due to interference.

RE Result reported from a re-analysis for which there is an original result reported.

& Quality control result exceeds quality control criteria as specified in the laboratory work plan.

U Not detected, values reported as 1/2 Minimum Detection Limit

PAH Analyte	P07		P08		P09		P10		P11		P12	
Station ID	NA		NA		NA		NA		NA		NA	
Naphthalene	6.2	&	3.2	B&	0.6	JB&	3.7	&	9.4	&	6.3	&
C1-Naphthalenes	3.9	&	2.8		0.45	JB&	3	&	11	&	8.9	&
C2-Naphthalenes	6.4	&	5		0.67	J&	4.9	&	47	&	12	&
C3-Naphthalenes	7	&	5.8		0.7	J&	5.3	&	77	&	14	&
C4-Naphthalenes	0.26	U&	0.225	U	0.85	&	0.165	U&	190	&	18	&
Acenaphthylene	100	&	73		4.3	&	31	&	26	&	62	&
Acenaphthene	4.8	&	5.3		0.38	J&	4.6	&	23	&	15	&
Biphenyl	1.7	&	1.6		0.18	JB&	1.4	&	4.6	&	3.7	&
Fluorene	10	&	12		1.2	&	9.3	&	18	&	22	&
C1-Fluorenes	0.105	U&	0.09	U	0.065	U&	0.07	U&	0.08	U&	0.095	U&
C2-Fluorenes	0.105	U&	0.09	U	0.065	U&	0.07	U&	0.08	U&	0.095	U&
C3-Fluorenes	0.105	U&	0.09	U	0.065	U&	0.07	U&	310	&	0.095	U&
Anthracene	220		170	&	12		93		170		190	
Phenanthrene	56		76		5.1		51		160		140	
C1-Phenanthrenes/anthracenes	60		60		3.9		42		170		110	
C2-Phenanthrenes/anthracenes	43		53		3.5		36		510		86	
C3-Phenanthrenes/anthracenes	37		46		3.6		33		780		80	
C4-Phenanthrenes/anthracenes	120		180		9.1		95		1100		200	
Dibenzothiophene	4.1		4.2		0.32	J	3.8		0.043	U	11	
C1-Dibenzothiophenes	6.6		5.5		0.56	J	5.2		0.043	U	13	
C2-Dibenzothiophenes	22		16		1.8		11		0.043	U	31	
C3-Dibenzothiophenes	31		29		3.3		27		1200		69	
Fluoranthene	190		500	D	20		270	D	1100	D	850	D
Pyrene	280		520	D	18		280	D	2100	D	740	D
C1-Fluoranthenes/pyrenes	340		520		22		260		1400		590	
C2-Fluoranthenes/pyrenes	250		190		12		140		870		300	
C3-Fluoranthenes/pyrenes	160		100		7.8		81		570		180	
Benzo[a]anthracene	200		320		13		160		610	D	390	D
Chrysene	390		980	D	24		300	D	840	D	760	D
C1-Chrysenes	260		210		10		140		660		320	
C2-Chrysenes	200		140		7.8		100		550		220	
C3-Chrysenes	120		100		5.3		61		300		140	
C4-Chrysenes	97		55		3.4		44		210		110	
Benzo[b]fluoranthene	1100	D&	950	D	51	D&	450	D&	1300	D&	1000	D&
Benzo[k]fluoranthene	330	D	310	D	13		140	D	310	D	340	D
Benzo[e]pyrene	610	D	500	D&	27		250	D	640	D	570	D
Benzo[a]pyrene	680	D	470	D&	28		270	D	730	D	620	D
Perylene	180		120	&	8.2		80		220		170	
Indeno[1,2,3,-c,d]pyrene	440	D	300	&	18		190		440	D	360	D
Dibenzo[a,h]anthracene	130		80	&	4.7		46		160		110	
Benzo[g,h,i]perylene	390	D	270	&	17		170		400	D	340	D
Total PAH	7024		7329		357		3846		17016		9078	
Priority Polutant PAH	4527		5040		230		2469		8396		5945	
Low Molecular Weight PAH	401		342		24		196		417		444	
High Molecular Weight PAH	1870		2870		108		1326		5540		3470	

All concentrations in ug/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).

E Estimated result exceeds highest level calibration response by greater than 10%

D Concentration reported from dilution analysis

B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.

I Estimated result due to interference.

RE Result reported from a re-analysis for which there is an original result reported.

& Quality control result exceeds quality control criteria as specified in the laboratory work plan.

U Not detected, values reported as 1/2 Minimum Detection Limit

PAH Analyte	P13		P14		P15		P16		P17	
Station ID	NA		NA		NA		NA		NA	
Naphthalene	1.8	&	6.7	&	10	&	11	&	9.1	&
C1-Naphthalenes	1.7	&	9.5	&	13	&	12	&	12	&
C2-Naphthalenes	2.5	&	15	&	21	&	16	&	26	&
C3-Naphthalenes	3.1	&	14	&	28	&	20	&	28	&
C4-Naphthalenes	0.15	U&	0.185	U&	51	&	29	&	0.205	U&
Acenaphthylene	17	&	60	&	68	&	76	&	70	&
Acenaphthene	2.4	&	16	&	14	&	15	&	24	&
Biphenyl	0.93	&	3.9	&	6.7	&	5.5	&	5.3	&
Fluorene	4.4	&	22	&	19	&	25	&	31	&
C1-Fluorenes	0.06	U&	0.075	U&	0.1	U&	0.085	U&	0.085	U&
C2-Fluorenes	0.06	U&	0.075	U&	0.1	U&	0.085	U&	0.085	U&
C3-Fluorenes	0.06	U&	0.075	U&	0.1	U&	0.085	U&	270	&
Anthracene	47		160		180		260		240	
Phenanthrene	25		240		96		140		170	
C1-Phenanthrenes/anthracenes	22		100		130		120		130	
C2-Phenanthrenes/anthracenes	21		76		200		120		260	
C3-Phenanthrenes/anthracenes	24		70		200		130		430	
C4-Phenanthrenes/anthracenes	68		170		500		280		720	
Dibenzothiophene	1.9		14		8.9		12		14	
C1-Dibenzothiophenes	3.2		14		35		19		0.046	U
C2-Dibenzothiophenes	9.4		28		84		57		0.046	U
C3-Dibenzothiophenes	26		62		270		130		410	
Fluoranthene	130		580	D	1100	D	850	D	730	D
Pyrene	140		900	D	2000	D	1000	D	1600	D
C1-Fluoranthenes/pyrenes	150		510		1000		740		990	
C2-Fluoranthenes/pyrenes	91		330		650		450		610	
C3-Fluoranthenes/pyrenes	55		190		430		260		370	
Benzo[a]anthracene	70		230		530	D	440	D	480	D
Chrysene	140		490	D	750	D	750	D	760	D
C1-Chrysenes	72		310		630		440		550	
C2-Chrysenes	59		250		500		370		390	
C3-Chrysenes	37		150		300		230		230	
C4-Chrysenes	26		110		220		170		170	
Benzo[b]fluoranthene	250	D&	860	D&	1600	D&	1400	D&	1200	D&
Benzo[k]fluoranthene	70		300	D	400	D	300	D	470	D
Benzo[e]pyrene	130		470	D	780	D	690	D	650	D
Benzo[a]pyrene	140		500	D	890	D	740	D	730	D
Perylene	43		160		240		220		210	
Indeno[1,2,3,-c,d]pyrene	94		280	D	500	D	430	D	400	D
Dibenzo[a,h]anthracene	25		110		170		160		140	
Benzo[g,h,i]perylene	91		270	D	490	D	430	D	380	D
Total PAH	2054		7964		14717		11330		13486	
Priority Polutant PAH	1248		5025		8817		7027		7434	
Low Molecular Weight PAH	99		514		400		539		556	
High Molecular Weight PAH	645		2810		5440		3940		4440	

All concentrations in ug/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).

E Estimated result exceeds highest level calibration response by greater than 10%

D Concentration reported from dilution analysis

B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.

I Estimated result due to interference.

RE Result reported from a re-analysis for which there is an original result reported.

& Quality control result exceeds quality control criteria as specified in the laboratory work plan.

U Not detected, values reported as 1/2 Minimum Detection Limit

Table A- 7. Chollas PCB Data.

PCB Congener	C01		C02		C03		C04		C05		C06		C07	
18 - 2,2',5-Trichlorobiphenyl (Cl3)	0.65		0.96		1.5		0.71		1		1.2		0.22	
28 - 2,4,4'-Trichlorobiphenyl (Cl3)	1.4		2		2.9		1.1		2.2		1.7		0.43	
37 - 3,4,4'-Trichlorobiphenyl (Cl3)	3.3		4		5.1		2.3		4.3		1.4		0.85	
44 - 2,2',3,5'-Tetrachlorobiphenyl (Cl4)	4.7		8.8		8		4		7.6		5		1.7	
49 - 2,2',4,5'-Tetrachlorobiphenyl (Cl4)	2.9		4.6		5.1		2.4		4		3.2		0.97	
52 - 2,2',5,5'-Tetrachlorobiphenyl (Cl4)	3.2		11		7.4		3.7		6.6		3.2		2.2	
66 - 2,3',4,4'-Tetrachlorobiphenyl (Cl4)	2.9		4.2		4.4		2.3		3.7		2.5		0.76	
70 - 2,3',4',5 -Tetrachlorobiphenyl (Cl4)	3.8		10		6.9		3.2		7.2		4.2		1.8	
74 - 2,2,4',5 -Tetrachlorobiphenyl (Cl4)	2.8		4.6		4.5		2.3		3.9		2.9		0.9	
81 - 3,4,4',5 -Tetrachlorobiphenyl (Cl4)	2.1		4.3		2		1.1		2.9		2.1		1.5	
77 - 3,3',4,4'-Tetrachlorobiphenyl (Cl4)	6		14		11		5.2		9.1		7.8		2	
87 - 2,2'3,4,5'-Pentachlorobiphenyl (Cl5)	3		10		6.4		2.8		5.2		2.9		1.2	
99 - 2,2',4,4',5-Pentachlorobiphenyl (Cl5)	5.1		11		9		4		7.7		5.8		1.7	
101 - 2,2',4,5,5'-Pentachlorobiphenyl (Cl5)	11	&	38	D&	18	&	8.5	&	14	&	11	&	4.2	&
105 - 2,3,3',4,4'-Pentachlorobiphenyl (Cl5)	5.1	&	14	&	9.1	&	3.9	&	7.6	&	5.8	&	2	&
110 - 2,3,3',4',5-Pentachlorobiphenyl (Cl5)	11		37	D	18		8.6		15		10		4.1	
114 - 2,3,4,4',5-Pentachlorobiphenyl (Cl5)	4.1		5.1		5.6		3.1		5.4		3.7		0.85	
118 - 2,3',4,4',5-Pentachlorobiphenyl (Cl5)	11		35	D	17		8.1		14		10		3.6	
119 - 2,3',4,4',6-Pentachlorobiphenyl (Cl5)	1.2		1.5		1.6		0.85		1.4		1.2		0.21	
123 - 2',3,4,4',5-Pentachlorobiphenyl (Cl5)	2.7		4.1		3.5		2		3.3		2.4		0.83	
126 - 3,3',4,4',5-Pentachlorobiphenyl (Cl5)	0.075		0.07		0.075		0.06		0.085		0.09		0.47	U
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl (Cl6)	3.2		8.2		6.5		3.2		4.3		2.8		0.94	
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl (Cl6)	18		47	D	27		13		20		17		5.3	
149 - 2,2',3,4',5',6-Hexachlorobiphenyl (Cl6)	4.4		16		11		6.8		10		9.1		2.9	
151 - 2,2',3,5,5',6-Hexachlorobiphenyl (Cl6)	4		6.1		5.7		2.9		4.2		4		1	
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl (Cl6)	20		52	D	41	D	13		21		18		5	
156 - 2,3,3',4,4',5-Hexachlorobiphenyl (Cl6)	3.1		6		4.4		2.2		3.5		2.5		0.76	
157 - 2,3,3',4,4',5'-Hexachlorobiphenyl (Cl6)	0.86		1.6		1.2		0.63		0.95		0.83		0.2	
158 - 2,3,3',4,4',6-Hexachlorobiphenyl (Cl6)	6		7.5		8.7		4		5.5		5.4		1.5	
167 - 2,3',4,4',5,5'-Hexachlorobiphenyl (Cl6)	3.1		3.7		4		2.2		2.8		3.3		0.76	
168 - 2,3',4,4',5',6'-Hexachlorobiphenyl (Cl6)	0.065	U	0.06	U	0.06	U	0.05	U	0.07	U	0.075	U	0.395	U
169 - 3,3',4,4',5,5'-Hexachlorobiphenyl (Cl6)	0.065	U	0.06	U	0.06	U	0.05	U	0.07	U	0.075	U	0.395	U
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl (Cl7)	5.5		8.8		9.6		3.8		5.4		5.3		1.2	
177 - 2,2',3,3',4',5,6-Heptachlorobiphenyl (Cl7)	4.4		5.1		6.6		3.2		4		4.4		1.1	
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl (Cl7)	9.9		13		17		7.2		9.5		9.8		2.1	
183 - 2,2',3,4,4',5',6-Heptachlorobiphenyl (Cl7)	3.4		4.9		5.3		2.1		3		3.1		0.82	
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl (Cl7)	6.6		7.4		10		4.4		5.6		6.6		1.3	
189 - 2,3,3',4,4',5,5-Heptachlorobiphenyl (Cl7)	0.31		0.43		0.56		0.21		0.27		0.29		0.09	
194 - 2,2',3,3',4,4',5,5'-Octachlorobiphenyl (Cl8)	3.2		3.5		4.9		2.1		2.6		3.1		0.47	
201 - 2,2',3,3',4,4',5,5',6-Octachlorobiphenyl (Cl8)	3.6		3.8		6		2.2		2.9		3.6		0.57	
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (Cl9)	2	&	2.2	&	3.2	&	1.2	&	1.7	&	2.4	&	0.27	&
Total PCB	189.73		421.58		319.86		144.66		233.55		189.76		59.56	

All concentrations in ug/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as Minimum Detection Limit

PCB Congener	C08		C09		C10		C11		C12		C13		C14	
18 - 2,2',5-Trichlorobiphenyl (Cl3)	0.2		0.53		0.94		0.42		1		1.6		0.155	U
28 - 2,4,4'-Trichlorobiphenyl (Cl3)	0.51		1.2		1.6		0.81		1.5		3.2		3.5	
37 - 3,4,4'-Trichlorobiphenyl (Cl3)	0.85		2.3		3.3		1.1		2.4		5.6		8.2	
44 - 2,2',3,5'-Tetrachlorobiphenyl (Cl4)	1.7		3.8		4.1		2.2		3.1		10		14	
49 - 2,2',4,5'-Tetrachlorobiphenyl (Cl4)	0.87		2.6		4.4		1.1		2.1		4.4		6	
52 - 2,2',5,5'-Tetrachlorobiphenyl (Cl4)	1.3		2.6		5		2.1		3.6		4.4		5.6	
66 - 2,3',4,4'-Tetrachlorobiphenyl (Cl4)	0.77		2.1		4.1		1.1		2.4		3.1		5.4	
70 - 2,3',4',5 -Tetrachlorobiphenyl (Cl4)	1.5		3.2		4.5		2.4		3.3		5.1		5.8	
74 - 2,2,4',5 -Tetrachlorobiphenyl (Cl4)	0.99		2.6		2.9		1.2		3.2		6.8		9.7	
81 - 3,4,4',5 -Tetrachlorobiphenyl (Cl4)	0.98		3.6		2.5		2.1		2		3.8		4	
77 - 3,3',4,4'-Tetrachlorobiphenyl (Cl4)	1.8		5.3		5.6		3.1		4.7		17		4.9	
87 - 2,2'3,4,5'-Pentachlorobiphenyl (Cl5)	0.89		2		3.2		1.5		1.8		2.2		2.6	
99 - 2,2',4,4',5-Pentachlorobiphenyl (Cl5)	1.6		4.6		6.8		2.2		3.3		4.9		6.6	
101 - 2,2',4,5,5'-Pentachlorobiphenyl (Cl5)	3.4	&	8.8	&	12	&	4.8	&	7.6	&	9.4	&	9.6	&
105 - 2,3,3',4,4'-Pentachlorobiphenyl (Cl5)	1.5	&	4.4	&	5.9	&	2.3	&	3.6	&	5.6	&	5.4	&
110 - 2,3,3',4',5-Pentachlorobiphenyl (Cl5)	3.3		9.2		11		5.1		8.7		13		10	
114 - 2,3,4,4',5-Pentachlorobiphenyl (Cl5)	1.2		3		3.1		2.1		4.5		13		17	
118 - 2,3',4,4',5-Pentachlorobiphenyl (Cl5)	3.1		8.3		10		4.2		6.8		11		8.3	
119 - 2,3',4,4',6-Pentachlorobiphenyl (Cl5)	0.32		0.83		1.3		0.35		0.77		2.4		3.9	
123 - 2',3,4,4',5-Pentachlorobiphenyl (Cl5)	0.98		2.8		2.8		0.79		7.2		3.6		3	
126 - 3,3',4,4',5-Pentachlorobiphenyl (Cl5)	0.475	U	0.07	U	0.07	U	0.475	U	0.075	U	0.07	U	0.1	U
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl (Cl6)	1.4		2.9		3.3		1		4.1		3.6		2.4	
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl (Cl6)	4.4		14		17		6.1		9.8		14		9.6	
149 - 2,2',3,4',5',6-Hexachlorobiphenyl (Cl6)	2		6.2		8.6		3.5		6.9		6.9		6.9	
151 - 2,2',3,5,5',6-Hexachlorobiphenyl (Cl6)	1		3		4.2		1.3		3.1		5.4		6.3	
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl (Cl6)	4.7		13		18		6.1		12		16		10	
156 - 2,3,3',4,4',5-Hexachlorobiphenyl (Cl6)	0.7		2.5		2.8		0.92		4.1		2.8		0.08	U
157 - 2,3,3',4,4',5'-Hexachlorobiphenyl (Cl6)	0.18		0.8		0.76		0.22		0.54		0.57		0.37	
158 - 2,3,3',4,4',6-Hexachlorobiphenyl (Cl6)	1.6		5.8		5.1		1.7		22		14		13	
167 - 2,3',4,4',5,5'-Hexachlorobiphenyl (Cl6)	0.81		3		2.7		0.98		0.06	U	8.6		1.2	
168 - 2,3',4,4',5',6'-Hexachlorobiphenyl (Cl6)	0.04	U	0.055	U	0.06	U	0.04	U	0.06	U	0.06	U	0.08	U
169 - 3,3',4,4',5,5'-Hexachlorobiphenyl (Cl6)	0.04	U	0.055	U	0.06	U	0.04	U	0.06	U	0.06	U	0.08	U
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl (Cl7)	1.1		3.9		5.2		1.7		3.8		4.3		2.2	
177 - 2,2',3,3',4',5,6-Heptachlorobiphenyl (Cl7)	0.7		3.7		4.4		1.3		4.4		7		9.3	
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl (Cl7)	2.1		7.7		10		3.1		7.4		23		4.5	
183 - 2,2',3,4,4',5',6-Heptachlorobiphenyl (Cl7)	0.67		2.3		3.1		0.96		2.2		3.2		2.2	
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl (Cl7)	1.4		4.8		8		1.7		4.3		5.7		3.3	
189 - 2,3,3',4,4',5,5-Heptachlorobiphenyl (Cl7)	0.067		0.28		0.35		0.12		1.4		0.31		0.055	U
194 - 2,2',3,3',4,4',5,5'-Octachlorobiphenyl (Cl8)	0.63		2.4		3.9		0.81		2.5		3.4		1.3	
201 - 2,2',3,3',4,4',5,5',6-Octachlorobiphenyl (Cl8)	0.72		2.7		4.5		0.87		2.6		4		4	
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (Cl9)	0.36	&	1.5	&	5.2	&	0.34	&	1.6	&	2	&	1.5	&
Total PCB	52.852		154.42		202.34		74.245		166.57		255.07		212.12	

All concentrations in ug/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as 1/2 Minimum Detection Limit

Table A- 8. Paleta PCB Data.

PCB Congener	P01		P02		P03		P04		P05		P06	
18 - 2,2',5-Trichlorobiphenyl (Cl3)	0.053		0.073		0.034		0.083		0.12		0.17	
28 - 2,4,4'-Trichlorobiphenyl (Cl3)	0.18		0.3		0.18		0.38		0.48		0.6	
37 - 3,4,4'-Trichlorobiphenyl (Cl3)	0.0485	U	0.08	U	0.88		1.4		2.1		1.6	
44 - 2,2',3,5'-Tetrachlorobiphenyl (Cl4)	0.38	&	0.54	&	0.4	&	0.73	&	1.4	&	1.2	&
49 - 2,2',4,5'-Tetrachlorobiphenyl (Cl4)	0.49		0.98		0.71		0.93		1.4		1.4	
52 - 2,2',5,5'-Tetrachlorobiphenyl (Cl4)	0.7	&	1.4	&	0.79	&	1.3	&	2	&	2.1	&
66 - 2,3',4,4'-Tetrachlorobiphenyl (Cl4)	0.59		0.84		0.79		1.1		1.8		1.5	
70 - 2,3',4',5 -Tetrachlorobiphenyl (Cl4)	0.83		1.5		1		1.2		2		2	
74 - 2,2,4',5 -Tetrachlorobiphenyl (Cl4)	0.41		0.83		0.48		0.9		1.2		1.2	
81 - 3,4,4',5 -Tetrachlorobiphenyl (Cl4)	0.52		1.2		0.31		0.51		0.83		0.68	
77 - 3,3',4,4'-Tetrachlorobiphenyl (Cl4)	1	&	1.9	&	1.3	&	2.2	&	2.8	&	3.3	&
87 - 2,2'3,4,5'-Pentachlorobiphenyl (Cl5)	0.71		1.4		0.82		1.5		2.3		2	
99 - 2,2',4,4',5-Pentachlorobiphenyl (Cl5)	1.3		2.6		1.8		2.7		3.5		3.7	
101 - 2,2',4,5,5'-Pentachlorobiphenyl (Cl5)	2.5	&	4.6	&	2.8	&	4.7	&	7.1	&	6.7	&
105 - 2,3,3',4,4'-Pentachlorobiphenyl (Cl5)	1.4		2.9		1.4		2.5		2.9		3.3	
110 - 2,3,3',4',5-Pentachlorobiphenyl (Cl5)	1.7		3		2.1		4.2		5.7		5.1	
114 - 2,3,4,4',5-Pentachlorobiphenyl (Cl5)	0.031	U	0.05	U	0.0335	U	0.043	U	2		1.2	
118 - 2,3',4,4',5-Pentachlorobiphenyl (Cl5)	2		4.2		2.7		4.8		6.2		5.9	
119 - 2,3',4,4',6-Pentachlorobiphenyl (Cl5)	0.044		0.28		0.15		0.35		0.42		0.44	
123 - 2',3,4,4',5-Pentachlorobiphenyl (Cl5)	0.031	U	0.05	U	0.0335	U	0.043	U	0.0445	U	0.042	U
126 - 3,3',4,4',5-Pentachlorobiphenyl (Cl5)	0.031	U	0.05	U	0.0335	U	0.043	U	0.0445	U	0.042	U
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl (Cl6)	0.62		1.1		0.89		1.5		1.8		1.6	
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl (Cl6)	4.3		8.6		5.6		11		24	D	12	
149 - 2,2',3,4',5',6-Hexachlorobiphenyl (Cl6)	2.9	&	5.5	&	3.4	&	6.6	&	34	D&	7.8	&
151 - 2,2',3,5,5',6-Hexachlorobiphenyl (Cl6)	0.89		1.7		1.1		2.1		11		2.5	
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl (Cl6)	4.6	&	9.3	&	5.7	&	11	&	54	D&	12	&
156 - 2,3,3',4,4',5-Hexachlorobiphenyl (Cl6)	0.51		1.1		0.64		1.3		0.0375	U	1.6	
157 - 2,3,3',4,4',5'-Hexachlorobiphenyl (Cl6)	0.23		0.41		0.21		0.44		0.0375	U	0.9	
158 - 2,3,3',4,4',6-Hexachlorobiphenyl (Cl6)	0.026	U	0.043	U	0.0285	U	0.0365	U	0.0375	U	0.0355	U
167 - 2,3',4,4',5,5'-Hexachlorobiphenyl (Cl6)	0.38		1.2		0.82		1.3		1.6		1.6	
168 - 2,3',4,4',5',6'-Hexachlorobiphenyl (Cl6)	0.026	U	0.043	U	0.0285	U	0.0365	U	0.0375	U	0.0355	U
169 - 3,3',4,4',5,5'-Hexachlorobiphenyl (Cl6)	0.026	U	0.043	U	0.0285	U	0.0365	U	0.0375	U	0.0355	U
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl (Cl7)	1.7		3		2		5.8		22	D	4.6	
177 - 2,2',3,3',4',5,6-Heptachlorobiphenyl (Cl7)	1		2.2		1.4		3		14		3	
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl (Cl7)	2.6	&	5.1	&	3.2	&	9.5	&	130	D&	8.8	&
183 - 2,2',3,4,4',5',6-Heptachlorobiphenyl (Cl7)	0.86		1.6		1		2.7		40	D	2.7	
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl (Cl7)	1.9		3.8		2.6		5.5		110	D	6	
189 - 2,3,3',4,4',5,5-Heptachlorobiphenyl (Cl7)	0.16		0.2		0.13		0.32		0.34		0.29	
194 - 2,2',3,3',4,4',5,5'-Octachlorobiphenyl (Cl8)	0.8		1.6		1.1		2.9		73	D	3.8	
201 - 2,2',3,3',4,4',5,5',6-Octachlorobiphenyl (Cl8)	1		2		1.3		3.1		130	D	4.7	
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (Cl9)	0.62		1.3		0.82		1.6		59	D	3.6	
Total PCBs	40.097		78.612		50.74		101.38		751.27		121.77	

All concentrations in ug/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as 1/2 Minimum Detection Limit

PCB Congener	P07		P08		P09		P10		P11		P12	
18 - 2,2',5-Trichlorobiphenyl (Cl3)	0.14		0.06	U	0.03		0.16		0.18		0.56	
28 - 2,4,4'-Trichlorobiphenyl (Cl3)	0.59		0.7		0.11		0.46		4.2		1	
37 - 3,4,4'-Trichlorobiphenyl (Cl3)	1.6		1.5		0.16		1.3		8.6		2.6	
44 - 2,2',3,5'-Tetrachlorobiphenyl (Cl4)	1.4	&	1.1	&	0.16	&	1.2	&	12	D&	2.8	
49 - 2,2',4,5'-Tetrachlorobiphenyl (Cl4)	1.4		0.034	U	0.18		2.4		7.2		2.7	
52 - 2,2',5,5'-Tetrachlorobiphenyl (Cl4)	1.8	&	1.7	&	0.24	&	1.5	&	15	D&	3.3	&
66 - 2,3',4,4'-Tetrachlorobiphenyl (Cl4)	1.7		1.6		0.16		1.4		7.6		2.6	
70 - 2,3',4',5 -Tetrachlorobiphenyl (Cl4)	2.1		1.9		0.26		1.8		19	D	3.7	
74 - 2,2,4',5 -Tetrachlorobiphenyl (Cl4)	1.2		0.98		0.14		1		7.2		2.1	
81 - 3,4,4',5 -Tetrachlorobiphenyl (Cl4)	0.51		1.3		0.084		0.65		4.4		0.77	
77 - 3,3',4,4'-Tetrachlorobiphenyl (Cl4)	3.5	&	2.8	&	0.29	&	2.6	&	23	D&	5.7	&
87 - 2,2'3,4,5'-Pentachlorobiphenyl (Cl5)	2		1.1		0.17		1.2		6.6		2.8	
99 - 2,2',4,4',5-Pentachlorobiphenyl (Cl5)	3.6		2.6		0.31		2.3		9.5		4.4	
101 - 2,2',4,5,5'-Pentachlorobiphenyl (Cl5)	6.4	&	4.7	&	0.62	&	3.9	&	24	D&	7.7	&
105 - 2,3,3',4,4'-Pentachlorobiphenyl (Cl5)	3.4		2.6		0.28		2.5		10		4.3	
110 - 2,3,3',4',5-Pentachlorobiphenyl (Cl5)	5.5		4.8		0.49		3.3		20	D	7	
114 - 2,3,4,4',5-Pentachlorobiphenyl (Cl5)	1.6		1.3		0.16		1.9		9.5		0.042	U
118 - 2,3',4,4',5-Pentachlorobiphenyl (Cl5)	5.7		4.1		0.55		3.8		23	D	7.3	
119 - 2,3',4,4',6-Pentachlorobiphenyl (Cl5)	0.42		0.29		0.035		0.34		0.97		0.62	
123 - 2',3,4,4',5-Pentachlorobiphenyl (Cl5)	0.046	U	0.0405	U	0.0285	U	0.0295	U	0.0345	U	0.042	U
126 - 3,3',4,4',5-Pentachlorobiphenyl (Cl5)	0.046	U	0.0405	U	0.0285	U	0.0295	U	0.0345	U	0.042	U
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl (Cl6)	1.6		1.2		0.14		1.5		2.7		1.6	
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl (Cl6)	11		7.6		0.92		6.2		29	D	11	
149 - 2,2',3,4',5',6-Hexachlorobiphenyl (Cl6)	7.5	&	5.1	&	0.65	&	4.4	&	22	D&	7.9	&
151 - 2,2',3,5,5',6-Hexachlorobiphenyl (Cl6)	2.4		1.6		0.2		1.4		4.6		2.5	
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl (Cl6)	12	&	7.7	&	1.1	&	6.7	&	34	D&	11	&
156 - 2,3,3',4,4',5-Hexachlorobiphenyl (Cl6)	1.4		1.1		0.11		0.88		2.6		1.8	
157 - 2,3,3',4,4',5'-Hexachlorobiphenyl (Cl6)	0.91		0.49		0.022	J	0.025	U	1.2		0.8	
158 - 2,3,3',4,4',6-Hexachlorobiphenyl (Cl6)	0.039	U	0.034	U	0.024	U	0.025	U	0.029	U	0.0355	U
167 - 2,3',4,4',5,5'-Hexachlorobiphenyl (Cl6)	1.6		1		0.13		1.2		2.6		2.2	
168 - 2,3',4,4',5',6'-Hexachlorobiphenyl (Cl6)	0.039	U	0.034	U	0.024	U	0.025	U	0.029	U	0.0355	U
169 - 3,3',4,4',5,5'-Hexachlorobiphenyl (Cl6)	0.039	U	0.034	U	0.024	U	0.025	U	0.18		0.0355	U
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl (Cl7)	4.2		2.8		0.32		2.1		7.5		4.3	
177 - 2,2',3,3',4',5,6-Heptachlorobiphenyl (Cl7)	2.9		2.3		0.23		1.6		4.3		2.8	
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl (Cl7)	7.4	&	4.3	&	0.53	&	3.9	&	20	D&	7	&
183 - 2,2',3,4,4',5',6-Heptachlorobiphenyl (Cl7)	2.3		1.5		0.18		1.2		4.3		2.4	
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl (Cl7)	5		3.2		0.4		2.6		8.3		4.6	
189 - 2,3,3',4,4',5,5-Heptachlorobiphenyl (Cl7)	0.31		0.16		0.023	J	0.18		0.29		0.16	
194 - 2,2',3,3',4,4',5,5'-Octachlorobiphenyl (Cl8)	2.5		1.4		0.14		1.3		4.1		2.4	
201 - 2,2',3,3',4,4',5,5',6-Octachlorobiphenyl (Cl8)	3.1		1.8		0.2		1.4		5.4		2.5	
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (Cl9)	2.9		1.7		0.14		1.3		3.6		1.7	
Total PCBs	113.79		80.297		9.993		71.729		368.75		128.84	

All concentrations in ug/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as 1/2 Minimum Detection Limit

PCB Congener	P13		P14		P15		P16		P17	
18 - 2,2',5-Trichlorobiphenyl (Cl3)	0.13		1		2.9		1.8		1.4	
28 - 2,4,4'-Trichlorobiphenyl (Cl3)	0.4		1.8		4.6		2.3		2.3	
37 - 3,4,4'-Trichlorobiphenyl (Cl3)	1.1		4.2		9.4		4.4		4	
44 - 2,2',3,5'-Tetrachlorobiphenyl (Cl4)	1.1		4.8	&	9.2	&	4	&	3.6	&
49 - 2,2',4,5'-Tetrachlorobiphenyl (Cl4)	1.6		4.9		6.8		3.5		9.8	
52 - 2,2',5,5'-Tetrachlorobiphenyl (Cl4)	1.8	&	6.4	&	11	&	4	&	3.9	&
66 - 2,3',4,4'-Tetrachlorobiphenyl (Cl4)	1.4		4		7.2		4.2		3.9	
70 - 2,3',4',5 -Tetrachlorobiphenyl (Cl4)	1.5		5.6		13		5.8		5.5	
74 - 2,2,4',5 -Tetrachlorobiphenyl (Cl4)	0.84		4		7.3		3.6		3.3	
81 - 3,4,4',5 -Tetrachlorobiphenyl (Cl4)	0.41		1.8		2.2		1.2		1	
77 - 3,3',4,4'-Tetrachlorobiphenyl (Cl4)	1.9	&	8.4	&	16	&	5.6	&	5.5	&
87 - 2,2'3,4,5'-Pentachlorobiphenyl (Cl5)	0.99		4.1		7.3		3.5		3.1	
99 - 2,2',4,4',5-Pentachlorobiphenyl (Cl5)	2.2		6.1		7.5		5.2		4.7	
101 - 2,2',4,5,5'-Pentachlorobiphenyl (Cl5)	3.3	&	11	&	13	&	8.9	&	7.9	&
105 - 2,3,3',4,4'-Pentachlorobiphenyl (Cl5)	1.8		6.8		11		5.1		4.1	
110 - 2,3,3',4',5-Pentachlorobiphenyl (Cl5)	3.1		9.8		22	D	10		9.6	
114 - 2,3,4,4',5-Pentachlorobiphenyl (Cl5)	0.027	U	0.033	U	14		10		12	
118 - 2,3',4,4',5-Pentachlorobiphenyl (Cl5)	3.3		10		22	D	9.7		8.4	
119 - 2,3',4,4',6-Pentachlorobiphenyl (Cl5)	0.32		0.88		1.1		0.79		0.66	
123 - 2',3,4,4',5-Pentachlorobiphenyl (Cl5)	0.027	U	0.033	U	0.043	U	0.0375	U	0.037	U
126 - 3,3',4,4',5-Pentachlorobiphenyl (Cl5)	0.027	U	0.033	U	0.043	U	0.0375	U	0.037	U
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl (Cl6)	0.77		2.7		4.1		2.4		1.3	
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl (Cl6)	4.1		18	D	34	D	19	D	18	D
149 - 2,2',3,4',5',6-Hexachlorobiphenyl (Cl6)	3.2	&	14	D&	25	D&	10	&	9.5	&
151 - 2,2',3,5,5',6-Hexachlorobiphenyl (Cl6)	0.97		3.3		5.8		3.3		3.3	
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl (Cl6)	4.7	&	22	D&	37	D&	21	D&	19	D&
156 - 2,3,3',4,4',5-Hexachlorobiphenyl (Cl6)	0.65		2.4		3.3		1.7		1.3	
157 - 2,3,3',4,4',5'-Hexachlorobiphenyl (Cl6)	0.18		1		1.7		0.57		0.93	
158 - 2,3,3',4,4',6-Hexachlorobiphenyl (Cl6)	0.023	U	0.028	U	0.036	U	0.0315	U	0.031	U
167 - 2,3',4,4',5,5'-Hexachlorobiphenyl (Cl6)	0.72		2.7		3.6		3.4		2.7	
168 - 2,3',4,4',5',6'-Hexachlorobiphenyl (Cl6)	0.023	U	0.028	U	0.036	U	0.0315	U	0.031	U
169 - 3,3',4,4',5,5'-Hexachlorobiphenyl (Cl6)	0.023	U	0.028	U	0.036	U	0.0315	U	0.031	U
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl (Cl7)	1.5		5.1		11		5		5.5	
177 - 2,2',3,3',4',5,6-Heptachlorobiphenyl (Cl7)	1		3.7		5.6		4		3.5	
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl (Cl7)	2.6	&	8.9	&	24	D&	10	&	10	&
183 - 2,2',3,4,4',5',6-Heptachlorobiphenyl (Cl7)	0.9		2.8		5.5		3.2		3.2	
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl (Cl7)	1.7		5.3		10		5.8		5.4	
189 - 2,3,3',4,4',5,5-Heptachlorobiphenyl (Cl7)	0.053		0.25		0.5		0.24		0.12	
194 - 2,2',3,3',4,4',5,5'-Octachlorobiphenyl (Cl8)	0.75		2.8		5.2		3.4		2.7	
201 - 2,2',3,3',4,4',5,5',6-Octachlorobiphenyl (Cl8)	0.87		3		6.2		3.4		3.6	
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (Cl9)	0.77		2		4.1		2.1		4.1	
Total PCBs	52.773		195.71		374.29		192.27		188.98	

All concentrations in ug/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as 1/2 Minimum Detection Limit

Table A- 9. Chollas Pesticide Data.

Pesticide Analyte	C01		C02		C03		C04		C05		C06		C07	
gamma-Chlordane	17		18		23		12		20		17		2.8	
alpha-Chlordane	12		13		14		8.9		16		12		1.8	
2,4'-DDE	0.1	U&	0.09	U&	0.095	U&	0.08	U&	0.105	U&	0.115	U&	0.06	U&
4,4'-DDE	15		16		18		11		17		15		2.2	
2,4'-DDD	2.5		2.8		4		2.1		3.1		2.9		0.55	
4,4'-DDD	5.5	&	8	&	7.7	&	4.4	&	7.6	&	6.1	&	1.2	&
2,4'-DDT	2.5	&	3.5	&	2.3	&	1.7	&	2.6	&	2.6	&	0.52	&
4,4'-DDT	3.2	&	14	&	6.9	&	2.7	&	3.1	&	3.6	&	0.52	&
Total Chlordane	29		31		37		20.9		36		29		4.6	
Total DDT	28.8		44.39		38.995		21.98		33.505		30.315		5.05	

Pesticide Analyte	C08		C09		C10		C11		C12		C13		C14	
gamma-Chlordane	4.5		12		13		6.2		19		50	D	65	D
alpha-Chlordane	3.4		8.3		8.7		4.2		11		39	D	54	D
2,4'-DDE	0.06	U&	0.085	U&	0.09	U&	0.06	U&	0.095	U&	0.09	U&	4	&
4,4'-DDE	3.4		11		12		4.7		13		38	D	51	D
2,4'-DDD	0.8		2.4		3.2		1.1		4.6		7.1		9.8	
4,4'-DDD	1.7	&	5.3	&	4.9	&	2.6	&	9	&	16	&	25	&
2,4'-DDT	0.87	&	1.7	&	2.2	&	0.66	&	1.4	&	6.2	&	13	&
4,4'-DDT	1.1	&	2.3	&	2.1	&	0.52	&	5.3	&	11	&	20	&
Total Chlordane	7.9		20.3		21.7		10.4		30		89		119	
Total DDT	7.93		22.785		24.49		9.64		33.395		78.39		122.8	

All concentrations in ug/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as 1/2 Minimum Detection Limit

Table A- 10. Paleta Pesticide Data.

Pesticide Analyte	P01		P02		P03		P04		P05		P06		P07	
gamma-Chlordane	0.45		1.2		0.75		2.5		2.5		1.8		2.7	
alpha-Chlordane	0.17		0.62		0.42		1.2		1.4		1		1.5	
2,4'-DDE	0.0395	U&	0.065	U&	0.043	U&	0.055	U&	0.055	U&	0.055	U&	0.06	U&
4,4'-DDE	0.96		2.8		2		3.9		6.3		4.8		5.1	
2,4'-DDD	0.31		0.77		0.5		1		1.5		1.3		1.4	
4,4'-DDD	0.35		0.65		0.56		1.3		3.6		1.8		1.6	
2,4'-DDT	0.0395	U&	0.065	U&	0.043	U&	0.055	U&	0.055	U&	0.7	&	0.06	U&
4,4'-DDT	3.2	&	0.43	&	0.18	&	0.95	&	14	&	1.3	&	4.1	&
Total Chlordane	0.62		1.82		1.17		3.7		3.9		2.8		4.2	
Total DDT	4.899		4.78		3.326		7.26		25.51		9.955		12.32	

Pesticide Analyte	P08		P09		P10		P11		P12		P13		P14	
gamma-Chlordane	2.3		0.16		3.6		14		6.2		2.1		11	
alpha-Chlordane	0.94		0.1	J	2.2		7.5		3.6		1.1		5.6	
2,4'-DDE	0.055	U&	0.0365	U&	0.038	U&	9.9	&	0.055	U&	0.0345	U&	0.0425	U&
4,4'-DDE	3.8		0.39		4.5		27	D	9.2		3.1		14	
2,4'-DDD	1.2		0.13	J	1.4		5.7		2.3		0.86		3.5	
4,4'-DDD	2.2		0.14	J	1.9		11	D	4.9		1.5		6.3	
2,4'-DDT	0.055	U&	0.07	J&	0.038	U&	0.044	U&	0.055	U&	0.25	&	0.0425	U&
4,4'-DDT	0.74	&	1.2	&	0.83	&	0.7	&	1.4	&	0.6	&	4.7	&
Total Chlordane	3.24		0.26		5.8		21.5		9.8		3.2		16.6	
Total DDT	8.05		1.9665		8.706		54.344		17.91		6.3445		28.585	

Pesticide Analyte	P15	P16	P17
gamma-Chlordane	23 D	13	6.4
alpha-Chlordane	11	9.1	7.8
2,4'-DDE	0.055 U&	0.048 U&	0.047 U&
4,4'-DDE	28 D	21 D	17 D
2,4'-DDD	6.8	5.2	4.8
4,4'-DDD	15 D	12 D	12 D
2,4'-DDT	0.055 U&	0.048 U&	0.047 U&
4,4'-DDT	1.3 &	7.5 &	30 D&
Total Chlordane	34	22.1	14.2
Total DDT	51.21	45.796	63.894

All concentrations in ug/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as 1/2 Minimum Detection Limit

Table A- 11. Chollas-Paleta Study Reference Station Physical and Metal Data.

Analyte	2231		2243		2433**		2440		2441*		2238	
Fines	41.24		30.25		38.44		26.40		82.83		69.00	
TOC	1.000		0.56		0.53		1.040		1.82		1.01	
Al	63600		72900		73900		67700		71300		81200	
Sb	0.725	&	0.593	&	0.561	&	0.741	&	0.783	&	0.8373	
As	7.78		5.94		5.55		4.65		8.82		7.8	
Ba	471		479		527.5		542		484		419	
Be	1.01		1.08		1.12		0.967		1.2		1.325	
Cd	0.025		0.143		0.288		0.313		0.411		0.1328	
Cr	46.6		40.2		42.15		38.1		54		59.2	
Cu	71.1		56.4		43.3		44.4		78.4		71	
Fe	30700		27500		29950		25000		38600		44600	
Pb	40.3		30.7		23.25		63.8		26.7		28.79	
Ni	11.5		10.2		11.15		8.72		17.5		16.46	
Hg	0.364	&	0.332	&	0.2505	&	0.262	&	0.238	&	0.262	
Ag	0.288	&	0.651	&	0.3845	&	0.385	&	0.388	&	0.51	&
Se	0.228	J	0.095	J	0.18	J	0.144	J	0.546		0.234	J
Zn	129		125		114.5		115		143		214.3	

***first value of lab duplicates**
****mean of field duplicates**
All concentrations in mg/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the proc
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as Minimum Detection Limit

Table A- 12. Chollas-Paleta Study Reference Station PAH Data.

PAH Analyte	2231		2243		2433		2440		2441		2238	
Naphthalene	5.5	&	2.1	JB&	3.1	&	29	&	3.4	J&	2	&
C1-Naphthalenes	2.2		0.97	JB	3.1		34		3.9	J	0.86	J&
C2-Naphthalenes	3		1.3	J	6		45		8.2		1.3	&
C3-Naphthalenes	4.4		2.2		6.1		27		6.7		1.4	&
C4-Naphthalenes	4.5		1.3	J	4.7		28		5.8		1.4	&
Acenaphthylene	12		2.6		6		19		16		1.8	&
Acenaphthene	2.6	&	0.87	J&	1.5	J&	190	&	12	&	0.42	J&
Biphenyl	1.1	J	0.39	JB	0.72	J	5.2		2.4	J	0.38	J&
Fluorene	4.8	&	1.2	J&	3.1	J&	130	&	21	&	1.2	&
C1-Fluorenes	2.8	&	0.4	U&	0.53	U&	25	&	6.4	&	0.18	U&
C2-Fluorenes	5.7		0.4	U	0.53	U	30		6.5		0.18	U&
C3-Fluorenes	11		0.4	U	7.5		80		20		0.18	U&
Anthracene	30	&	4.5	&	18	&	130	&	88	&	2.9	
Phenanthrene	29	&	7.8	&	21	&	520	&	92	&	7.9	
C1-Phenanthrenes/anthracenes	24		5.2		18		150		53		4.3	
C2-Phenanthrenes/anthracenes	24		5.6		16		120		35		4.3	
C3-Phenanthrenes/anthracenes	14		5.7		10		100		23		3.7	
C4-Phenanthrenes/anthracenes	35		6		26		210		72		5.6	
Dibenzothiophene	1.8	J&	0.6	J&	1.4	J&	44	&	6.5	&	0.7	J
C1-Dibenzothiophenes	3		0.91	J	2.2	J	23		4.5		0.86	J
C2-Dibenzothiophenes	6.7		2.2		5.1		39		7.5		1.4	
C3-Dibenzothiophenes	6.8		2.5		5.1		58		9.2		1.9	
Fluoranthene	96	&	26	&	78	&	880	D&	250	&	28	
Pyrene	110	&	27	&	89	&	840	D&	270	&	32	
C1-Fluoranthenes/pyrenes	84		15		66		450		220		12	
C2-Fluoranthenes/pyrenes	40		8.2		34		240		99		9.3	
C3-Fluoranthenes/pyrenes	20		4.8		16		140		51		4.6	
Benzo[a]anthracene	77		13		58		350		150		8.2	
Chrysene	110	&	18	&	86	&	550	&	290	&	13	
C1-Chrysenes	43		8.3		32		180		99		5.2	
C2-Chrysenes	24		6.1		19		150		57		3.8	
C3-Chrysenes	20		6.2		15		140		39		4	
C4-Chrysenes	23		5.5		9.1		90		23		4.1	
Benzo[b]fluoranthene	180	&	55	&	140	&	580	&	390	&	28	&
Benzo[k]fluoranthene	63	&	11	&	51	&	190	&	110	&	5.5	
Benzo[e]pyrene	110		29		72		310		170		17	
Benzo[a]pyrene	120		28		90		360		220		19	
Perylene	32		7.3		24		120		64		5.2	
Indeno[1,2,3,-c,d]pyrene	100		32		62		270		110		21	
Dibenzo[a,h]anthracene	23		5.8		14		69		30		3.2	
Benzo[g,h,i]perylene	100		32		59		280		91		25	
TPAH	1591		387		1166		8061		3208		288	
PPPAH	1063		267		780		5387		2143		199	
LMWPAH	86		20		56		1052		236		17	
HMWPAH	536		118		415		3049		1210		103	

All concentrations in ug/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as Minimum Detection Limit

Table A- 13. Chollas-Paleta Study Reference Station PCB and Pesticide Data (µg/kg).

Analyte	2231	2243	2433*	2440	2441	2238
18 - 2,2',5-Trichlorobiphenyl (Cl3)	0.13	0.15	0.51	1.2	0.93	0.02
28 - 2,4,4'-Trichlorobiphenyl (Cl3)	0.08	0.28	0.5	1.1	0.85	0.09
37 - 3,4,4'-Trichlorobiphenyl (Cl3)	0.85	0.25	0.58	2.9	0.57	0.28
44 - 2,2',3,5'-Tetrachlorobiphenyl (Cl4)	0.45	0.15	0.41	8.1	0.46	0.19
49 - 2,2',4,5'-Tetrachlorobiphenyl (Cl4)	0.07	0.27	0.38	4	0.62	0.34
52 - 2,2',5,5'-Tetrachlorobiphenyl (Cl4)	0.08	0.38	0.52	11	0.72	0.29
66 - 2,3',4,4'-Tetrachlorobiphenyl (Cl4)	0.68	0.33	0.68	3.6	0.89	0.37
70 - 2,3',4',5 -Tetrachlorobiphenyl (Cl4)	0.11	0.25	0.64	9.4	0.8	0.46
74 - 2,2,4',5 -Tetrachlorobiphenyl (Cl4)	0.7	0.18	0.41	4.2	0.76	0.23
81 - 3,4,4',5 -Tetrachlorobiphenyl (Cl4)	0.45	0.25	0.4	9.5	0.6	0.25
77 - 3,3',4,4'-Tetrachlorobiphenyl (Cl4)	0.99	0.11	0.64	11	0.64	0.20
87 - 2,2'3,4,5'-Pentachlorobiphenyl (Cl5)	0.39	0.2	0.31	6.5	0.34	0.16
99 - 2,2',4,4',5-Pentachlorobiphenyl (Cl5)	1.3	0.79	0.91	8.3	1	0.75
101 - 2,2',4,5,5'-Pentachlorobiphenyl (Cl5)	2.6	1.1	1.4	20	1.8	0.72
105 - 2,3,3',4,4'-Pentachlorobiphenyl (Cl5)	0.96	0.33	0.72	14	0.66	0.32
110 - 2,3,3',4',5-Pentachlorobiphenyl (Cl5)	1.5	0.67	0.83	21	1.2	0.39
114 - 2,3,4,4',5-Pentachlorobiphenyl (Cl5)	0.9	0.14	0.16	7	0.24	0.04
118 - 2,3',4,4',5-Pentachlorobiphenyl (Cl5)	2.9	1.2	1.5	19	1.8	0.62
119 - 2,3',4,4',6-Pentachlorobiphenyl (Cl5)	0.13	0.06	0.07	0.8	0.07	0.04
123 - 2',3,4,4',5-Pentachlorobiphenyl (Cl5)	0.64	0.41	0.83	4	1.7	0.04
126 - 3,3',4,4',5-Pentachlorobiphenyl (Cl5)	0.08	0.09	0.12	0.13	0.16	0.04
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl (Cl6)	0.81	0.3	0.37	5.4	0.92	0.16
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl (Cl6)	4.5	2.1	2.6	24	2.7	0.96
149 - 2,2',3,4',5',6-Hexachlorobiphenyl (Cl6)	2.2	1.1	1.2	10	1.2	0.76
151 - 2,2',3,5,5',6-Hexachlorobiphenyl (Cl6)	0.89	0.38	0.59	3.8	0.55	0.17
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl (Cl6)	4.3	2.7	3	35	3.2	1.30
156 - 2,3,3',4,4',5-Hexachlorobiphenyl (Cl6)	0.38	0.11	0.26	4.6	0.32	0.06
157 - 2,3,3',4,4',5'-Hexachlorobiphenyl (Cl6)	0.1	0.04	0.05	1.20	0.01	0.03
158 - 2,3,3',4,4',6-Hexachlorobiphenyl (Cl6)	1.5	2.2	0.64	3.7	2	0.03
167 - 2,3',4,4',5,5'-Hexachlorobiphenyl (Cl6)	0.43	0.21	0.35	3.9	0.44	0.13
168 - 2,3',4,4',5',6'-Hexachlorobiphenyl (Cl6)	0.07	0.08	0.10	0.11	0.14	0.03
169 - 3,3',4,4',5,5'-Hexachlorobiphenyl (Cl6)	0.07	0.08	0.10	0.11	0.14	0.03
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl (Cl7)	1.6	0.53	0.77	4.8	0.68	0.26
177 - 2,2',3,3',4',5,6-Heptachlorobiphenyl (Cl7)	0.81	0.44	0.58	2.8	0.65	0.31
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl (Cl7)	2.2	0.72	1.2	6.6	0.88	0.30
183 - 2,2',3,4,4',5',6-Heptachlorobiphenyl (Cl7)	0.51	0.3	0.42	2	0.44	0.12
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl (Cl7)	1.9	1	1.1	3.8	1.2	0.52
189 - 2,3,3',4,4',5,5-Heptachlorobiphenyl (Cl7)	0.05	0.01	0.05	0.22	0.07	0.03
194 - 2,2',3,3',4,4',5,5'-Octachlorobiphenyl (Cl8)	0.84	0.24	0.35	1.6	0.31	0.11
201 - 2,2',3,3',4,4',5,5',6-Octachlorobiphenyl (Cl8)	1.3	0.43	0.61	1.8	0.54	0.21
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (Cl9)	2.3	0.17	0.21	0.8	0.32	0.08
Total PCB	42.7	20.7	27.1	283	33.5	11.4
gamma-Chlordane	0.64	0.11	0.39	10	0.72	0.14
alpha-Chlordane	0.27	0.095	0.18	6.2	0.11	0.043
2,4'-DDE	0.21	0.11	0.145	0.165	0.205	0.05
4,4'-DDE	1.5	0.57	1.1	6.6	1.9	0.7
2,4'-DDD	0.4	0.15	0.22	2.9	0.34	0.16
4,4'-DDD	1.5	0.33	0.34	8.7	0.41	0.081
2,4'-DDT	0.62	0.2	0.18	2.1	0.72	0.074
4,4'-DDT	6.7	0.18	0.11	1.1	0.21	0.23
Total Chlordane	0.91	0.205	0.57	16.2	0.83	0.183
Total DDT	10.93	1.54	2.10	21.6	3.79	1.30

*mean of field duplicates

A2 - SEDIMENT CHEMISTRY DATA PLOTS

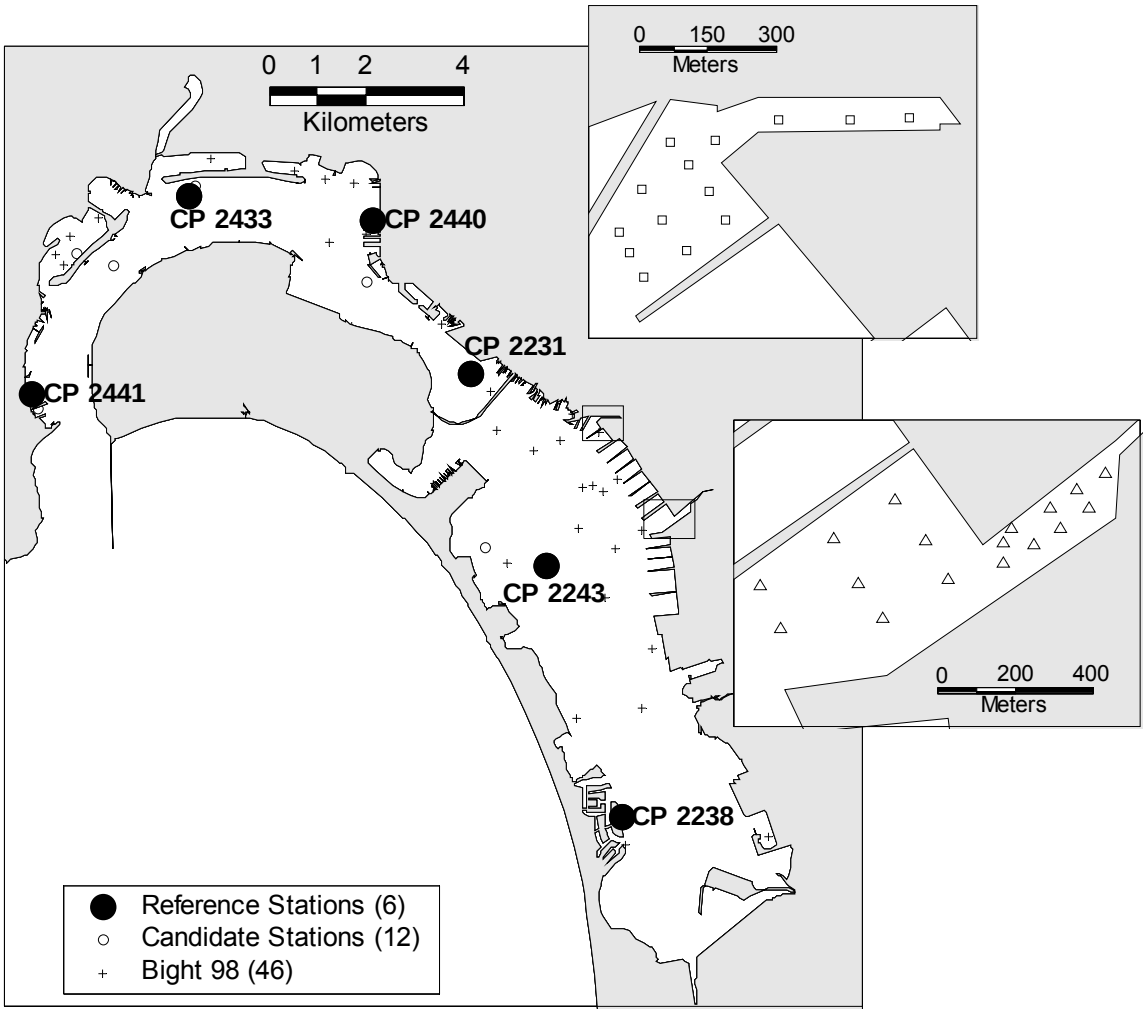
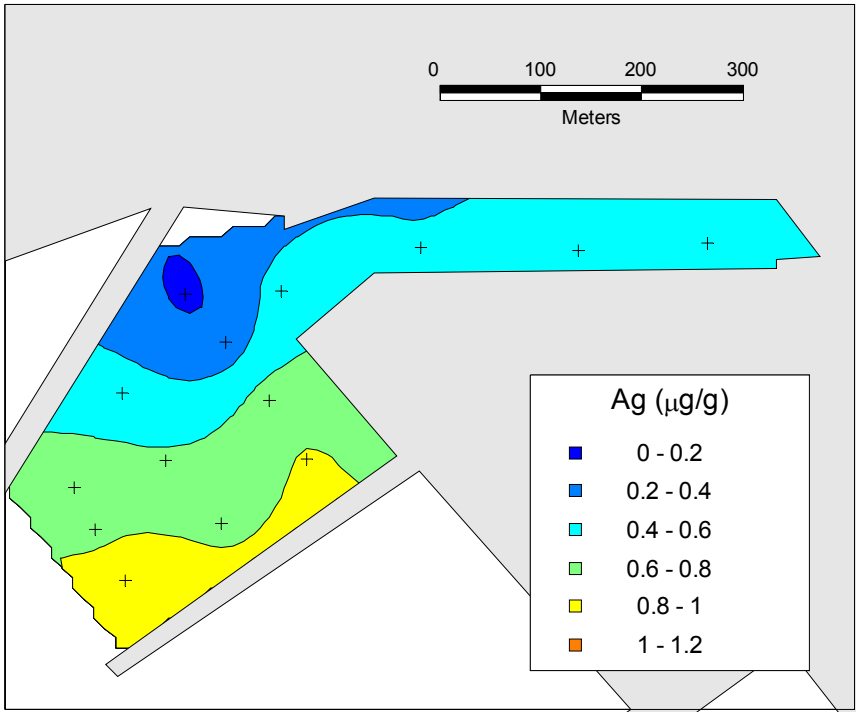


Figure A-1. Distribution of reference, Chollas, and Paleta stations in San Diego Bay.



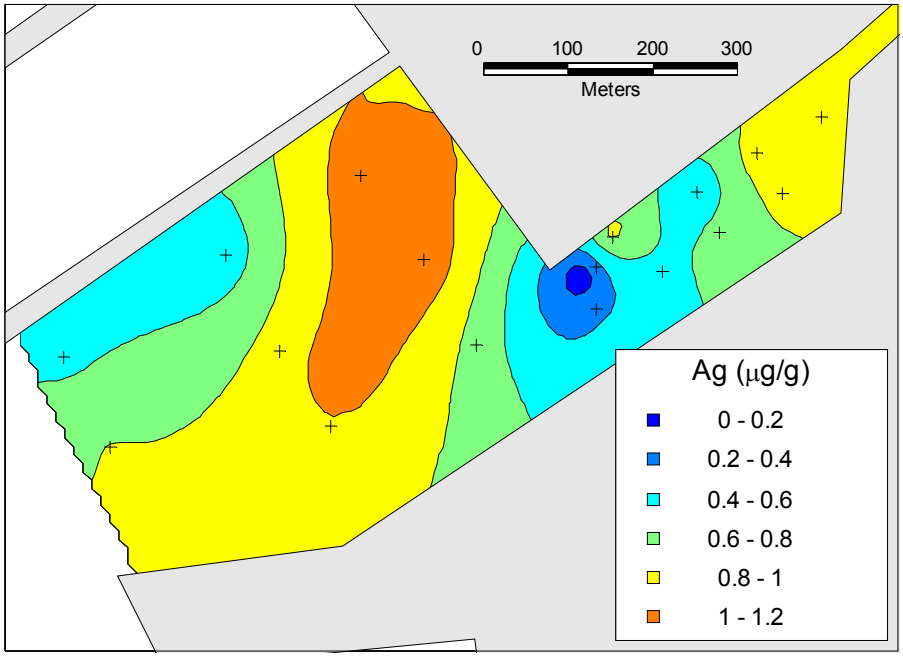
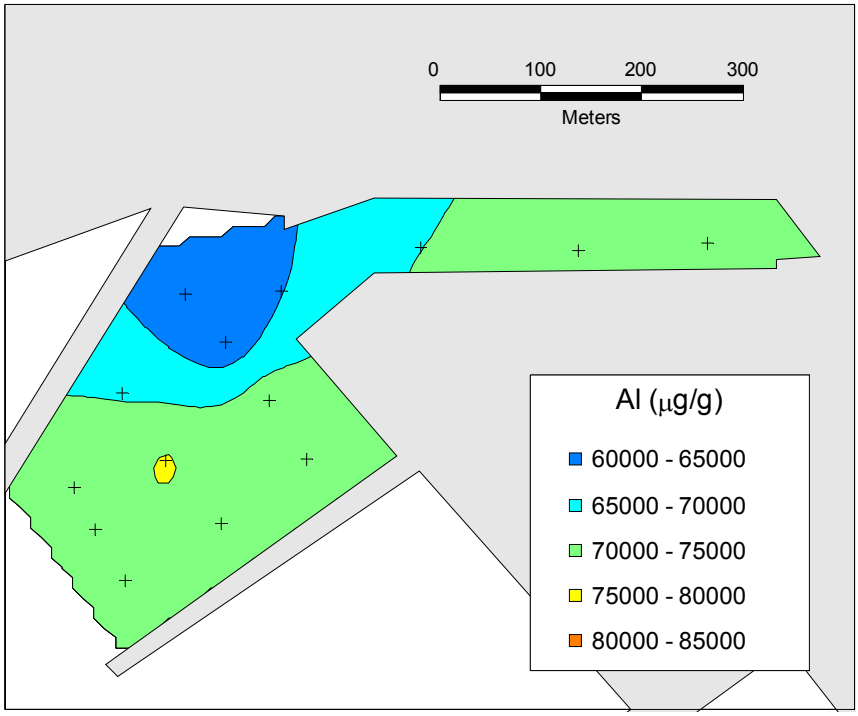


Figure A-2. Distribution of silver at the Chollas and Paleta sites.



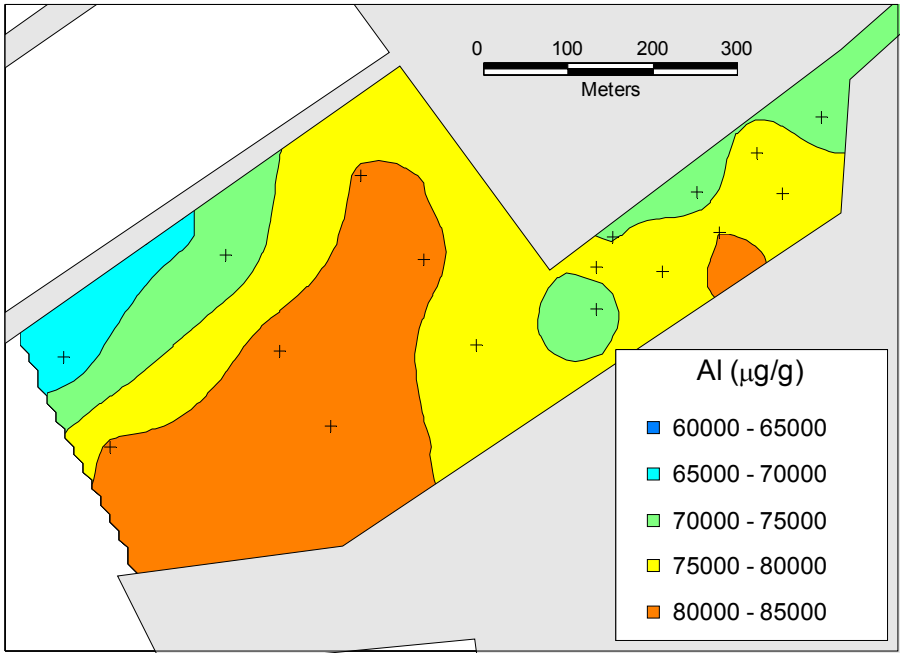
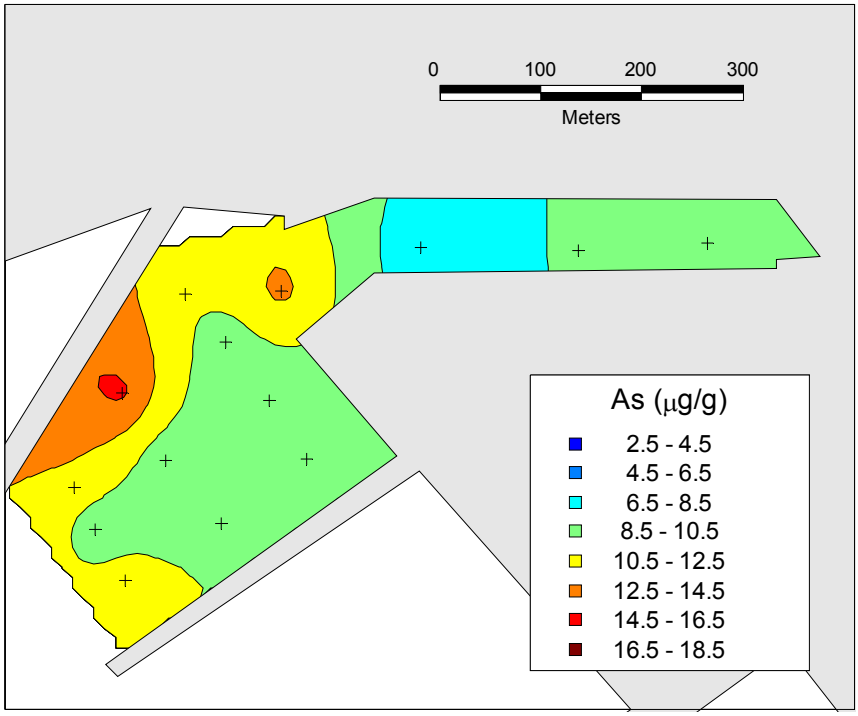


Figure A-3. Distribution of aluminum at the Chollas and Paleta sites.



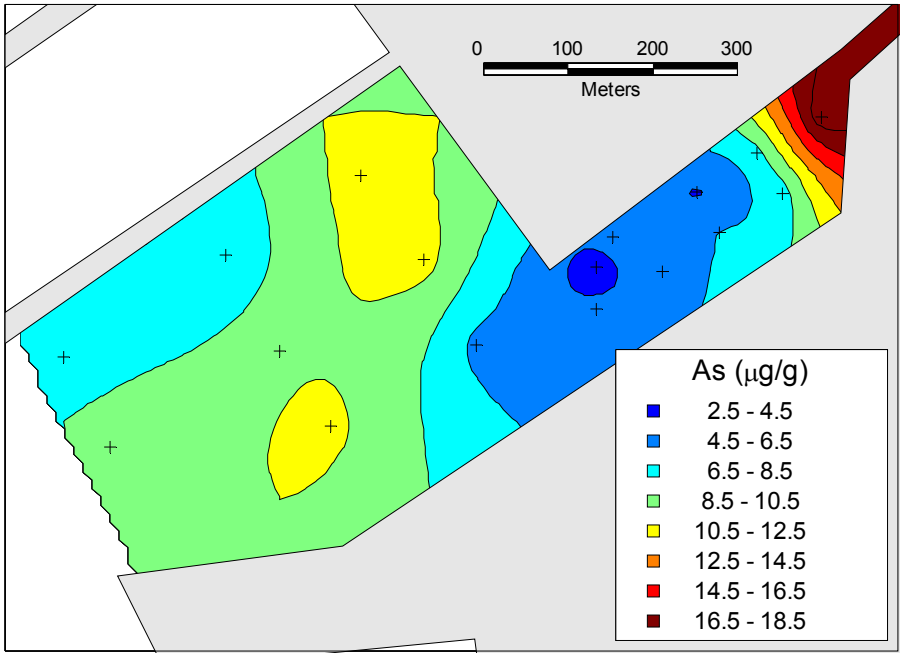
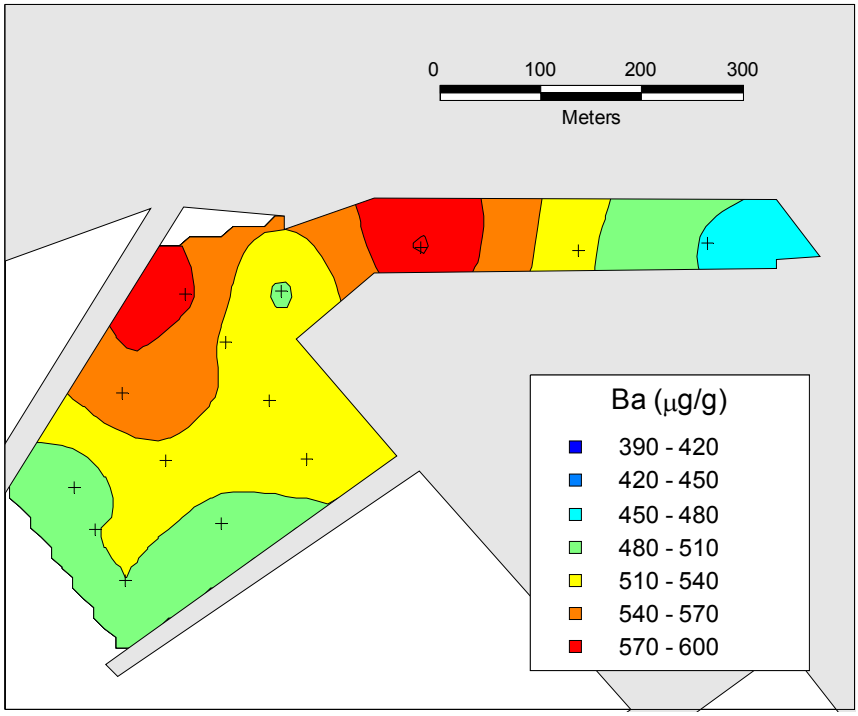


Figure A-4. Distribution of arsenic at the Chollas and Paleta sites.



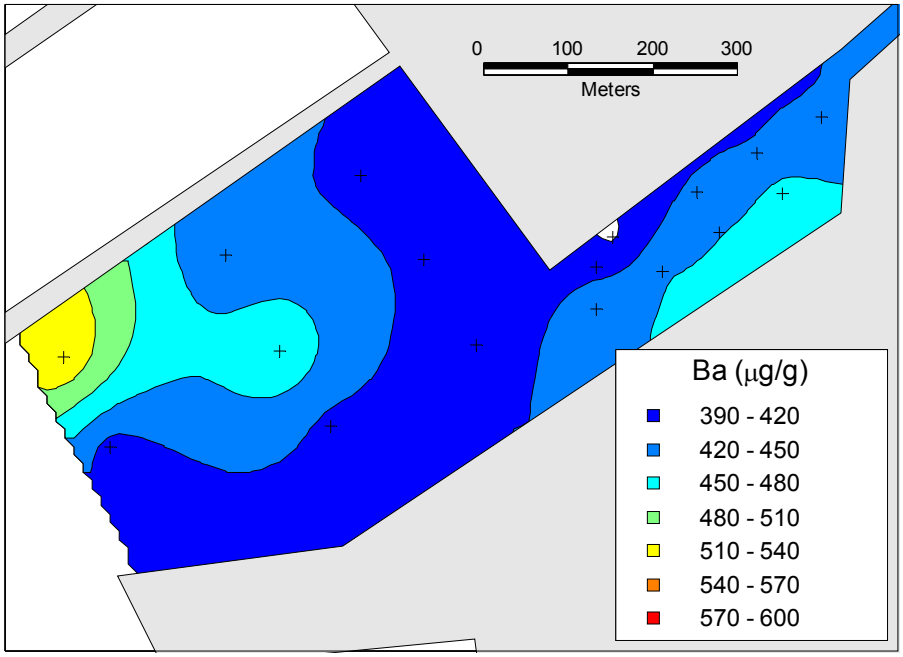
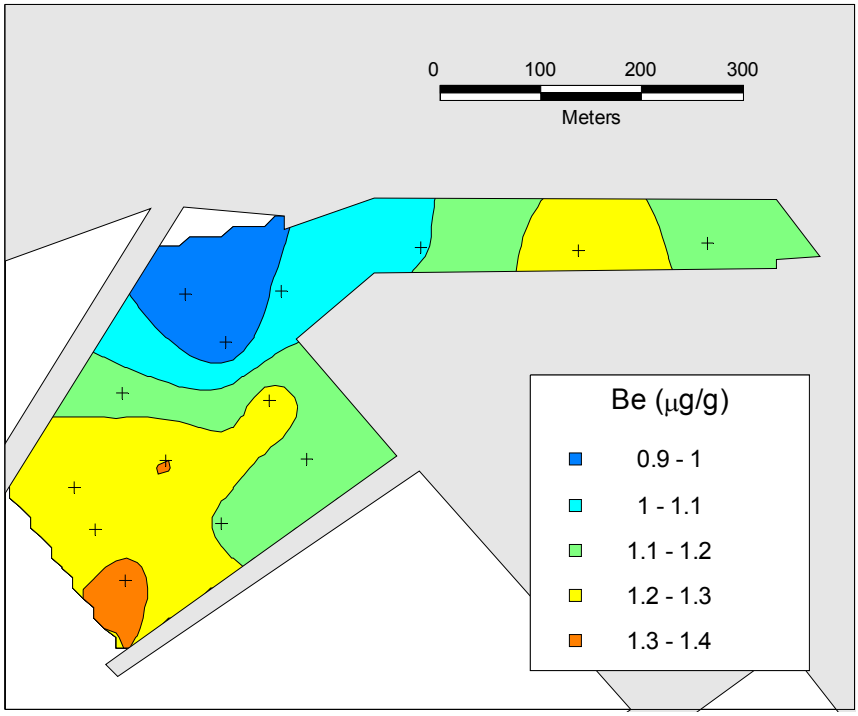


Figure A-5. Distribution of barium at the Chollas and Paleta sites.



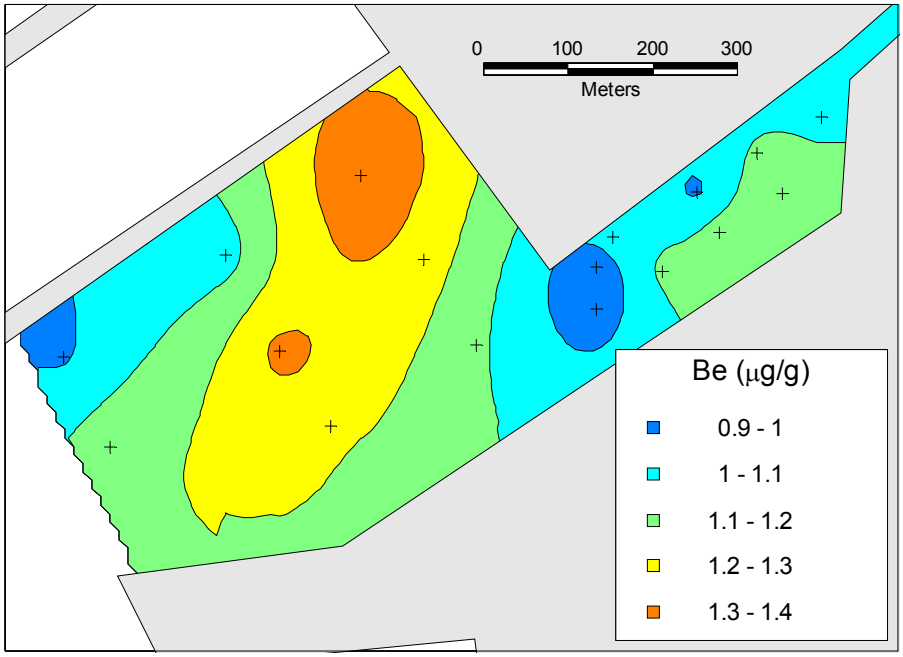
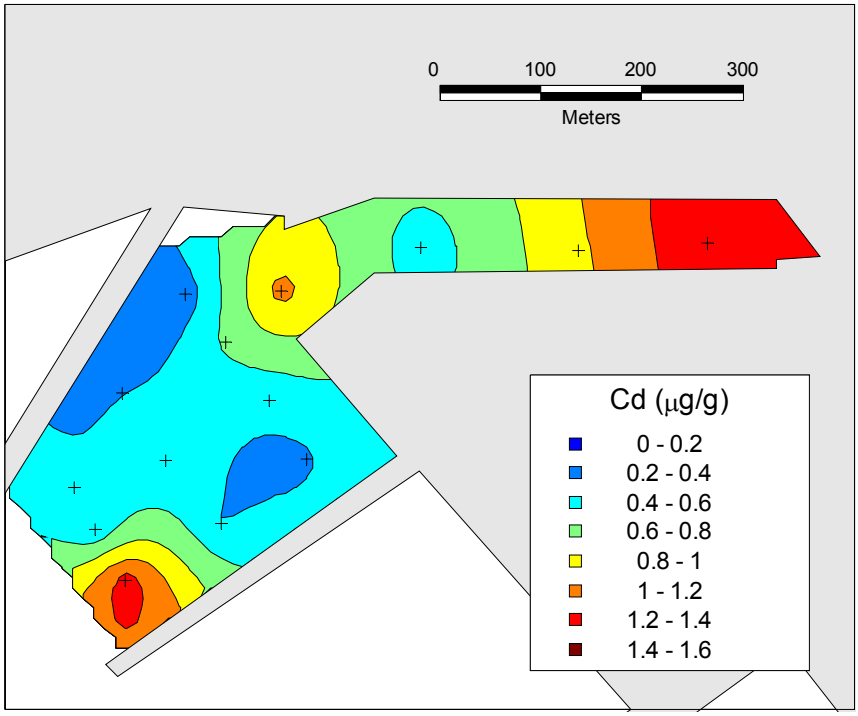


Figure A-6. Distribution of beryllium at the Chollas and Paleta sites.



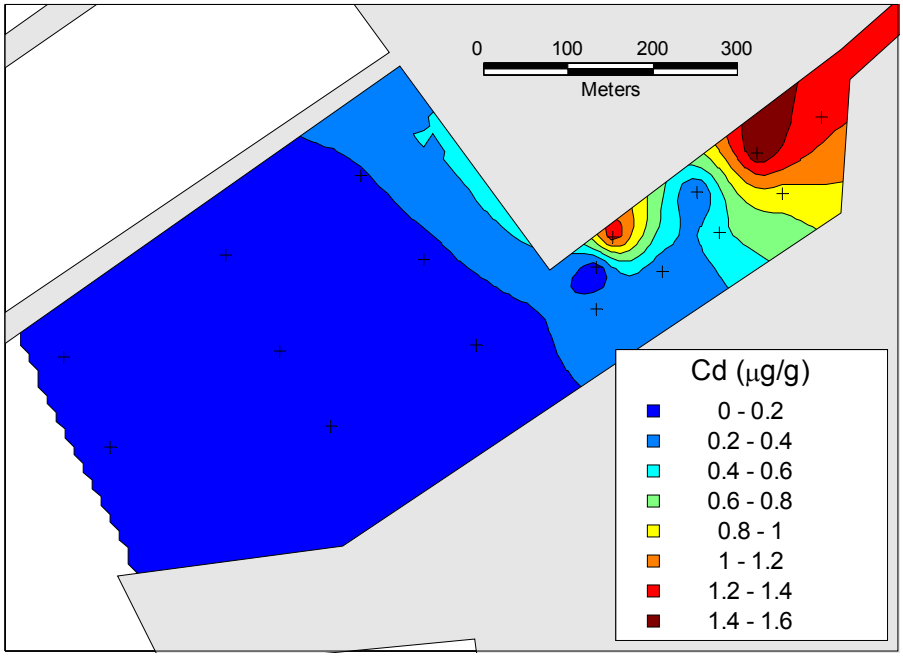
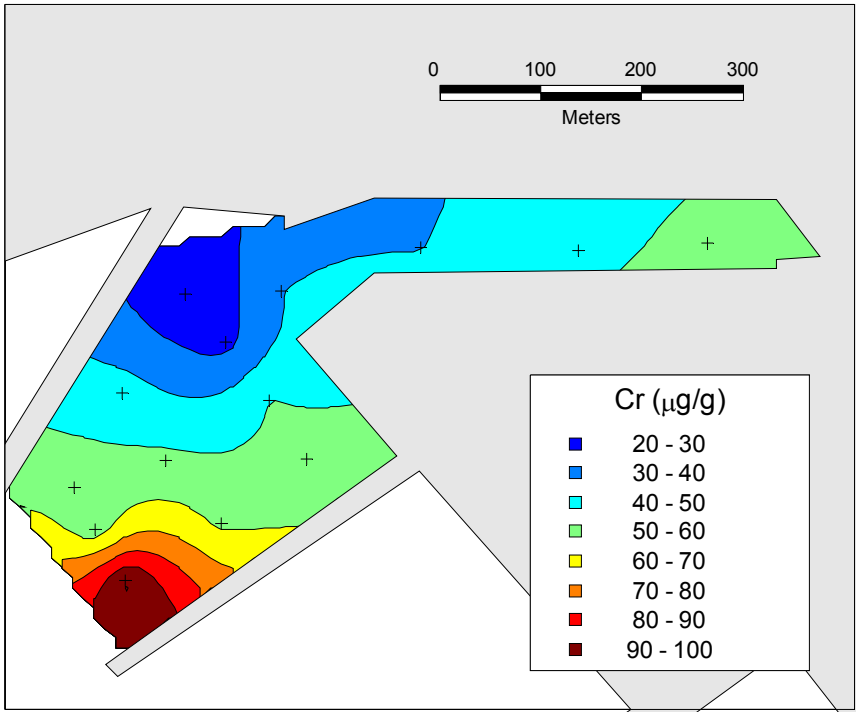


Figure A-7. Distribution of cadmium at the Chollas and Paleta sites.



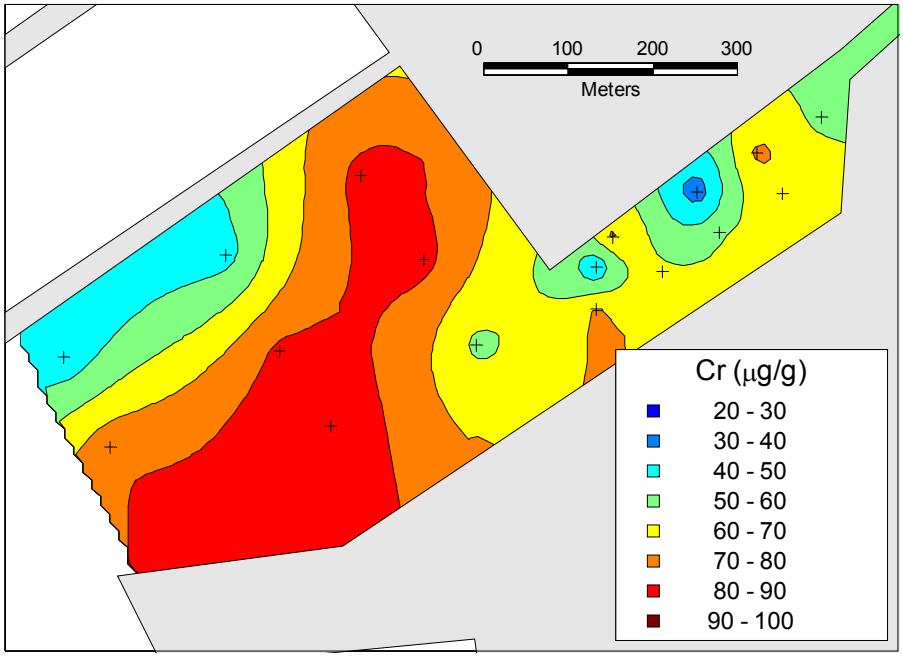
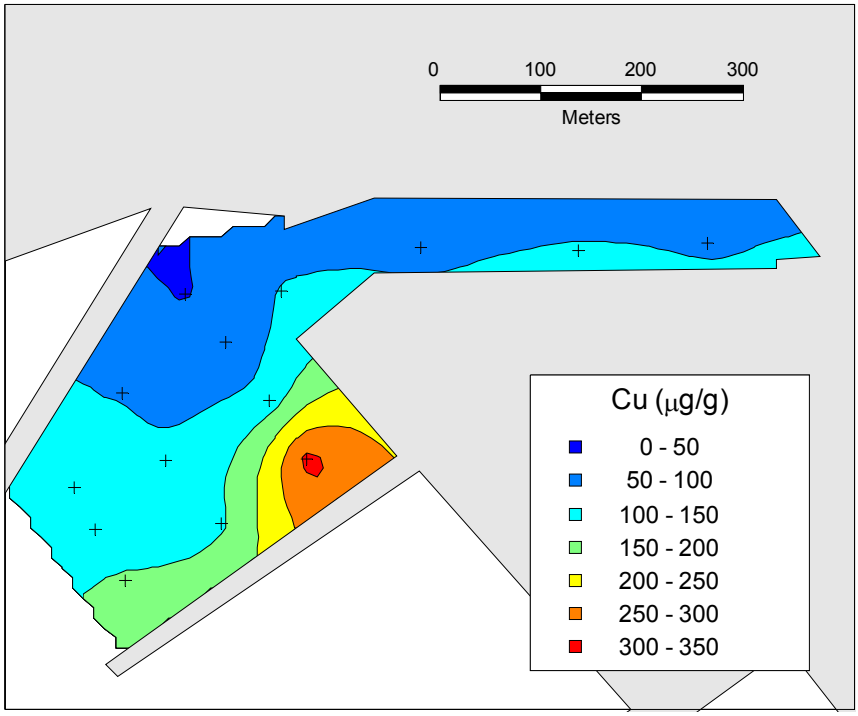


Figure A-8. Distribution of chromium at the Chollas and Paleta sites.



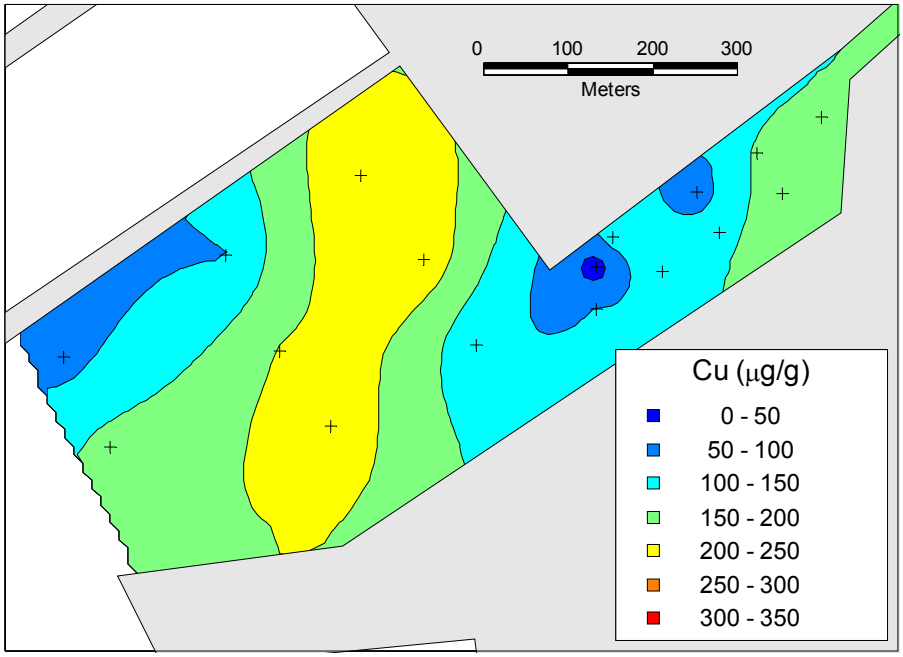
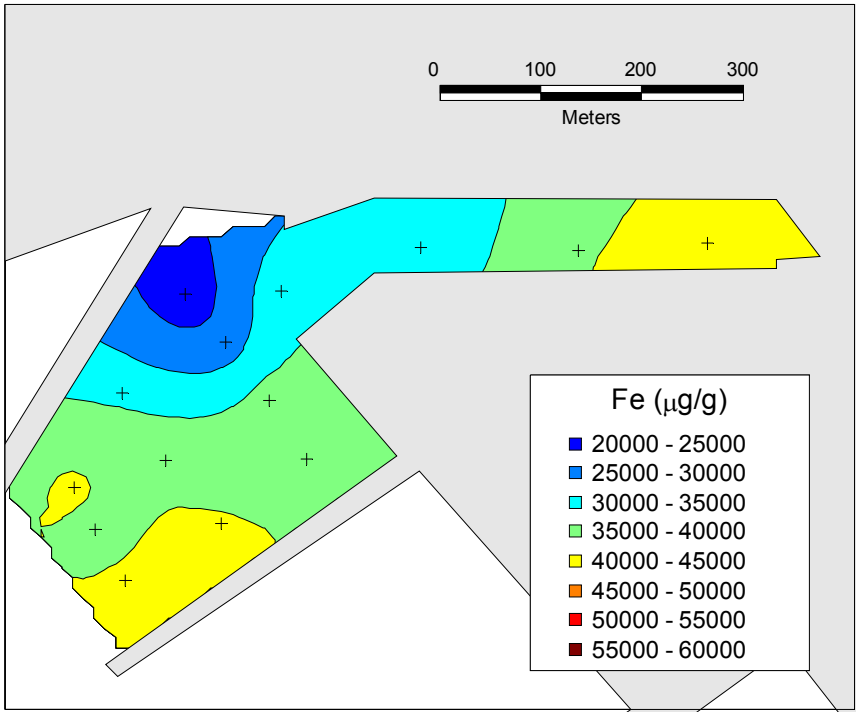


Figure A-9. Distribution of copper at the Chollas and Paleta sites.



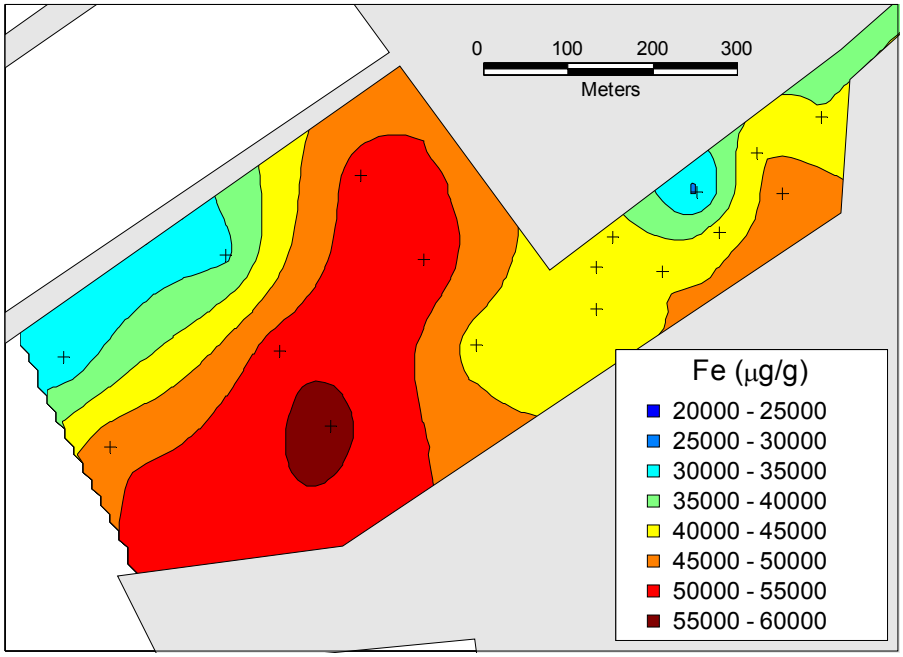
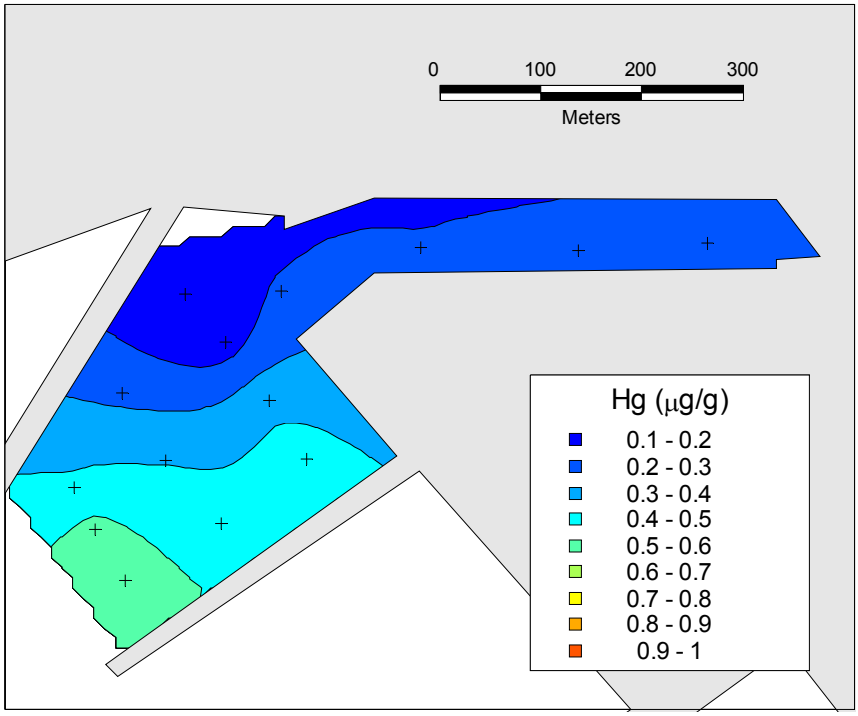


Figure A-10. Distribution of iron at the Chollas and Paleta sites.



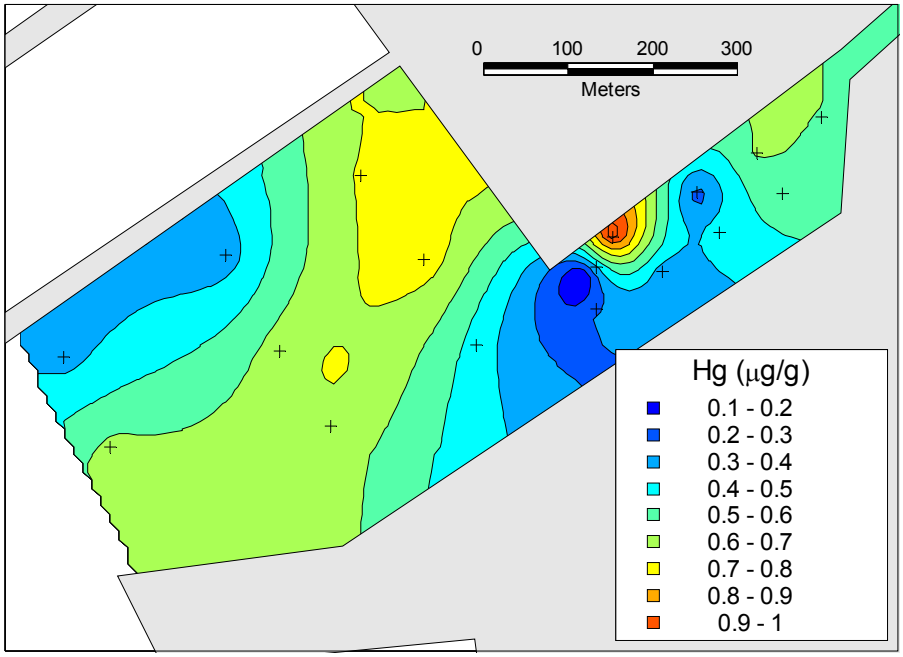
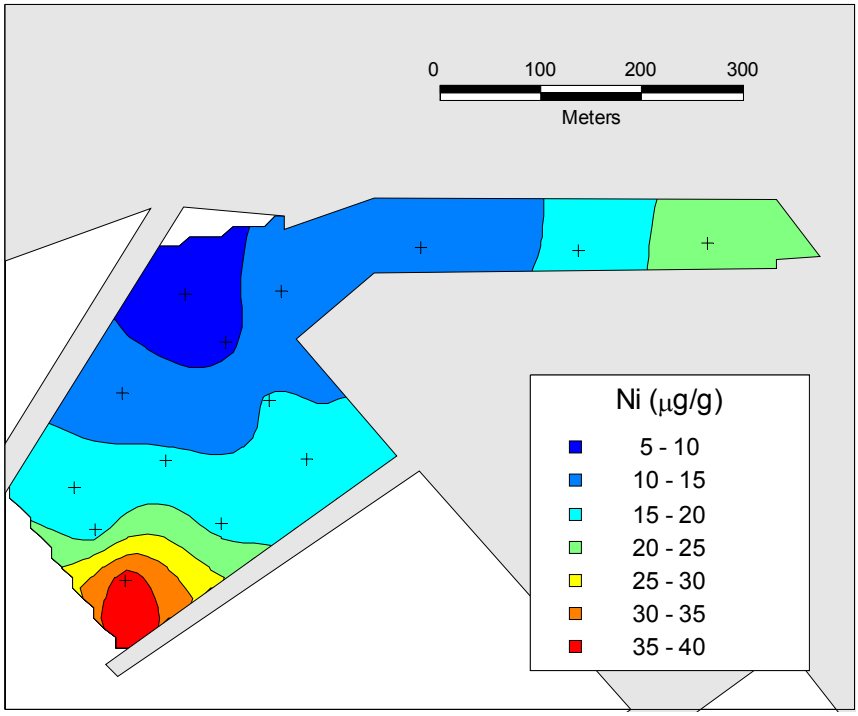


Figure A-11. Distribution of mercury at the Chollas and Paleta sites.



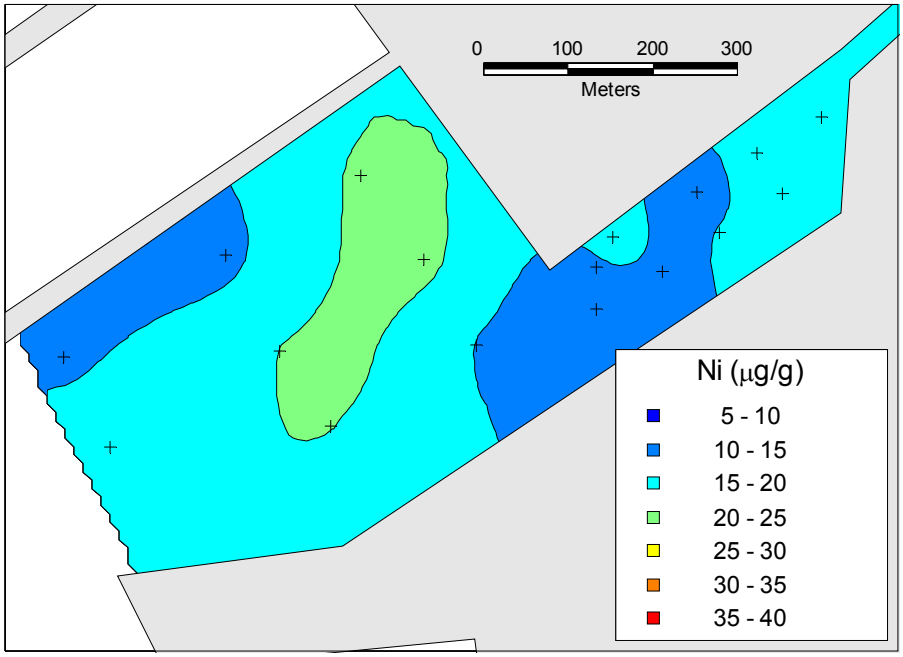
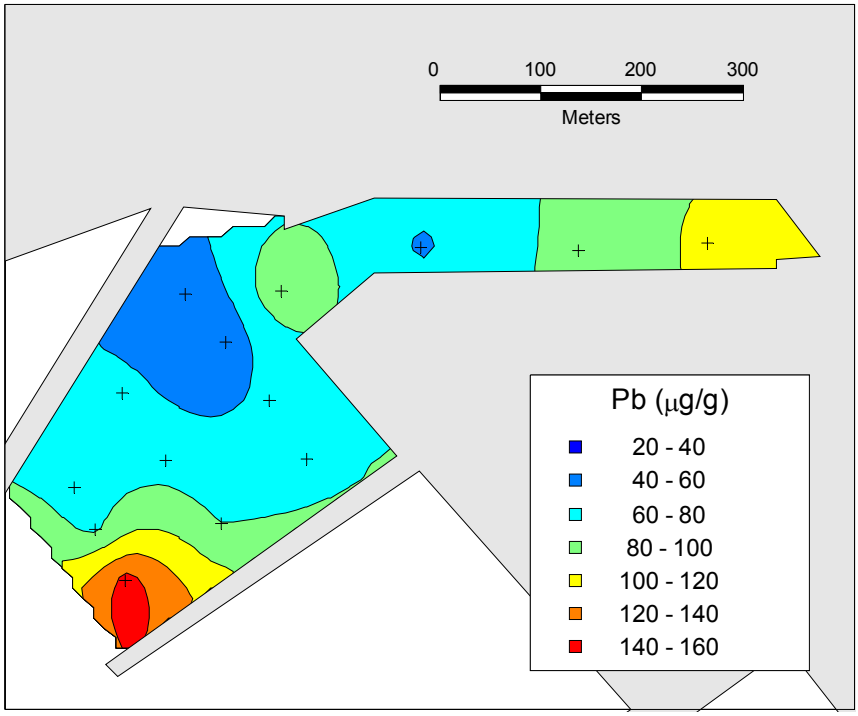


Figure A-12. Distribution of nickel at the Chollas and Paleta sites.



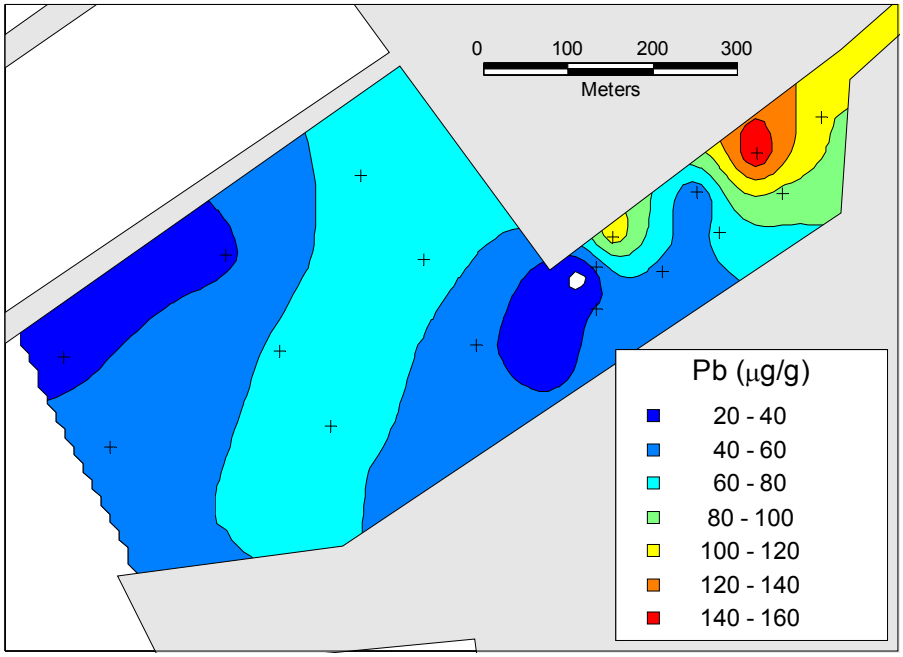
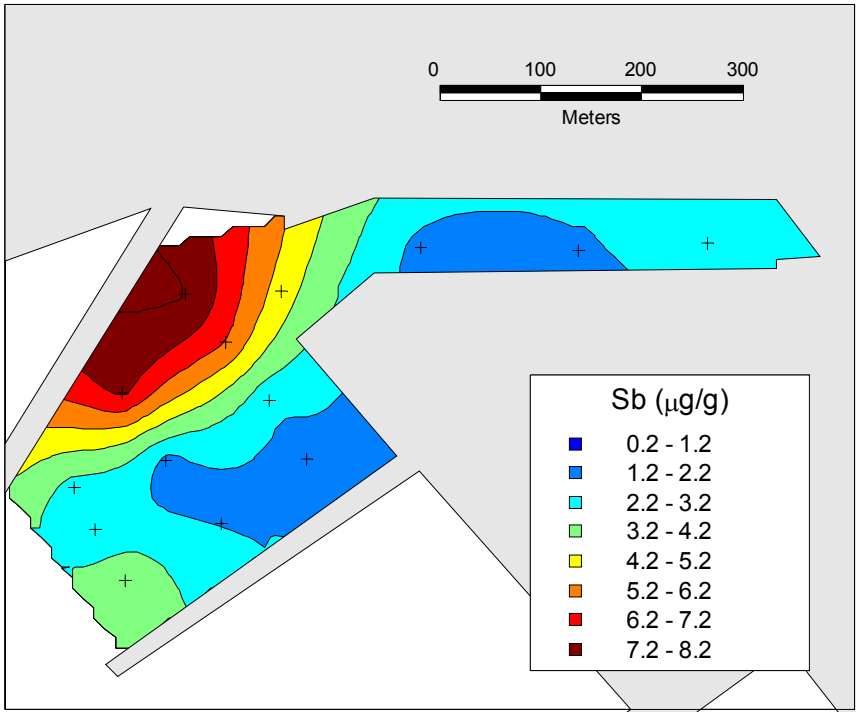


Figure A-13. Distribution of lead at the Chollas and Paleta sites.



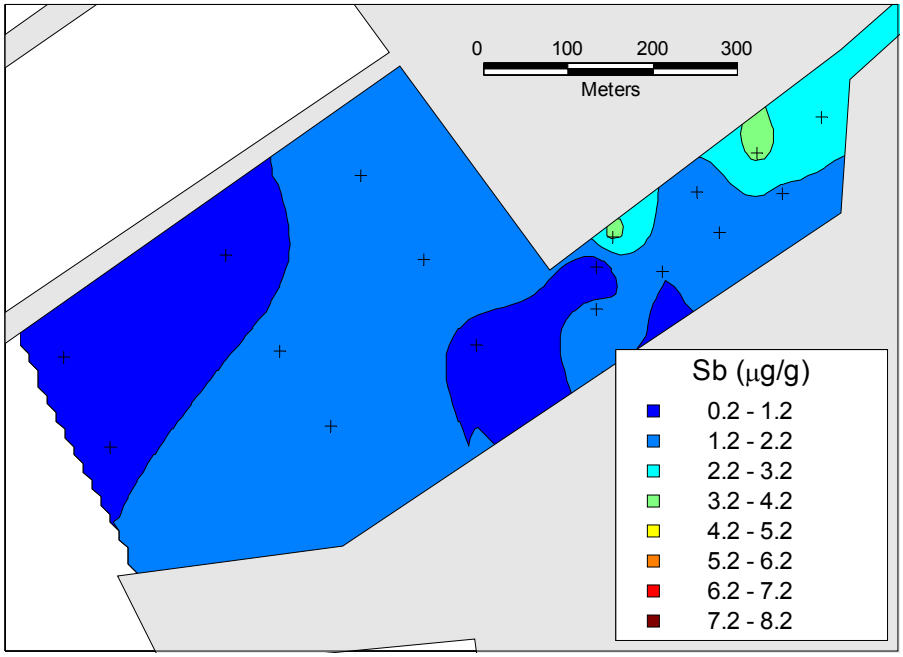
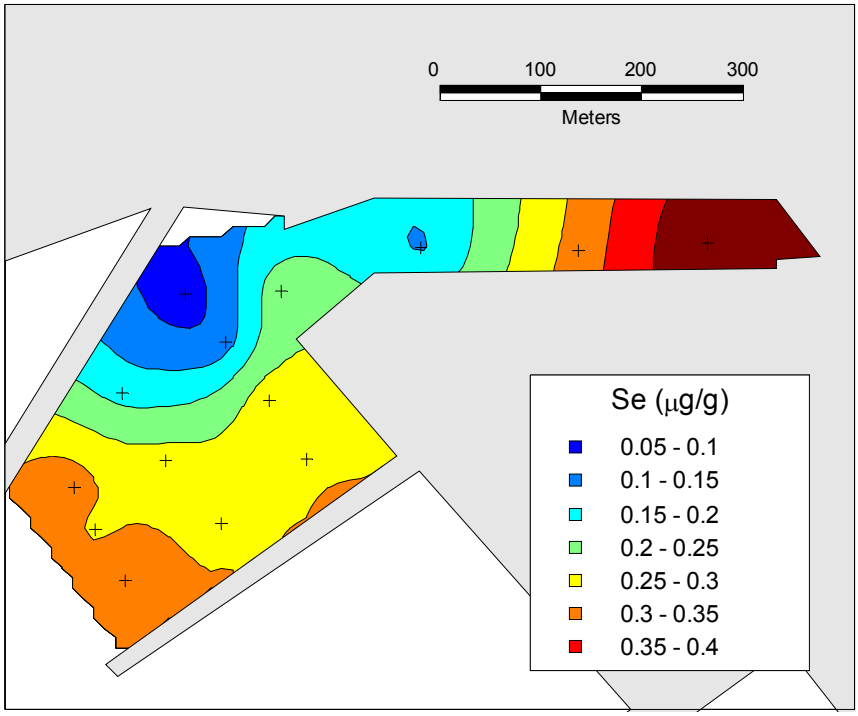


Figure A-14. Distribution of antimony at the Chollas and Paleta sites.



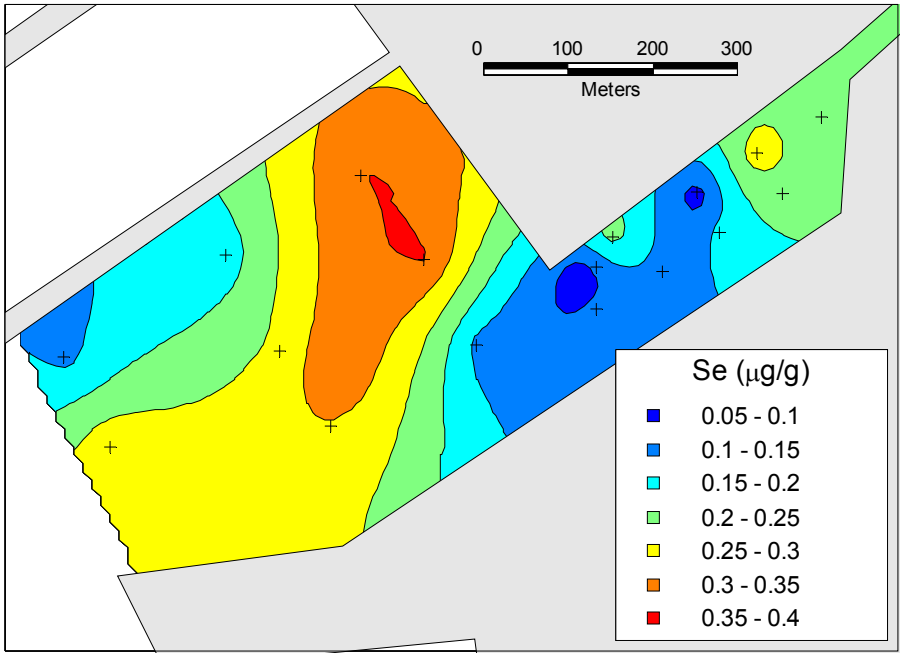
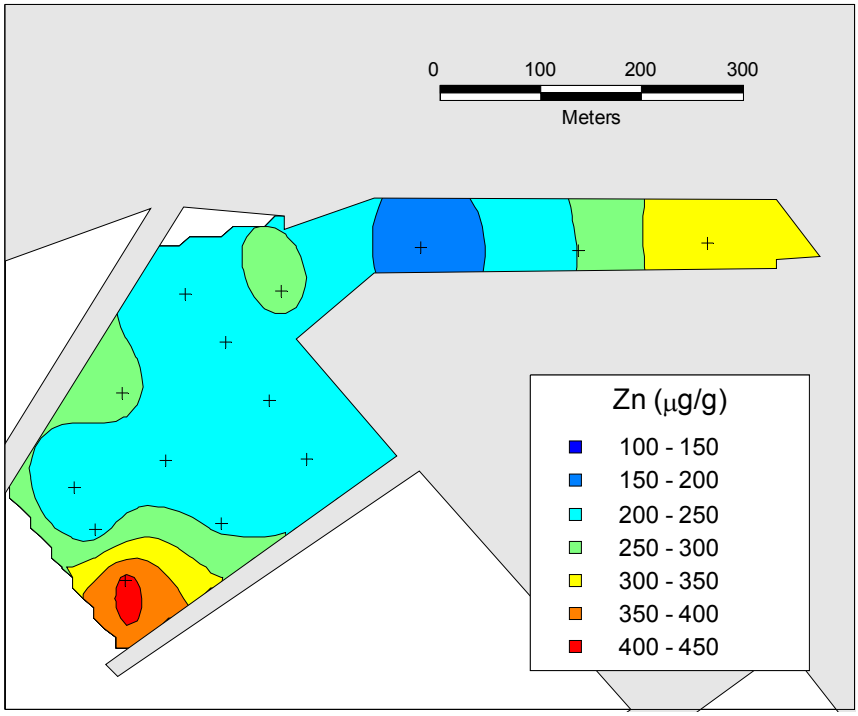


Figure A-15. Distribution of selenium at the Chollas and Paleta sites.



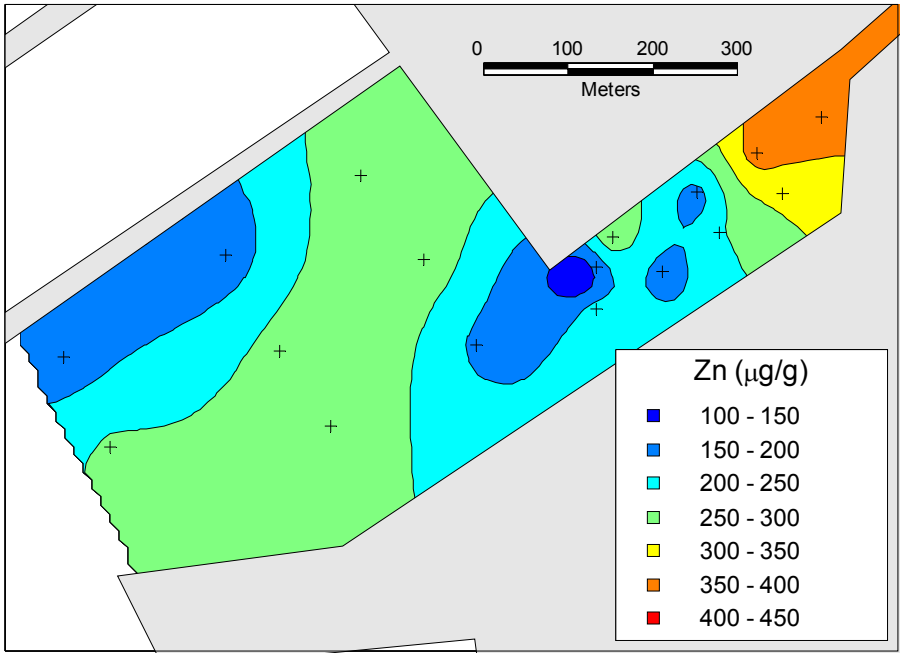
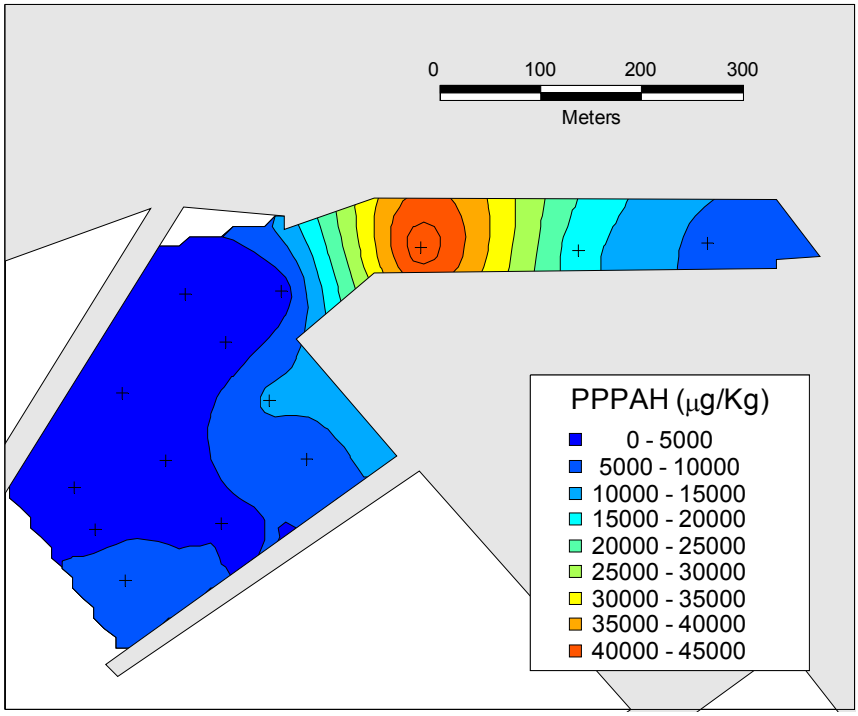


Figure A-16. Distribution of zinc at the Chollas and Paleta sites.



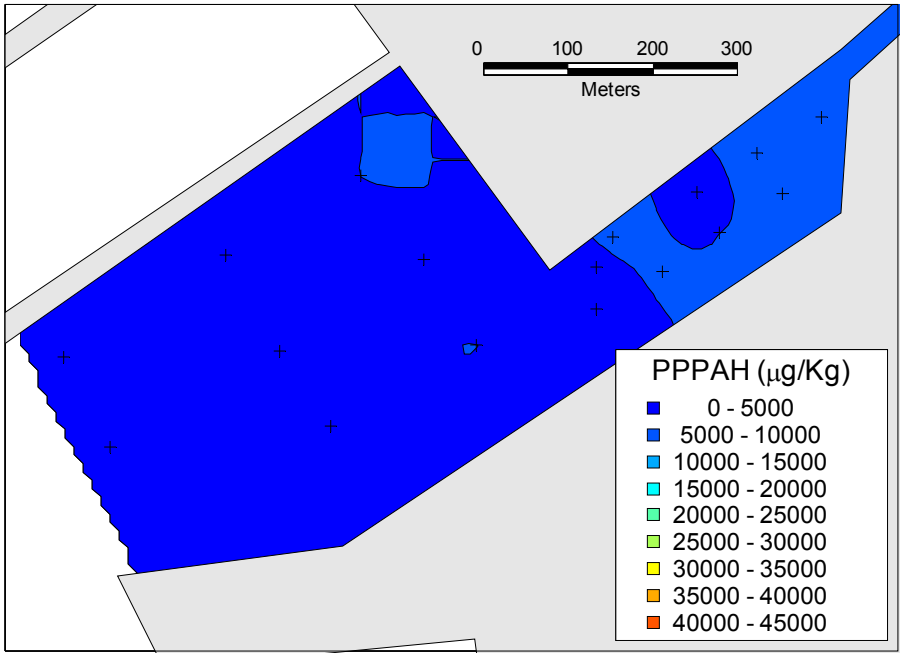
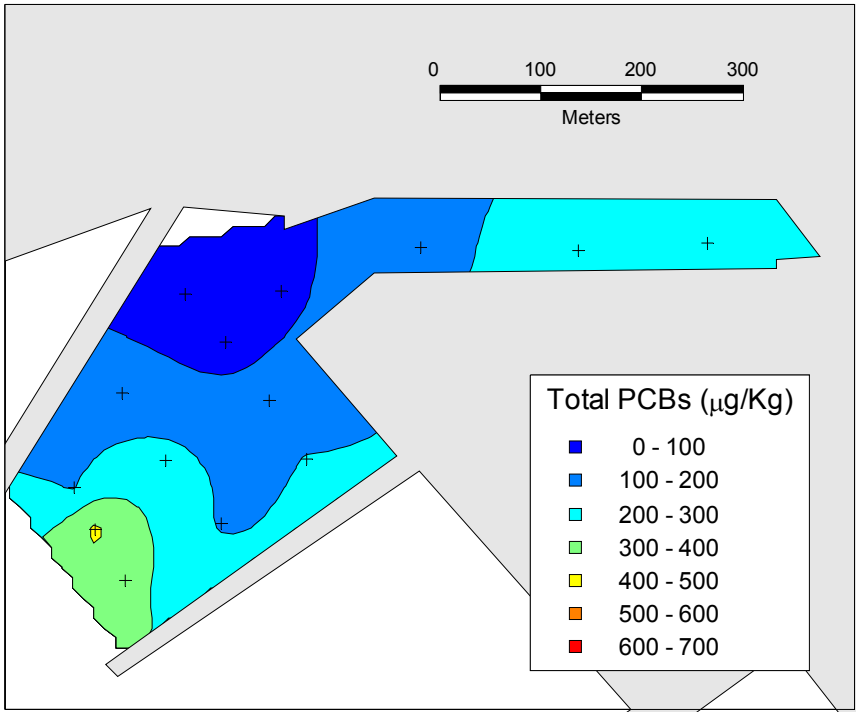


Figure A-17. Distribution of PPPAH at the Chollas and Paleta sites.



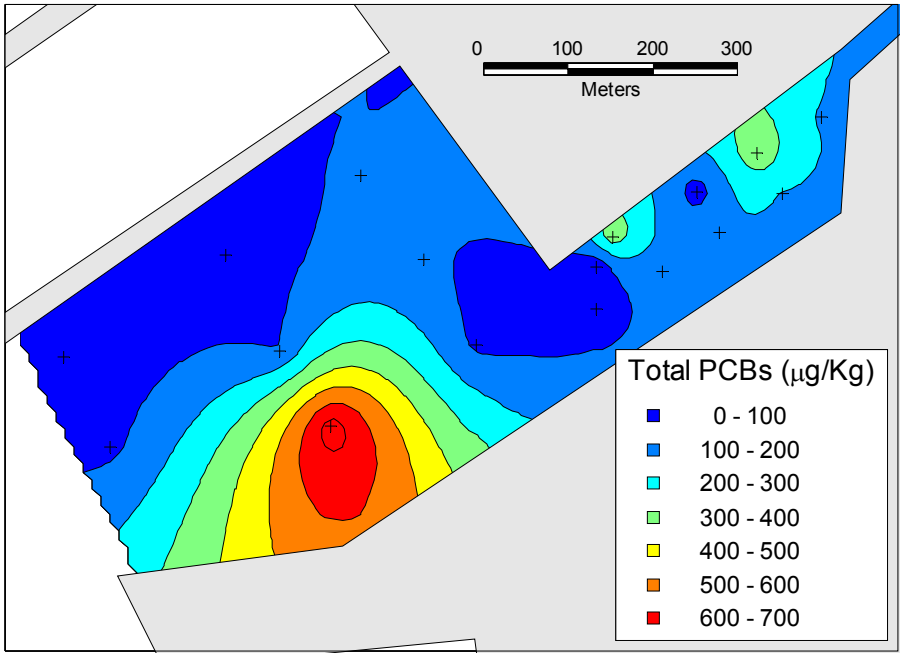
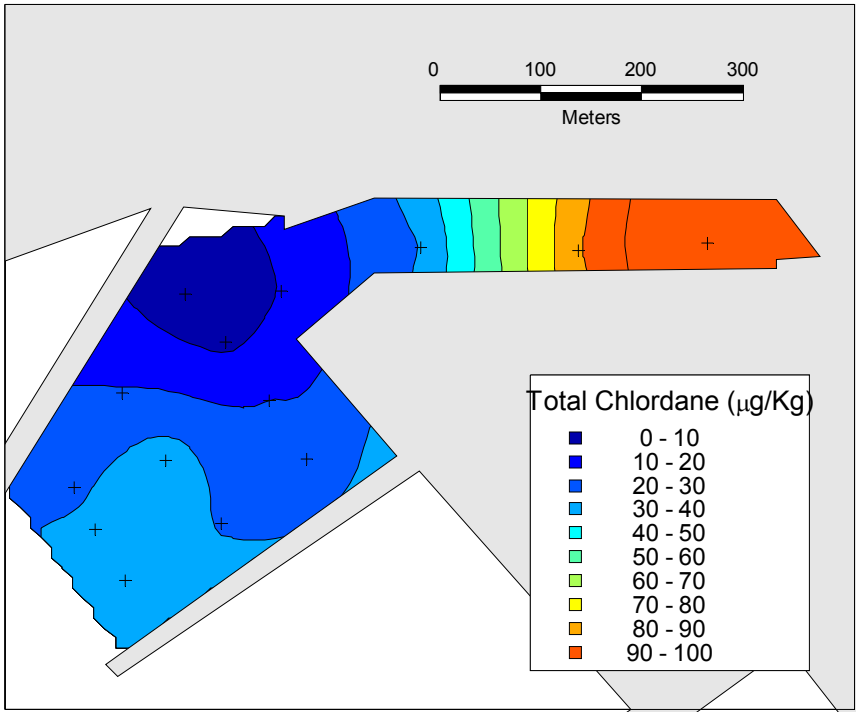


Figure A-18. Distribution of TPCB at the Chollas and Paleta sites.



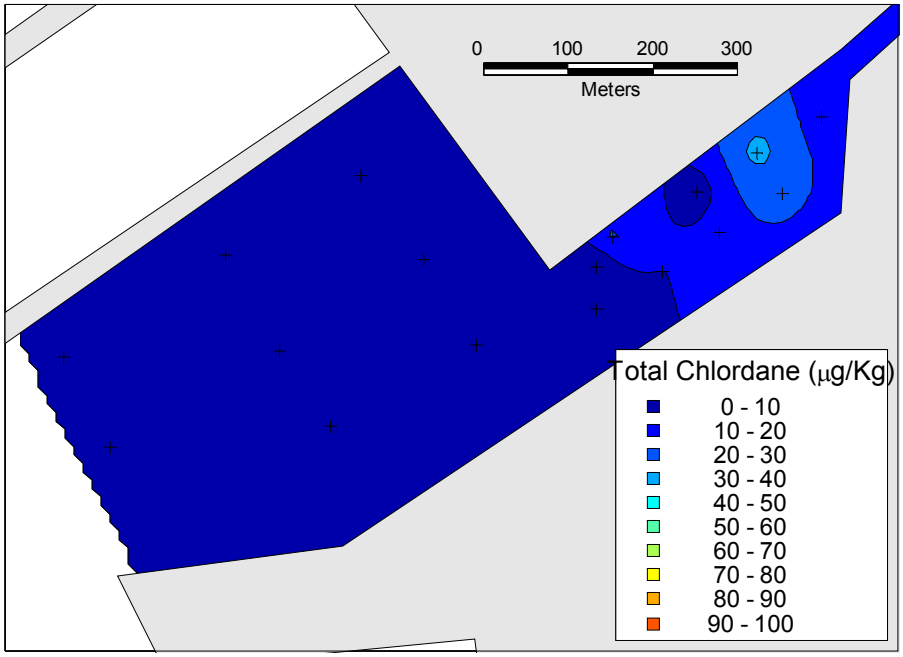
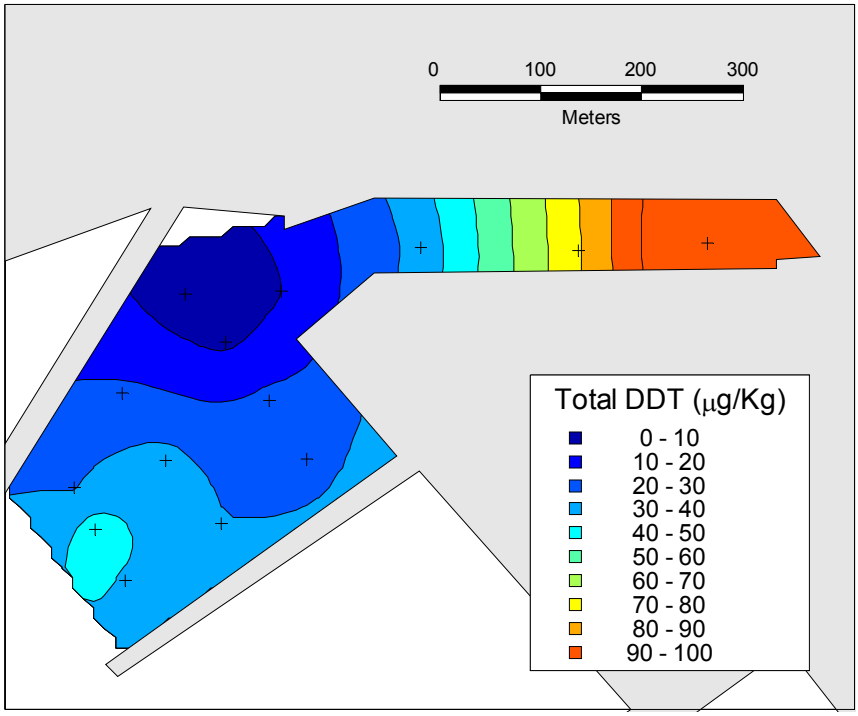


Figure A-19. Distribution of TCHLOR at the Chollas and Paleta sites.



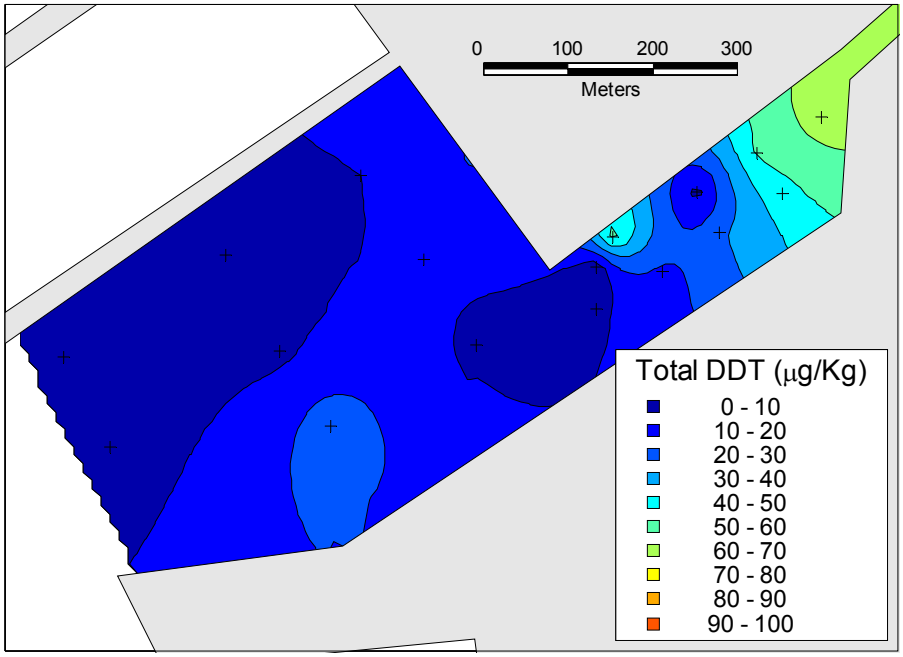
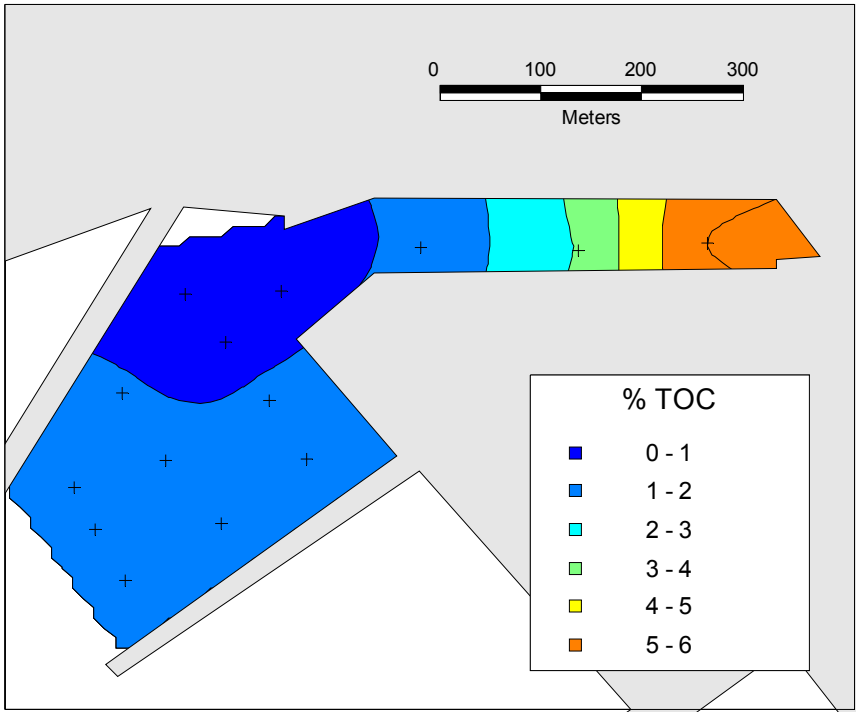


Figure A-20. Distribution of TDDT at the Chollas and Paleta sites.



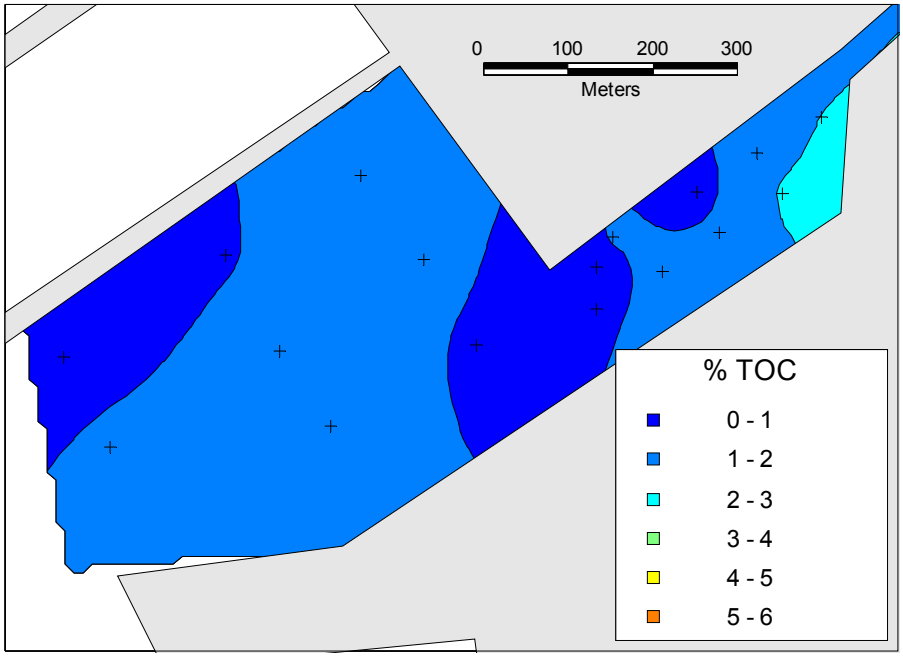
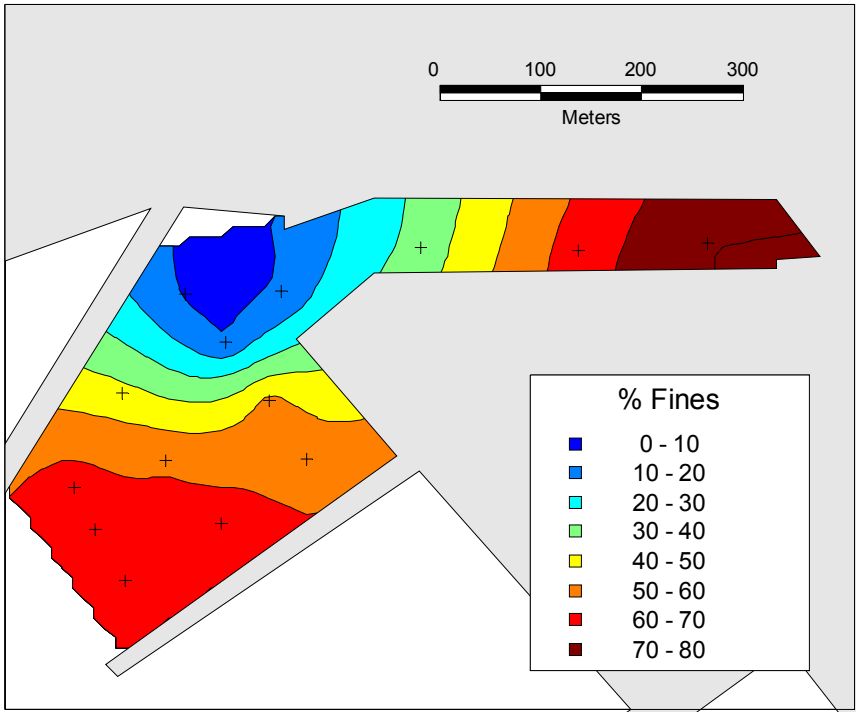


Figure A-21. Distribution of TOC at the Chollas and Paleta sites.



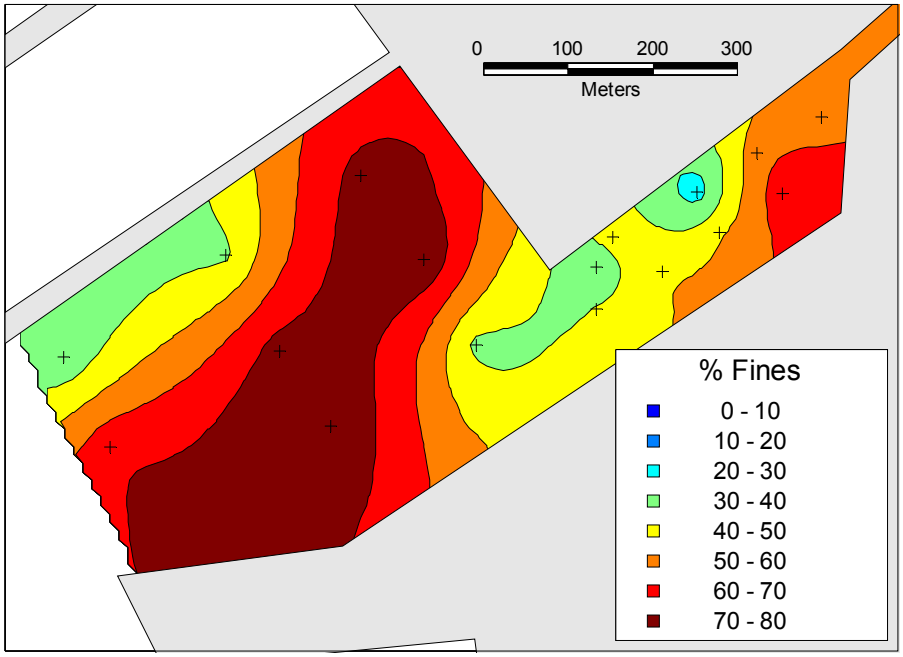
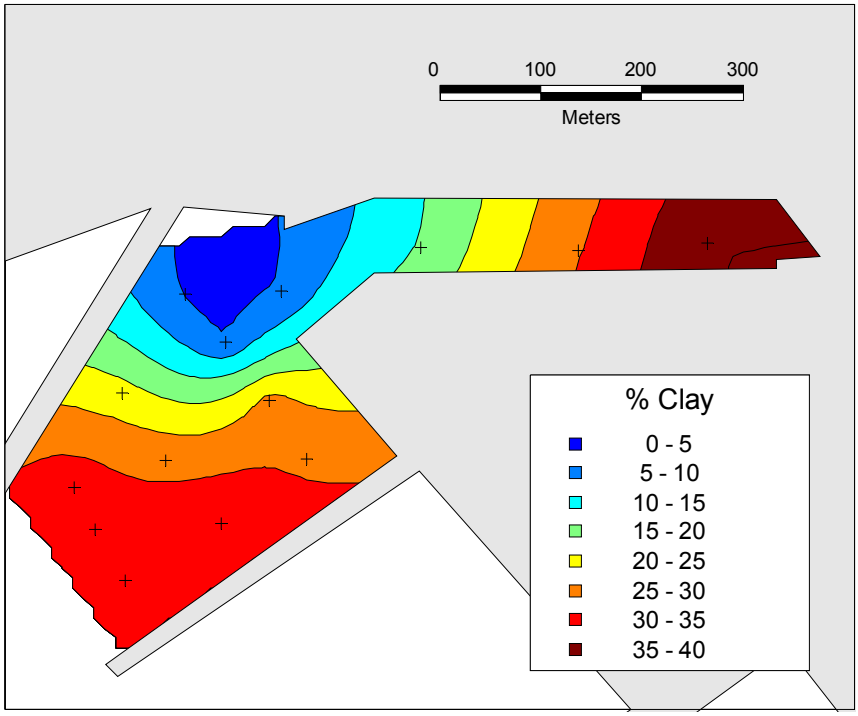


Figure A-22. Distribution of fines at the Chollas and Paleta sites.



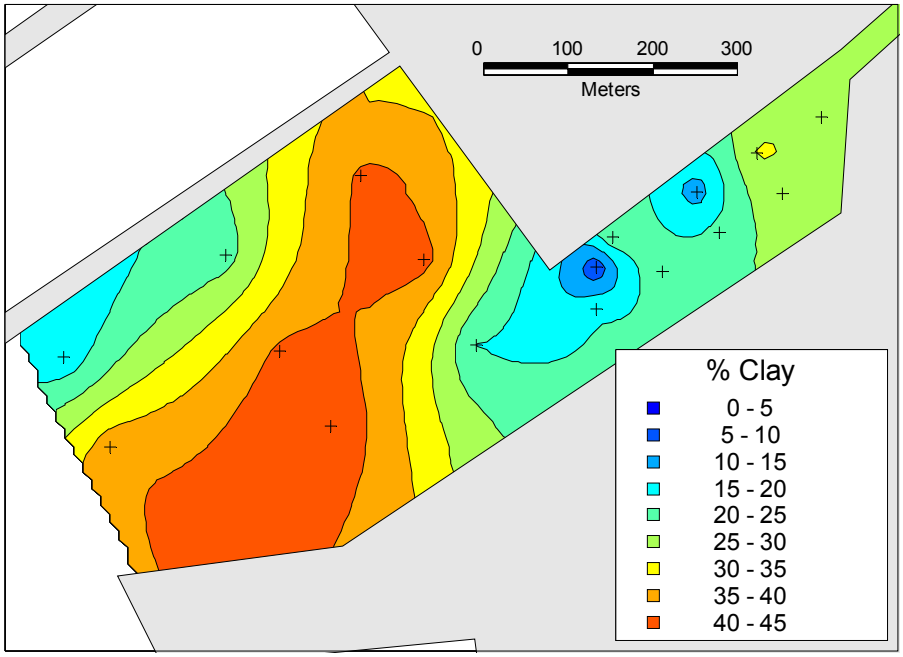
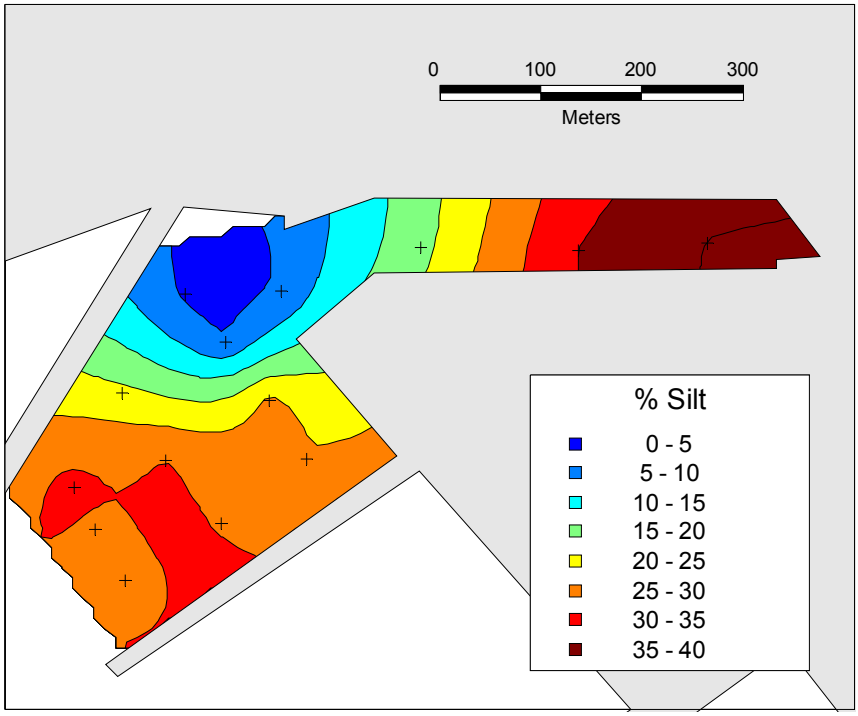


Figure A-23. Distribution of clay at the Chollas and Paleta sites.



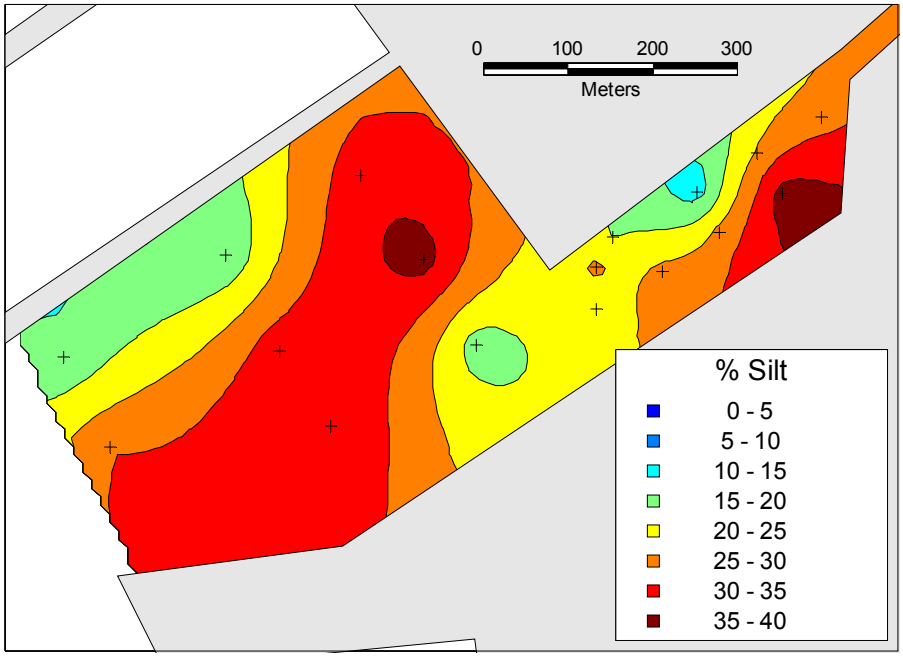
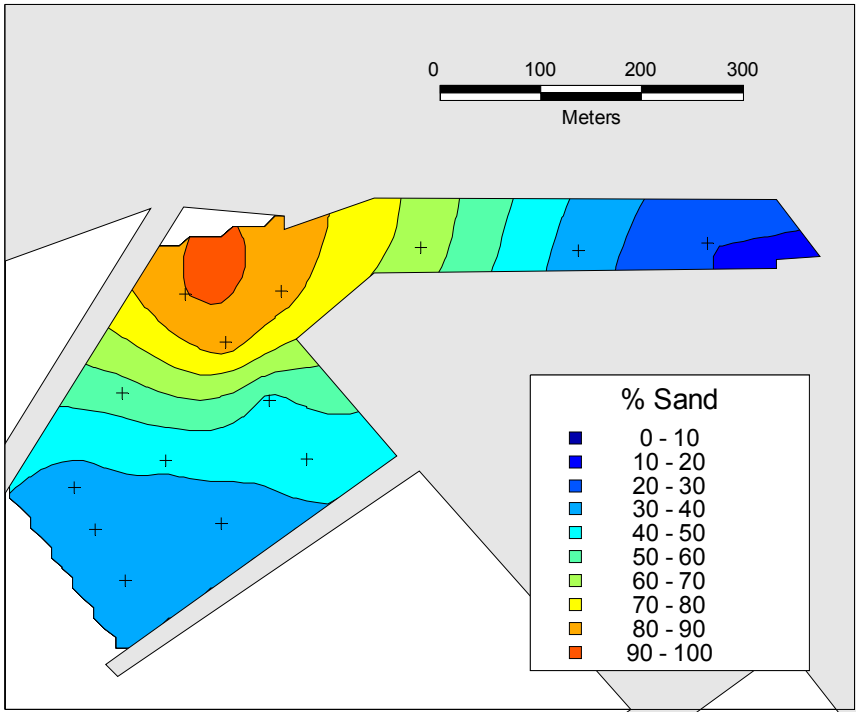


Figure A-24. Distribution of silt at the Chollas and Paleta sites.



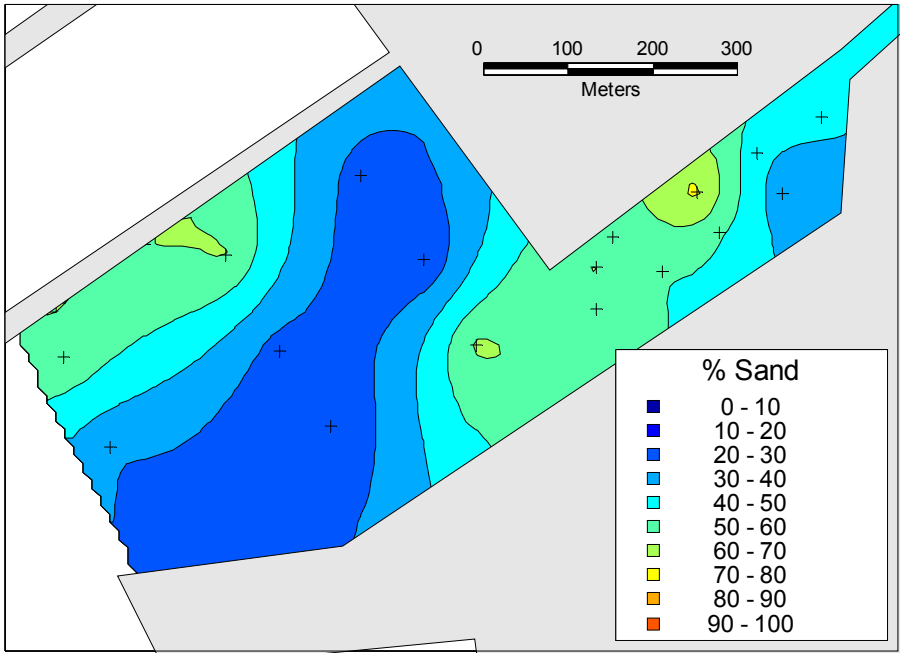


Figure A-25. Distribution of sand at the Chollas and Paleta sites.

APPENDIX B: BIOACCUMULATION TISSUE CHEMISTRY DATA

B1 - BIOACCUMULATION TISSUE CHEMISTRY DATA TABLES

Table B- 1. Chollas Metal Data.

Analyte	C 02	C 05	C 08***	C 11	C 12	C 13	C 14
Al	1390	1440	1236.910	2720	1340	1180	1350
Sb	0.120	0.123	0.392	1.08	0.121	0.132	0.149
As	25.3	22.0	23.483	23.6	18.2	19.7	19.1
Ba	13.7	14.2	12.447	44.9	11.0	10.5	10.9
Be	0.0195 U	0.0195 U	0.020 U	0.0679 J	0.0195 U	0.0195 U	0.0195 U
Cd	0.226	0.226	0.241	0.306	0.223	0.207	0.293
Cr	6.87	47.0	13.193	12.1	3.23	6.68	18.4
Cu	16.5	13.5	13.733	31.0	14.2	12.6	12.3
Fe	1387	1486	1496.941	2216	1499	1260	1445
Pb	4.90	4.83	4.378	9.27	5.60	3.77	4.50
Ni	5.30	35.9	9.303	7.95	2.53	7.68	17.7
Hg	0.0588	0.0598	0.052	0.0660	0.0535	0.0415	0.0409
Ag	0.733 &	0.367 &	0.397 &	0.491 &	0.350 &	0.369 &	0.456 &
Se	3.06	3.32	3.503	2.81	3.04	2.59	3.09
Zn	76.2	73.2	85.267	99.9	83.9	74.8	86.7

C 08-1	C 08-2	C 08-3
1735.000	755.731	1220.000
0.936	0.129	0.111
23.950	23.200	23.300
21.150	5.890	10.300
0.020 U	0.020 U	0.020 U
0.291	0.228	0.203
33.600	3.050	2.930
19.200	11.100	10.900
2150.012	1044.430	1296.382
6.655	3.660	2.820
22.500	3.000	2.410
0.053	0.059	0.045
0.427 &	0.353 &	0.410 &
3.310	3.860	3.340
109.000	79.300	67.500

*** first value of lab duplicates**
**** mean of field duplicates**
***** mean of field and lab duplicates**

All concentrations in mg/Kg dry weight

Data Qualifiers
J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as Minimum Detection Limit

Table B- 2. Paleta Metal Data.

Analyte	P 02	P 04	P 08	P 11**	P 13	P 15	P 17
Al	1190	1460	825	1425.08	1550	1310	1250
Sb	0.108	0.0599	0.118	0.44	0.165	0.249	0.178
As	22.5	21.9	20.3	21.63	21.9	22.2	21.8
Ba	8.84	7.43	10.2	15.66	11.6	8.04	9.16
Be	0.0195 U	0.0195 U	0.0195 U	0.03 J	0.0195 U	0.0195 U	0.0195 U
Cd	0.176	0.251	0.218	0.28	0.202	0.287	0.280
Cr	7.97	5.19	43.0	22.45	7.24	6.68	62.6
Cu	13.1	15.8	15.3	13.30	16.2	17.3	18.7
Fe	1355	1606	1226	1430.91	1557	1615	1683
Pb	2.89	3.85	3.84	6.79	5.08	10.6	5.91
Ni	5.59	3.36	35.2	15.05	4.88	4.69	44.8
Hg	0.0651	0.0664	0.0635	0.06	0.0676	0.0702	0.0547
Ag	0.413 &	0.399 &	0.436 &	0.38 &	0.328 &	0.394 &	0.320 &
Se	2.37	4.25	2.39	3.54	3.28	4.18	4.16
Zn	70.2	81.1	66.3	78.23	79.2	84.7	99.4

P11-1	P11-2	P11-3
2979.68	684.03	611.53
0.88	0.21	0.22
20.60	21.80	22.50
37.20	4.75	5.04
0.05	0.0195 U	0.0195 U
0.36	0.23	0.24
43.20	6.94	17.20
16.40	11.80	11.70
2369.95	999.49	923.29
9.58	5.39	5.40
29.50	4.45	11.20
0.07	0.06	0.06
0.49 &	0.31 &	0.35 &
3.82	3.00	3.80
83.80	73.60	77.30

***first value of lab duplicates**
****mean of field duplicates**

All concentrations in mg/Kg dry weight

Data Qualifiers
J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as Minimum Detection Limit

Table B- 3. Chollas PAH Data.

PAH Analyte	CO2		CO5		C08*		C11		C12		C13		C14		C08-1		C08-2		C08-3	
Station ID	**NA**		**NA**				**NA**		**NA**		**NA**		**NA**							
Naphthalene	12	JB&	16	JB&	8.3	JB&	14	JB&	12	JB&	8.7	JB&	8.9	JB&	8.0	JB&	9.1	JB&	7.8	JB&
C1-Naphthalenes	4.4	JB	6.2	JB	5.0	JB	7.2	JB	11	J	6	JB	5.5	JB	4.1	JB	4.8	JB	6.0	JB
C2-Naphthalenes	16	J	15	J	20	J	24		41		36		23		13	J	24		22	
C3-Naphthalenes	11	J	11	J	12	J	17	J	66		51		34		11	J	13	J	13	J
C4-Naphthalenes	15	J	14	J	20	J	47		120		75		54		21		26		14	J
Acenaphthylene	30		23		29		28		120		37		9	J	28		30		30	
Acenaphthene	6	J	9	J	16	J	6.5	J	110		46		16	J	6	J	14	J	28	
Biphenyl	2.3	JB	2.2	JB	2.2	JB	3.1	J	7.1	J	3.4	J	2.8	JB	1.9	JB	2.3	JB	2.4	JB
Fluorene	7.6	J	9.6	J	17	J	8.5	J	110		52		26		7	J	12	J	31	
C1-Fluorenes	8.3	J	8.8	J	11	J	16	J	76		47		21		8	J	11	J	13	J
C2-Fluorenes	12	J	10	J	13	JU	56		150		93		65		1	U	22		15	J
C3-Fluorenes	53		51		54	U	160		350		240		170		1	U	84		77	
Anthracene	69	&	53	&	76	&	74	&	700	&	400	&	79	&	67		79		81	
Phenanthrene	33		46		88		47		840		200		120		33		70		160	
C1-Phenanthrenes/anthracene	26		26		47		43		600		270		110		28		45		68	
C2-Phenanthrenes/anthracene	41		35		63		130		700		420		260		54		66		69	
C3-Phenanthrenes/anthracene	50		50		74		220		440		280		240		78		84		60	
C4-Phenanthrenes/anthracene	86		87		130		260		700		390		190		130		140		120	
Dibenzothiophene	4.7	J	6	J	10	J	5.8	J	56		49		16	J	5	J	8	J	17	
C1-Dibenzothiophenes	8.5	J	8	J	11	J	18		74		56		30		10	J	12	J	12	J
C2-Dibenzothiophenes	21		20		27		88		180		150		130		26		34		21	
C3-Dibenzothiophenes	40		39		55		250		250		200		190		57		64		43	
Fluoranthene	130	&	130	&	403	&	540	&	5900	D&	3300	&	660	&	180		380		650	
Pyrene	390	&	400	&	790	&	1400	&	3300	&	2200	&	510	&	620		810		940	
C1-Fluoranthenes/pyrenes	240		240		417		710		2900		1300		330		360		430		460	
C2-Fluoranthenes/pyrenes	170		160		223		370		980		440		180		220		230		220	
C3-Fluoranthenes/pyrenes	100		92		113		190		370		170		110		120		110		110	
Benzo[a]anthracene	51	&	46	&	87	&	160	&	1800	&	690	&	140	&	67		98		96	
Chrysene	99		83		143		270		1700		800		240		130		160		140	
C1-Chrysenes	91		88		123		210		650		260		140		120		130		120	
C2-Chrysenes	76		65		73		120		250		120		120		76		76		68	
C3-Chrysenes	38		32		33		62		87		46		55		35		35		29	
C4-Chrysenes	19		16		18	J	34		37		26		37		21		16	J	18	
Benzo[b]fluoranthene	350	&	310	&	367	&	380	&	1600	&	500	&	120	&	360		330		410	
Benzo[k]fluoranthene	120		94		113		120		520		150		37		110		100		130	
Benzo[e]pyrene	200		170		193		200		750		250		78		190		180		210	
Benzo[a]pyrene	160		140		170		190		860		240		54		170		160		180	
Perylene	42		37		45		58		220		70		23		42		43		49	
Indeno[1,2,3,-c,d]pyrene	42		36		36		36		160		44		20		39		34		36	
Dibenzo[a,h]anthracene	8.8	J	7.7	J	8.0	J	8	J	37		11	J	4.2	J	8.7	J	8.4	J	7.0	J
Benzo[g,h,i]perylene	45		39		39		40		140		49		33		41		37		38	
Total PAH	2854		2659		4080		6259		27414		13321		4325		3409		4104		4728	
Priority Polutant PAH	1553		1442		2390		3322		17909		8728		2077		1875		2332		2965	
Low Molecular Weight PAH	162		163		239		185		1903		750		264		153		219		344	
High Molecular Weight PAH	839		807		1602		2568		13597		7241		1608		1176		1616		2013	

***mean of field duplicates**
****mean of field and lab duplicates**

All concentrations in ug/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as Minimum Detection Limit

Table B- 4. Paleta PAH Data.

PAH Analyte	PO2		PO4		PO8		P11*		P13		P15		P17		P11-1		P11-2		P11-3	
Naphthalene	7.2	JB&	10	JB&	8.5	JB&	7.6	JB&	11	JB&	7	JB&	11	JB&	7.0	JB	9.3	JB	6.6	JB
C1-Naphthalenes	4.3	JB	6.7	JB	4.3	JB	6.3	JB	5.1	JB	5.1	JB	8	J	6.5	JB	6.8	JB	5.6	JB
C2-Naphthalenes	16	J	18		17		46		22		21		26		52		47		38	
C3-Naphthalenes	8.8	J	11	J	12	J	92		16		25		29		91		130		56	
C4-Naphthalenes	14	J	16	J	23		577	&	34	&	2.4	U&	2.4	U&	310		910		510	
Acenaphthylene	77		100		75		38		81		38		73		35		44		35	
Acenaphthene	4.6	J	8.2	J	5.9	J	24		6.8	J	6	J	16	J	35		15		22	
Biphenyl	2	JB	2.5	JB	1.9	JB	5.3	J	2.3	JB	2.8	J	3.6	J	5.9	J	5.6	J	4.5	J
Fluorene	6.2	J	8.5	J	6.8	J	27		10	J	10	J	19	J	34		20		28	
C1-Fluorenes	7.8	J	10	J	11	J	68		15		24		34		60		85		58	
C2-Fluorenes	1.1	U	14	J	18		453		48		85		140		390		580		390	
C3-Fluorenes	1.1	U	42		63		1333		140		280		590		1100		1700		1200	
Anthracene	150	&	210	&	160	&	183	&	210	&	120	&	240	&	180		200		170	
Phenanthrene	25		32		49		210		67		53		110		260		160		210	
C1-Phenanthrenes/anthracenes	30		34		47		250		86		76		140		260		280		210	
C2-Phenanthrenes/anthracenes	32		36		64		957		140		180		460		900		1200		770	
C3-Phenanthrenes/anthracenes	38		41		80		1367		200		340		910		1300		1600		1200	
C4-Phenanthrenes/anthracenes	87		79		160		1233		410		690		1200		1300		1400		1000	
Dibenzothiophene	3.5	J	4	J	5.4	J	34		7.5	J	8	J	14	J	36		33		34	
C1-Dibenzothiophenes	7.3	J	8.4	J	12	J	92	&	19	&	40	&	41	&	82		110		85	
C2-Dibenzothiophenes	20		20		30		1157		79		120		200		870		1600		1000	
C3-Dibenzothiophenes	31		38		71		2200		230		540		860		2000		2600		2000	
Fluoranthene	130	&	97	&	310	&	1900		910		460		960		1500		2400		1800	
Pyrene	300	&	280	&	480	&	3267		1000		2800		2600		3300		3600		2900	
C1-Fluoranthenes/pyrenes	280		270		470		2267		1100		1600		1900		2200		2600		2000	
C2-Fluoranthenes/pyrenes	210		220		310		1167		530		940		1000		1200		1300		1000	
C3-Fluoranthenes/pyrenes	120		140		170		583		280		500		490		580		650		520	
Benzo[a]anthracene	71	&	72	&	130	&	713		360		240		480		610		920		610	
Chrysene	180		170		310		983		680		410		780		960		1100		890	
C1-Chrysenes	140		160		200		587		370		440		510		580		700		480	
C2-Chrysenes	80		94		110		347		200		310		280		350		400		290	
C3-Chrysenes	38		44		53		120		73		99		88		120		140		99	
C4-Chrysenes	17	J	22		22		72		46		64		60		74		84		57	
Benzo[b]fluoranthene	760	&	860	&	930	&	1167		1200		1200		1300		1200		1300		1000	
Benzo[k]fluoranthene	200		240		260		273		310		280		450		240		270		310	
Benzo[e]pyrene	370		470		490		640		620		600		700		640		690		590	
Benzo[a]pyrene	350		410		430		593		540		560		640		590		640		550	
Perylene	75		100		110		160		140		130		170		160		180		140	
Indeno[1,2,3,-c,d]pyrene	88		120		100		123		130		100		120		130		130		110	
Dibenzo[a,h]anthracene	19		25		22		29		33		24		29		31		32		25	
Benzo[g,h,i]perylene	79		110		90		120		120		100		120		130		130		100	
Total PAH	4019		4583		5803		21988		10146		12822		16689		20921		25659		19385	
Priority Polutant PAH	2447		2753		3367		9660		5669		6408		7948		9242		10970		8767	
Low Molecular Weight PAH	274		375		310		497		391		239		477		558		455		477	
High Molecular Weight PAH	1050		1054		1682		7486		3523		4494		5489		6991		8692		6775	

***mean of field duplicates**
****mean of field and lab duplicates**

All concentrations in ug/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.

Table B- 5. Chollas PCB Data.

PCB Congener	CO2		CO5		CO8*		C11		C12		C13		C14		CO8-1		CO8-2		CO8-
18 - 2,2',5-Trichlorobiphenyl (Cl3)	0.26	U	0.245	U	0.25	U	0.27	U	0.245	U	0.235	U	0.265	U	0.21	U	0.28	U	0.26
28 - 2,4,4'-Trichlorobiphenyl (Cl3)	0.135	U	3.7		2.30	U	5.1		5		3.4		2.7		0.1	U	3.2		3.6
37 - 3,4,4'-Trichlorobiphenyl (Cl3)	0.26	U	0.245	U	0.25	U	0.27	U	0.245	U	0.235	U	0.265	U	0.21	U	0.28	U	0.26
44 - 2,2',3,5'-Tetrachlorobiphenyl (Cl4)	4.1		1.5		1.33		3.6		2.9		1.6		1.5		1.2		1.6		1.2
49 - 2,2',4,5'-Tetrachlorobiphenyl (Cl4)	12		8.7		9.60		10		12		11		12		10.0		9.7		9.1
52 - 2,2',5,5'-Tetrachlorobiphenyl (Cl4)	16		7.4		8.00		9.8		11		5.2		4.3		8.0		8.0		8.0
66 - 2,3',4,4'-Tetrachlorobiphenyl (Cl4)	8.5		6		6.30		9.8		9.1		3.7		3.7		6.6		6.1		6.2
70 - 2,3',4',5 -Tetrachlorobiphenyl (Cl4)	13		6.3		4.32	U	8.9		0.29	U	0.28	U	0.32	U	0.2	U	6.3		6.4
74 - 2,4,4',5 -Tetrachlorobiphenyl (Cl4)	0.31	U	3.6		2.78	U	5.2		0.29	U	0.28	U	0.32	U	0.2	U	4.0		4.1
81 - 3,4,4',5 -Tetrachlorobiphenyl (Cl4)	0.31	U	0.29	U	0.29	U	0.32	U	0.29	U	0.28	U	0.32	U	0.25	U	0.33	U	0.31
77 - 3,3',4,4'-Tetrachlorobiphenyl (Cl4)	16	&	4	&	6.37	&	11	&	7.5	&	4.7	&	3.6	&	6.5	&	5.6	&	7.0
87 - 2,2',3,4,5'-Pentachlorobiphenyl (Cl5)	16		6.8		4.85	U	12		12		7		6		0.1	U	7.4		7.0
99 - 2,2',4,4',5-Pentachlorobiphenyl (Cl5)	11		5.1		5.60		5		6.8		3		1.6		5.4		5.8		5.6
101 - 2,2',4,5,5'-Pentachlorobiphenyl (Cl5)	27		12		13.00		14		18		6.6		4.9		13		13		13
105 - 2,3,3',4,4'-Pentachlorobiphenyl (Cl5)	12		3.8		4.13		5		6.8		2.4		2		4.2		4.2		4.0
110 - 2,3,3',4',6-Pentachlorobiphenyl (Cl5)	41		22		26.00		32		39		21		18		30		22		26
114 - 2,3,4,4',5-Pentachlorobiphenyl (Cl5)	0.095	U	0.09	U	0.09	U	0.1	U	0.09	U	0.09	U	0.1	U	0.1	U	0.1	U	0.1
118 - 2,3',4,4',5-Pentachlorobiphenyl (Cl5)	24		12		12.00		13		16		7.6		7.1		12		12		12
119 - 2,3',4,4',6-Pentachlorobiphenyl (Cl5)	0.75		0.15	U	0.15	U	0.165	U	0.15	U	0.145	U	0.16	U	0.1	U	0.2	U	0.2
123 - 2',3,4,4',5-Pentachlorobiphenyl (Cl5)	0.26	U	0.245	U	0.25	U	0.27	U	0.245	U	0.235	U	0.265	U	0.2	U	0.3	U	0.3
126 - 3,3',4,4',5-Pentachlorobiphenyl (Cl5)	0.26	U	0.245	U	0.25	U	0.27	U	0.245	U	0.235	U	0.265	U	0.2	U	0.3	U	0.3
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl (Cl6)	5.7		1.9		2.20		2.1		3.2		1.2		0.97		2.1		2.7		1.8
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl (Cl6)	28	&	14	&	14.33	&	15	&	21	&	7.8	&	5.8	&	14	&	16	&	13
149 - 2,2',3,4',5',6-Hexachlorobiphenyl (Cl6)	18		9.2		10.57		17		17		5.1		2.6		11		11		10
151 - 2,2',3,5,5',6-Hexachlorobiphenyl (Cl6)	5		3.1		2.68	U	3.8		0.18	U	2.1		2.1		0.2	U	4.3		3.6
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl (Cl6)	30		16		13.33		11		19		7		5.4		17		12		11
156 - 2,3,3',4,4',5-Hexachlorobiphenyl (Cl6)	3		0.76		1.12		1		0.09	U	1.1		0.1	U	0.9		1.6		0.9
157 - 2,3,3',4,4',5'-Hexachlorobiphenyl (Cl6)	0.095	U	0.09	U	0.22	UJ	0.1	U	0.09	U	0.09	U	0.1	U	0.5	J	0.1	U	0.1
158 - 2,3,3',4,4',6-Hexachlorobiphenyl (Cl6)	3.1		1.1		1.37		1.4		2.2		0.65		0.38	J	1.4		1.6		1.1
167 - 2,3',4,4',5,5'-Hexachlorobiphenyl (Cl6)	1.3		0.51	J	0.43	UJ	0.16	U	0.145	U	0.14	U	0.16	U	0.1	U	0.7	J	0.5
168 - 2,3',4,4',5',6-Hexachlorobiphenyl (Cl6)	0.155	U	0.145	U	0.15	U	0.16	U	0.145	U	0.14	U	0.16	U	0.1	U	0.2	U	0.2
169 - 3,3',4,4',5,5'-Hexachlorobiphenyl (Cl6)	0.155	U	0.145	U	0.15	U	0.16	U	0.145	U	0.14	U	0.16	U	0.1	U	0.2	U	0.2
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl (Cl7)	4		3.3		3.53		4.1		7.3		3		2.4		3.1		4.9		2.6
177 - 2,2',3,3',4',5,6-Heptachlorobiphenyl (Cl7)	2.3		1.8		1.93		2.3		5.3		2		1.1		2.0		2.2		1.6
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl (Cl7)	7.8		4.3		6.30		6		10		11		16		6.7		7.4		4.8
183 - 2,2',3,4,4',5',6-Heptachlorobiphenyl (Cl7)	1.9	&	1.2	&	1.37	&	1.8	&	2.5	&	0.84	&	0.41	J&	1.6	&	1.4	&	1.1
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl (Cl7)	4.2		3.2		3.33		3.9		6.5		2.2		1.1		3.5		3.5		3.0
189 - 2,3,3',4,4',5,5'-Heptachlorobiphenyl (Cl7)	0.091	J	0.15	U	0.15	U	0.165	U	0.15	U	0.145	U	0.16	U	0.1	U	0.2	U	0.2
194 - 2,2',3,3',4,4',5,5'-Octachlorobiphenyl (Cl8)	0.98		0.79		0.88	J	1.1		2.2		0.69		0.16	U	0.8		1.2		0.6
201 - 2,2',3,3',4,5,5',6'-Octachlorobiphenyl (Cl8)	1.5		1.1		1.37		1.4		2.2		0.54	J	0.46	J	1.5		1.6		1.0
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (Cl9	0.64	J&	0.44	J&	0.70	&JB	0.68	J&	1.4	&	0.33	JB&	0.36	JB&	0.6	&	1.1	&	0.4
Total PCB	321.16		167.64		174.2		219.39		248.94		125.42		109.76		166.235		184.35		172.015

***mean of field duplicates**
****mean of field and lab duplicates**

All concentrations in ug/Kg dry weight

Data Qualifiers

J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as Minimum Detection Limit

Table B- 6. Paleta PCB Data.

PCB Congener	PO2		PO4		PO8		P11*		P13		P15		P17		P11-1		P11-2		P11-3	
18 - 2,2',5-Trichlorobiphenyl (Cl3)	0.27	U	0.27	U	0.24	U	4.70		0.21	U	4.7		2.1		4.60		5.30		4.20	
28 - 2,4,4'-Trichlorobiphenyl (Cl3)	1.6		1.8		2.6		7.37	U	5.3		12		7.3		0.11	U	12.00		10.00	
37 - 3,4,4'-Trichlorobiphenyl (Cl3)	0.27	U	0.27	U	0.24	U	0.21	U	0.21	U	0.3	U	0.295	U	0.21	U	0.22	U	0.20	U
44 - 2,2',3,5'-Tetrachlorobiphenyl (Cl4)	0.65	J	0.84		0.94		15.00		4.4		14		6.2		15.00		16.00		14.00	
49 - 2,2',4,5'-Tetrachlorobiphenyl (Cl4)	4.2		5.4		7.6		18.33		15		21		19		18.00		20.00		17.00	
52 - 2,2',5,5'-Tetrachlorobiphenyl (Cl4)	4.4		4.8		8.1		25.33		15		26		15		25.00		27.00		24.00	
66 - 2,3',4,4'-Tetrachlorobiphenyl (Cl4)	12		13		17		35.00		17		30		16		38.00		37.00		30.00	
70 - 2,3',4',5 -Tetrachlorobiphenyl (Cl4)	0.325	U	0.32	U	0.285	U	20.08	U	15		30		16		0.25	U	32.00		28.00	
74 - 2,4,4',5 -Tetrachlorobiphenyl (Cl4)	1.9		1.8		3.6		16.67		8.3		17		9.1		16.00		18.00		16.00	
81 - 3,4,4',5 -Tetrachlorobiphenyl (Cl4)	0.325	U	0.32	U	0.285	U	3.23		0.64		2.4		1.6		2.90		3.90		2.90	
77 - 3,3',4,4'-Tetrachlorobiphenyl (Cl4)	1.7	&	4.5	&	4.6	&	17.67	&	12	&	15	&	15	&	17.00	&	19.00		17.00	
87 - 2,2',3,4,5'-Pentachlorobiphenyl (Cl5)	4.4		5.1		7.3		22.00		14		24		17		22.00		24.00		20.00	
99 - 2,2',4,4',5-Pentachlorobiphenyl (Cl5)	10		9.7		12		14.00		15		12		9.4		13.00		15.00		14.00	
101 - 2,2',4,5,5'-Pentachlorobiphenyl (Cl5)	15		5.6		20		29.00		25		32		23		29.00		31.00		27.00	
105 - 2,3,3',4,4'-Pentachlorobiphenyl (Cl5)	4.5		4.5		6.7		17.00		11		16		11		17.00		18.00		16.00	
110 - 2,3,3',4',6-Pentachlorobiphenyl (Cl5)	21		23		30		52.00		46		62		43		51.00		58.00		47.00	
114 - 2,3,4,4',5-Pentachlorobiphenyl (Cl5)	0.1	U	0.1	U	0.09	U	0.08	U	0.08	U	0.11	U	0.11	U	0.08	U	0.08	U	0.08	U
118 - 2,3',4,4',5-Pentachlorobiphenyl (Cl5)	13		14		18		28.00		23		30		22		28.00		30.00		26.00	
119 - 2,3',4,4',6-Pentachlorobiphenyl (Cl5)	1		0.94		1.1		1.13		1.5		0.78	J	0.84		1.10		1.20		1.10	
123 - 2',3,4,4',5-Pentachlorobiphenyl (Cl5)	0.27	U	0.27	U	0.24	U	3.34	U	4.3		4.5		3		0.21	U	5.30		4.50	
126 - 3,3',4,4',5-Pentachlorobiphenyl (Cl5)	0.27	U	0.27	U	0.24	U	1.50	U	0.21	U	0.3	U	0.295	U	1.80		2.50		0.20	U
128 - 2,2',3,3',4,4'-Hexachlorobiphenyl (Cl6)	3		2.9		3.5		5.20		4.3		5.2		4.3		5.40		5.70		4.50	
138 - 2,2',3,4,4',5'-Hexachlorobiphenyl (Cl6)	20	&	20	&	21	&	25.00		25		31		24		25.00		27.00		23.00	
149 - 2,2',3,4',5',6-Hexachlorobiphenyl (Cl6)	16		16		18		61.67		31		47		30		60.00		68.00		57.00	
151 - 2,2',3,5,5',6-Hexachlorobiphenyl (Cl6)	4.4		4.5		4.6		5.70		5.5		7.4		5.7		5.50		5.90		5.70	
153 - 2,2',4,4',5,5'-Hexachlorobiphenyl (Cl6)	25		26		27		30.00		31		38		29		30.00		32.00		28.00	
156 - 2,3,3',4,4',5-Hexachlorobiphenyl (Cl6)	1.5		1.6		1.6		3.23		2.8		3.2		3.1		3.10		3.60		3.00	
157 - 2,3,3',4,4',5'-Hexachlorobiphenyl (Cl6)	0.65	J	0.72		0.67		1.08		0.86		1.3		0.84		1.10		1.20		0.93	
158 - 2,3,3',4,4',6-Hexachlorobiphenyl (Cl6)	1.4		1.5		1.8		3.20		2.4		3.4		2.6		3.00		3.60		3.00	
167 - 2,3',4,4',5,5'-Hexachlorobiphenyl (Cl6)	0.92		0.98		1.2		0.83		0.9		1		0.81		0.81		0.92		0.77	
168 - 2,3',4,4',5',6-Hexachlorobiphenyl (Cl6)	0.16	U	0.16	U	0.14	U	0.13	U	0.125	U	0.18	U	0.175	U	0.13	U	0.13	U	0.12	U
169 - 3,3',4,4',5,5'-Hexachlorobiphenyl (Cl6)	0.16	U	0.16	U	0.14	U	0.13	U	0.125	U	0.18	U	0.175	U	0.13	U	0.13	U	0.12	U
170 - 2,2',3,3',4,4',5-Heptachlorobiphenyl (Cl7)	4.5		4.7		5.4		6.07	&	5.6	&	8.1	&	6.3	&	6.10	&	6.80		5.30	
177 - 2,2',3,3',4',5,6-Heptachlorobiphenyl (Cl7)	3.1		3.1		3.3		4.33		4.2		5.5		5		4.30		4.50		4.20	
180 - 2,2',3,4,4',5,5'-Heptachlorobiphenyl (Cl7)	6.2		6.3		6.8		8.17		7.9		11		9.2		8.40		8.70		7.40	
183 - 2,2',3,4,4',5',6-Heptachlorobiphenyl (Cl7)	2.1	&	2.2	&	2.1	&	3.37	&	2.8	&	4.3	&	3	&	3.50	&	3.60		3.00	
187 - 2,2',3,4',5,5',6-Heptachlorobiphenyl (Cl7)	6.2		6.3		6.2		7.73		7.3		9.2		7.2		7.80		8.20		7.20	
189 - 2,3,3',4,4',5,5'-Heptachlorobiphenyl (Cl7)	0.098	J	0.165	U	0.15	J	0.28	J	0.23	J	0.22	J	0.25	J	0.29	J	0.32	J	0.24	J
194 - 2,2',3,3',4,4',5,5'-Octachlorobiphenyl (Cl8)	1.2		1.2		1.3		2.17		2		2.5		2.3		2.30		2.40		1.80	
201 - 2,2',3,3',4,5,5',6'-Octachlorobiphenyl (Cl8)	1.7		1.6		1.8		3.20		2.5		3		2.9		3.40		3.40		2.80	
206 - 2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (Cl9)	0.87	&	0.86	&	1	&	1.50	&	1.4	&	1.5	&	1.2	&	1.70	&	1.60		1.20	
Total PCB	196.34		197.75		248.86		504.62		371.09		537.27		375.29		472.21		563.2		478.46	

***mean of field duplicates**
****mean of field and lab duplicates**

All concentrations in ug/Kg dry weight

Data Qualifiers
J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as Minimum Detection Limit

Table B- 7. Chollas Pesticide Data.

Pesticide Analyte	CO2		CO5		CO8*		C11		C12		C13		C14		C08-1		C08-2		C08-3	
gamma-Chlordane	12		12		10.63		17		16		8.7		12		12		10		9.9	
alpha-Chlordane	12		13		11.67		18		17		12		13		13		11		11	
2,4'-DDE	0.14	U	0.13	U	0.13	U	0.145	U	0.13	U	0.125	U	0.14	U	0.11	U	0.145	U	0.135	U
4,4'-DDE	14		12		10.97		17		17		13		12		12		11		9.9	
2,4'-DDD	0.125	U	1.8	J	1.575	JU	2.9	J	5.1		2.9	J	1.8	J	2.4	J	2.2	J	0.125	U
4,4'-DDD	5.5		4.1		4.033		4		7.5		5.8		0.155	U	4.2		4.2		3.7	
2,4'-DDT	0.155	U	0.145	U	0.143	U	0.16	U	0.145	U	0.14	U	0.155	U	0.12	U	0.16	U	0.15	U
4,4'-DDT	0.175	U	0.165	U	0.165	U	0.18	U	0.165	U	0.51	J	1.2	J	0.14	U	0.185	U	0.17	U
Total Chlordane	24		25		22.3		35		33		20.7		25		25		21		20.9	
Total DDT	20.095		18.34		17.01		24.385		30.04		22.475		15.45		18.97		17.89		14.18	

***mean of field duplicates**
****mean of field and lab duplicates**

All concentrations in ug/Kg dry weight

Data Qualifiers
J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as Minimum Detection Limit

Table B- 8. Paleta Pesticide Data.

Pesticide Analyte	PO2		PO4		PO8		P11*		P13		P15		P17		P11-1		P11-2		P11-3	
gamma-Chlordane	1.5	J	3.9		3.4		27		11		28		16		25		34		22	
alpha-Chlordane	2.1	J	4.2		3.8		16.667		9.7		24		18		14		21		15	
2,4'-DDE	0.145	U	0.145	U	0.13	U	0.1117	U	0.11	U	0.16	U	0.155	U	0.11	U	0.115	U	0.11	U
4,4'-DDE	8.1		10		12		36		23		36		30		35		40		33	
2,4'-DDD	1.3	J	2.2	J	2.8	J	11.333		6		10		8.5		11		13		10	
4,4'-DDD	0.16	U	2.4	J	4.1		21		13		26		21		21		23		19	
2,4'-DDT	0.16	U	0.16	U	0.14	U	0.1217	U	1.3	J	0.175	U	0.175	U	0.12	U	0.125	U	0.12	U
4,4'-DDT	0.18	U	0.18	U	0.16	U	0.14	U	0.99	J	1	J	2.5	J	0.14	U	0.145	U	0.135	U
Total Chlordane	3.6		8.1		7.2		43.667		20.7		52		34		39		55		37	
Total DDT	10.045		15.085		19.33		68.707		44.4		73.335		62.33		67.37		76.385		62.365	

***mean of field duplicates**
****mean of field and lab duplicates**

All concentrations in ug/Kg dry weight

Data Qualifiers
J Concentration above zero and below the adjusted minimum reporting limit (MRL).
E Estimated result exceeds highest level calibration response by greater than 10%
D Concentration reported from dilution analysis
B Result detected in the associated procedural blank and sample result is less than 5 times the result found in the procedural blank.
I Estimated result due to interference.
RE Result reported from a re-analysis for which there is an original result reported.
& Quality control result exceeds quality control criteria as specified in the laboratory work plan.
U Not detected, values reported as Minimum Detection Limit

APPENDIX C: SEDIMENT TOXICITY DATA

C1 - WHOLE SEDIMENT TOXICITY DATA

Bulk Sediment Test Outliers. Some stations had a high variability in amphipod survival among test replicates. In the majority of these cases, there were replicates with high survival and a couple of replicates that had very poor survival. The replicates with very poor survival appeared to be outliers that did not represent the toxicity at these stations. A threshold screening approach was used to identify and remove these outlier data. Outliers were identified as those values which were ≥30 percentage points below the next highest value, working from highest to lowest values. For example, Chollas Station C01 had replicates with 0, 15, 45, 60, and 70% survival. The value of 15 was removed as an outlier because it was 30 percentage points below 45. The value of 0 was then removed because it was more than 30 percentage points from 45. The remaining replicates for Station C01 had 45, 60 and 70% survival.

The cause of the aberrant survival in each outlier replicate was not known, but may have been related to dying infauna in the sediments, resulting in poor water quality. An association between abundance of infaunal mussels and the presence of outliers was present in the samples collected in July (see Section C2). Dead mussels were present in the sediment toxicity samples at the termination of the test and may have contributed to the presence of some outliers. Other unidentified factors also contributed to the presence of outliers, as the samples collected in August were prescreened to remove mussels, but still contained outliers.

Outlier replicates were found in six Chollas stations, five Paleta stations and three of the CP reference stations. Stations C04, C09, P05, P10, P12, P13, P14 and CP2441 each had one outlier, while Stations C01, C10 and CP2243 had two outliers, and Stations C13, C14 and CP2231 each had three outliers. One outlier replicate was also identified in the home sediment treatment used with the Chollas site sediments.

Table C- 1. Amphipod survival in San Diego Bay sediments. Data are not control adjusted.

Sample	Sample Type	QA Batch	Percent Survival	Outlier
Home Sediment	Negative Control	EE29	100	
Home Sediment	Negative Control	EE29	60	Yes
Home Sediment	Negative Control	EE29	95	
Home Sediment	Negative Control	EE29	100	
Home Sediment	Negative Control	EE29	100	
C01	Result	EE29	70	
C01	Result	EE29	15	Yes
C01	Result	EE29	45	
C01	Result	EE29	0	Yes
C01	Result	EE29	60	
C02	Result	EE29	80	
C02	Result	EE29	70	
C02	Result	EE29	60	
C02	Result	EE29	80	
C02	Result	EE29	65	
C03	Result	EE29	75	
C03	Result	EE29	75	
C03	Result	EE29	70	
C03	Result	EE29	85	
C03	Result	EE29	70	
C04	Result	EE29	85	
C04	Result	EE29	65	
C04	Result	EE29	70	
C04	Result	EE29	60	
C04	Result	EE29	25	Yes
C05	Result	EE29	90	
C05	Result	EE29	75	
C05	Result	EE29	65	
C05	Result	EE29	75	
C05	Result	EE29	90	
C06	Result	EE29	40	
C06	Result	EE29	90	
C06	Result	EE29	75	
C06	Result	EE29	35	
C06	Result	EE29	65	
C07	Result	EE29	90	
C07	Result	EE29	95	
C07	Result	EE29	90	
C07	Result	EE29	90	
C07	Result	EE29	100	

Sample	Sample Type	QA Batch	Percent Survival	Outlier
C08	Result	EE29	100	
C08	Result	EE29	95	
C08	Result	EE29	95	
C08	Result	EE29	95	
C08	Result	EE29	90	
C09	Result	EE29	90	
C09	Result	EE29	85	
C09	Result	EE29	75	
C09	Result	EE29	30	Yes
C09	Result	EE29	65	
C10	Result	EE29	55	
C10	Result	EE29	85	
C10	Result	EE29	65	
C10	Result	EE29	0	Yes
C10	Result	EE29	10	Yes
C11	Result	EE29	90	
C11	Result	EE29	90	
C11	Result	EE29	75	
C11	Result	EE29	100	
C11	Result	EE29	95	
C12	Result	EE29	95	
C12	Result	EE29	95	
C12	Result	EE29	95	
C12	Result	EE29	75	
C12	Result	EE29	95	
C13	Result	EE29	35	Yes
C13	Result	EE29	75	
C13	Result	EE29	0	Yes
C13	Result	EE29	0	Yes
C13	Result	EE29	80	
C14	Result	EE29	0	Yes
C14	Result	EE29	55	
C14	Result	EE29	0	Yes
C14	Result	EE29	0	Yes
C14	Result	EE29	50	
2231	Result	EE29	85	
2231	Result	EE29	20	Yes
2231	Result	EE29	0	Yes
2231	Result	EE29	5	Yes
2231	Result	EE29	65	
2243	Result	EE29	0	Yes
2243	Result	EE29	65	
2243	Result	EE29	95	
2243	Result	EE29	90	

Sample	Sample Type	QA Batch	Percent Survival	Outlier
2243	Result	EE29	0	Yes
2433	Result	EE29	90	
2433	Result	EE29	90	
2433	Result	EE29	85	
2433	Result	EE29	60	
2433	Result	EE29	90	
2240	Result	EE29	100	
2240	Result	EE29	90	
2240	Result	EE29	95	
2240	Result	EE29	30	Yes
2240	Result	EE29	90	
2241	Result	EE29	90	
2241	Result	EE29	95	
2241	Result	EE29	30	Yes
2241	Result	EE29	65	
2241	Result	EE29	75	
Home Sediment	Negative Control	EE33	100	
Home Sediment	Negative Control	EE33	90	
Home Sediment	Negative Control	EE33	100	
Home Sediment	Negative Control	EE33	85	
Home Sediment	Negative Control	EE33	95	
P01	Result	EE33	95	
P01	Result	EE33	95	
P01	Result	EE33	75	
P01	Result	EE33	85	
P01	Result	EE33	100	
P02	Result	EE33	75	
P02	Result	EE33	85	
P02	Result	EE33	90	
P02	Result	EE33	95	
P02	Result	EE33	65	
P03	Result	EE33	85	
P03	Result	EE33	100	
P03	Result	EE33	85	
P03	Result	EE33	90	
P03	Result	EE33	100	
P04	Result	EE33	75	
P04	Result	EE33	75	
P04	Result	EE33	95	
P04	Result	EE33	90	
P04	Result	EE33	80	
P05	Result	EE33	90	
P05	Result	EE33	90	
P05	Result	EE33	96	

Sample	Sample Type	QA Batch	Percent Survival	Outlier
P05	Result	EE33	75	
P05	Result	EE33	40	Yes
P06	Result	EE33	95	
P06	Result	EE33	80	
P06	Result	EE33	95	
P06	Result	EE33	95	
P06	Result	EE33	75	
P07	Result	EE33	85	
P07	Result	EE33	95	
P07	Result	EE33	85	
P07	Result	EE33	90	
P07	Result	EE33	100	
P08	Result	EE33	80	
P08	Result	EE33	75	
P08	Result	EE33	90	
P08	Result	EE33	75	
P08	Result	EE33	90	
P09	Result	EE33	85	
P09	Result	EE33	95	
P09	Result	EE33	100	
P09	Result	EE33	85	
P09	Result	EE33	95	
P10	Result	EE33	80	
P10	Result	EE33	85	
P10	Result	EE33	90	
P10	Result	EE33	30	Yes
P10	Result	EE33	80	
P11	Result	EE33	50	
P11	Result	EE33	50	
P11	Result	EE33	30	
P11	Result	EE33	60	
P11	Result	EE33	45	
P12	Result	EE33	95	
P12	Result	EE33	85	
P12	Result	EE33	80	
P12	Result	EE33	40	Yes
P12	Result	EE33	90	
P13	Result	EE33	80	
P13	Result	EE33	75	
P13	Result	EE33	85	
P13	Result	EE33	35	Yes
P13	Result	EE33	75	
P14	Result	EE33	95	
P14	Result	EE33	90	

Sample	Sample Type	QA Batch	Percent Survival	Outlier
P14	Result	EE33	35	Yes
P14	Result	EE33	80	
P14	Result	EE33	80	
P15	Result	EE33	80	
P15	Result	EE33	80	
P15	Result	EE33	90	
P15	Result	EE33	80	
P15	Result	EE33	70	
P16	Result	EE33	93	
P16	Result	EE33	80	
P16	Result	EE33	65	
P16	Result	EE33	80	
P16	Result	EE33	75	
P17	Result	EE33	90	
P17	Result	EE33	85	
P17	Result	EE33	80	
P17	Result	EE33	90	
P17	Result	EE33	75	
2238	Result	EE33	90	
2238	Result	EE33	75	
2238	Result	EE33	80	
2238	Result	EE33	95	
2238	Result	EE33	85	

C2 - BACKGROUND INFORMATION ON THE OCCURRENCE OF OUTLIER VALUES IN THE AMPHIPOD TOXICITY TEST RESULTS

The relationship between the abundance of mussels and occurrence of outliers in the July 2001 amphipod toxicity data provided by SCCWRP is shown in Figure 1. Outliers were always present whenever the abundance of mussels exceeded 20 per 0.1 m^2. Note that the amphipod toxicity and benthic infauna samples were obtained from separate grab samples, so that there is some uncertainty in the number of mussels actually present in the sediment sample collected for toxicity measurement.

Only the data for the July 2001 sampling of reference sites and stations near Chollas Creek are shown. A similar analysis of the data for the Paleta Creek stations (sampled in August 2001) is not appropriate because the toxicity samples were prescreened before testing in order to remove the mussels. No such screening was used for the July 2001 samples. The frequency and magnitude of outliers is lower for the Paleta data set, which supports the hypothesis that the presence of mussels in the toxicity test chamber was the probable cause of most of the outlier results.

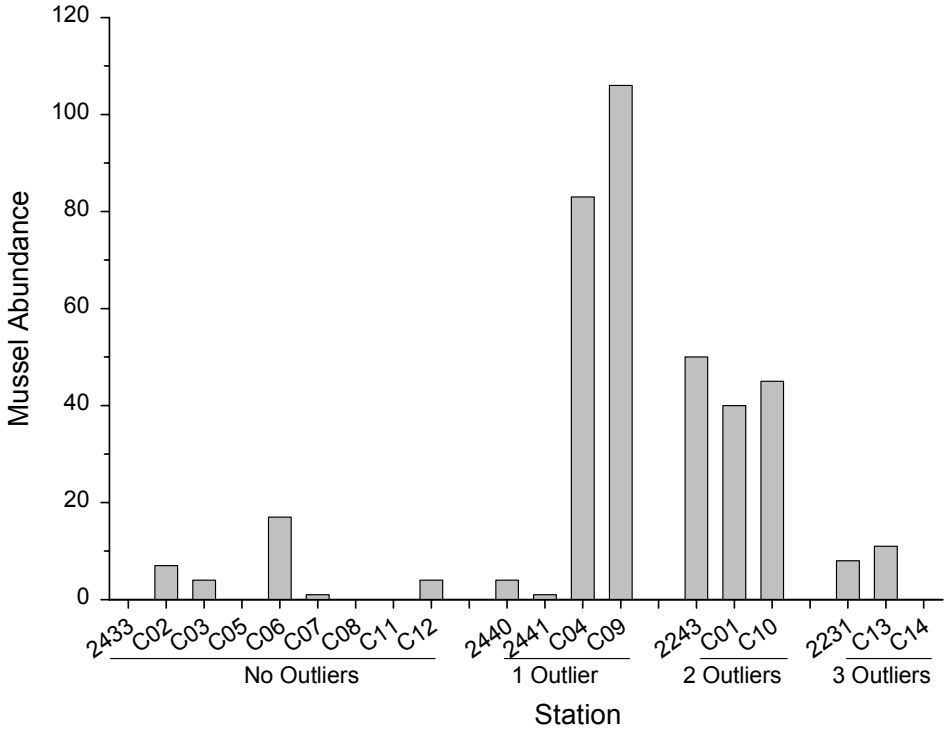


Figure C-1. Abundance of the infaunal mussel *Musculista senhousei* in sediment samples collected during the July 2001 sampling of reference sites and in the Chollas Creek study area.

Frequency and magnitude of outliers in other tests

The Bight'98 dataset provides an excellent dataset to examine the occurrence of outliers in other studies. The same species of amphipod was used in Bight'98, a large number of samples (241) from diverse locations were tested, and six different laboratories conducted the tests.

Figure 2 shows the frequency of occurrence of sample data (5 replicates) having various differences between the median and the minimum replicate survival. The median-minimum difference provides an analogous measure of variability among replicates (*i.e.* magnitude of the gap between replicates) as the outlier identification rule proposed for the 2001 San Diego Bay dataset. The inflection point for this plot is at about 30 percentage points, similar to the value proposed for the 2001 data. All of the 14 samples with a median-minimum difference >40 percentage points would be classified as containing an outlier if the rule proposed for the 2001 data were applied to this dataset.

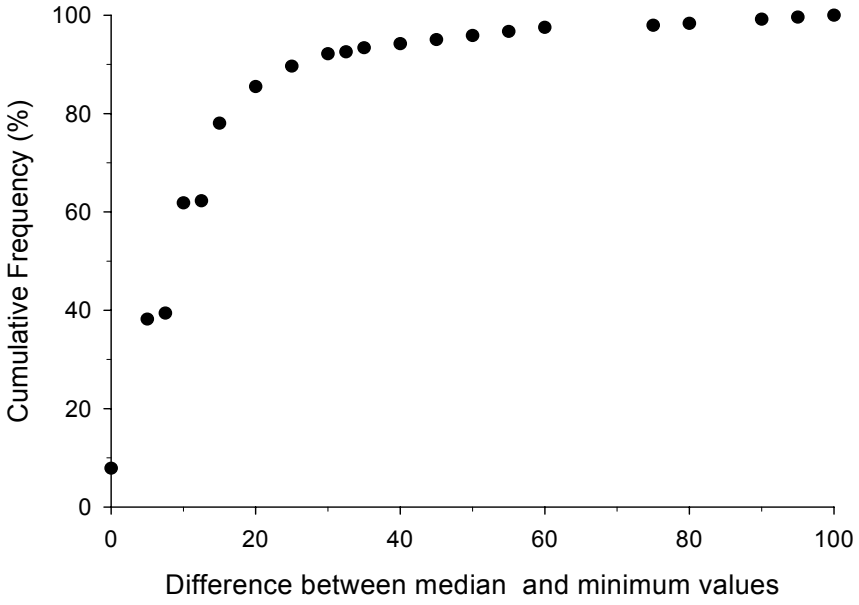


Figure C-2. Cumulative frequency distribution of the difference between the median and minimum values among replicates for Bight'98 amphipod percent survival data.

When the same outlier detection rule proposed for the Chollas/Paleta THS study is applied to the Bight'98 dataset, 17 stations are identified as having 1-2 outliers. These stations constitute 7% of the 241 stations analyzed. All but one of these outlier-containing stations had a median survival of ≥80%. The occurrence of outliers was relatively high in Bight'98 data from San Diego Bay; outliers were identified at 10% of the stations (5 of 46 samples). The incidence of outliers for stations outside of San Diego Bay was 6%. The occurrence of outliers in the 2001 samples from San Diego Bay was 38% (14 of 37 stations).

C3 - POREWATER TOXICITY DATA

Table C-2. Sea urchin fertilization success in sediment pore water from San Diego Bay. The seawater control from reference toxicant test S542 was used for statistical comparison with the pore water samples in experiment S541. NA = not applicable. NC = analyzed, but not counted. QA = sample included for quality assurance purposes.

Sample	Sample Type	QA Batch	Percent Sample / Percent Fertilization		
			25%	50%	100%
Control	Negative control	S542	NA	NA	99
Control	Negative control	S542	NA	NA	98
Control	Negative control	S542	NA	NA	78
Control	Negative control	S542	NA	NA	98
Control	Negative control	S542	NA	NA	93
Control	Negative control	S541	NA	NA	5
Control	Negative control	S541	NA	NA	39
Control	Negative control	S541	NA	NA	20
Control	Negative control	S541	NA	NA	79
Centrifuge Blank	QA	S541	NA	NA	64
Centrifuge Blank	QA	S541	NA	NA	87
Centrifuge Blank	QA	S541	NA	NA	71
Centrifuge Blank	QA	S541	NA	NA	58
C01	Result	S541	NC	95	89
C01	Result	S541	NC	90	87
C01	Result	S541	NC	89	81
C01	Result	S541	NC	93	79
C02	Result	S541	NC	94	95
C02	Result	S541	NC	98	88
C02	Result	S541	NC	94	93
C02	Result	S541	NC	98	95
C03	Result	S541	NC	NC	99
C03	Result	S541	NC	NC	99
C03	Result	S541	NC	NC	99
C03	Result	S541	NC	NC	98
C04	Result	S541	NC	98	89
C04	Result	S541	NC	97	80
C04	Result	S541	NC	91	90
C04	Result	S541	NC	95	88
C05	Result	S541	NC	90	89

Sample	Sample Type	QA Batch	Percent Sample / Percent Fertilization		
			25%	50%	100%
C05	Result	S541	NC	97	94
C05	Result	S541	NC	96	90
C05	Result	S541	NC	89	93
C06	Result	S541	NC	96	80
C06	Result	S541	NC	99	87
C06	Result	S541	NC	96	94
C06	Result	S541	NC	97	91
C07	Result	S541	NC	96	98
C07	Result	S541	NC	98	97
C07	Result	S541	NC	89	88
C07	Result	S541	NC	98	94
C08	Result	S541	NC	NC	97
C08	Result	S541	NC	NC	96
C08	Result	S541	NC	NC	97
C08	Result	S541	NC	NC	95
C09	Result	S541	NC	93	90
C09	Result	S541	NC	97	82
C09	Result	S541	NC	85	91
C09	Result	S541	NC	96	90
C10	Result	S541	NC	92	79
C10	Result	S541	NC	83	86
C10	Result	S541	NC	96	84
C10	Result	S541	NC	91	80
C11	Result	S541	NC	NC	83
C11	Result	S541	NC	NC	99
C11	Result	S541	NC	NC	93
C11	Result	S541	NC	NC	94
C12	Result	S541	92	67	83
C12	Result	S541	89	97	71
C12	Result	S541	93	93	73
C12	Result	S541	88	90	72
C13	Result	S541	0	0	0
C13	Result	S541	0	0	0
C13	Result	S541	0	0	0
C13	Result	S541	0	0	0
C14	Result	S541	NC	93	84
C14	Result	S541	NC	96	79
C14	Result	S541	NC	98	90
C14	Result	S541	NC	94	91
2231	Result	S541	98	95	43

Sample	Sample Type	QA Batch	Percent Sample / Percent Fertilization		
			25%	50%	100%
2231	Result	S541	83	97	69
2231	Result	S541	99	90	72
2231	Result	S541	100	91	61
2243	Result	S541	NC	98	93
2243	Result	S541	NC	98	92
2243	Result	S541	NC	99	89
2243	Result	S541	NC	98	89
2433	Result	S541	NC	98	95
2433	Result	S541	NC	97	90
2433	Result	S541	NC	97	91
2433	Result	S541	NC	99	95
2440	Result	S541	NC	97	84
2440	Result	S541	NC	97	80
2440	Result	S541	NC	92	78
2440	Result	S541	NC	95	75
2441	Result	S541	NC	NC	95
2441	Result	S541	NC	NC	94
2441	Result	S541	NC	NC	98
2441	Result	S541	NC	NC	95
Control	Negative control	S555	NA	NA	97
Control	Negative control	S555	NA	NA	74
Control	Negative control	S555	NA	NA	75
Control	Negative control	S556	NA	NA	58
Control	Negative control	S556	NA	NA	68
Control	Negative control	S556	NA	NA	15
Control	Negative control	S556	NA	NA	16
Control	Negative control	S556	NA	NA	11
Centrifuge Blank	QA	S555	NA	NA	41
Centrifuge Blank	QA	S555	NA	NA	95
Centrifuge Blank	QA	S555	NA	NA	41
Centrifuge Blank	QA	S555	NA	NA	92
P01	Result	S555	43	61	65
P01	Result	S555	65	50	57
P01	Result	S555	70	63	53
P01	Result	S555	55	55	57
P02	Result	S555	95	82	59
P02	Result	S555	93	77	72
P02	Result	S555	94	93	63

Sample	Sample Type	QA Batch	Percent Sample / Percent Fertilization		
			25%	50%	100%
P02	Result	S555	94	87	61
P03	Result	S555	NC	NC	90
P03	Result	S555	NC	NC	94
P03	Result	S555	NC	NC	94
P03	Result	S555	NC	NC	94
P04	Result	S555	NC	93	89
P04	Result	S555	NC	91	80
P04	Result	S555	NC	91	86
P04	Result	S555	NC	89	87
P05	Result	S555	NC	92	80
P05	Result	S555	NC	85	88
P05	Result	S555	NC	93	87
P05	Result	S555	NC	91	86
P06	Result	S555	92	88	71
P06	Result	S555	91	79	63
P06	Result	S555	85	91	78
P06	Result	S555	94	88	67
P07	Result	S555	NC	NC	96
P07	Result	S555	NC	NC	90
P07	Result	S555	NC	NC	97
P07	Result	S555	NC	NC	91
P08	Result	S555	87	90	70
P08	Result	S555	96	88	72
P08	Result	S555	92	78	74
P08	Result	S555	96	87	73
P09	Result	S555	96	79	80
P09	Result	S555	98	89	82
P09	Result	S555	96	94	85
P09	Result	S555	96	89	85
P10	Result	S555	NC	NC	89
P10	Result	S555	NC	NC	91
P10	Result	S555	NC	NC	90
P10	Result	S555	NC	NC	92
P11	Result	S555	71	65	83
P11	Result	S555	90	77	92
P11	Result	S555	85	73	91
P11	Result	S555	90	58	86
P12	Result	S555	NC	NC	90
P12	Result	S555	NC	NC	96
P12	Result	S555	NC	NC	97

Sample	Sample Type	QA Batch	Percent Sample / Percent Fertilization		
			25%	50%	100%
P12	Result	S555	NC	NC	98
P13	Result	S555	NC	92	81
P13	Result	S555	NC	89	81
P13	Result	S555	NC	88	81
P13	Result	S555	NC	95	84
P14	Result	S555	NC	NC	95
P14	Result	S555	NC	NC	98
P14	Result	S555	NC	NC	97
P14	Result	S555	NC	NC	95
P15	Result	S555	NC	NC	95
P15	Result	S555	NC	NC	99
P15	Result	S555	NC	NC	98
P15	Result	S555	NC	NC	97
P16	Result	S555	NC	NC	95
P16	Result	S555	NC	NC	97
P16	Result	S555	NC	NC	99
P16	Result	S555	NC	NC	97
P17	Result	S555	NC	NC	98
P17	Result	S555	NC	NC	97
P17	Result	S555	NC	NC	99
P17	Result	S555	NC	NC	98
2238	Result	S555	93	91	31
2238	Result	S555	97	94	22
2238	Result	S555	97	89	23
2238	Result	S555	96	95	41

C4 - SEDIMENT-WATER INTERFACE TOXICITY DATA

Identification of outliers and adjustment for ammonia influence in the sediment-water interface test

An approach was used to identify outliers and determine the amount of toxicity that was due to ammonia in the sediment-water interface tests with San Diego Bay sediments. The toxicity due to ammonia was then offset and the percentage of normal development adjusted to reflect the amount of toxicity due to other constituents.

Identification of Outliers

The results from a previous experiment using ammonia-spiked seawater were used to describe the effect of ammonia on sea urchin development (Figure C-1). The lower 95% confidence limit from the dose-response experiments was calculated using logistic regression analysis and used to develop two thresholds to classify ammonia influence. The ammonia effect threshold was established as the concentration of ammonia where the lower 95% confidence limit was associated with 80% normal development (0.033 mg/L). Samples with concentrations above the effect threshold and <80% normal development were considered to be affected by unionized ammonia (Figure C-1). Samples with concentrations below the effects threshold, and any sample with ≥80% normal embryo development (regardless of ammonia concentration), were considered to be unaffected by ammonia.

The second threshold represented the concentration of ammonia that was associated with extreme effects, sufficient to cause all of the toxicity observed in samples with <80% normal development. This threshold was determined as the x-intercept of the lower 95% confidence limit, which is equivalent to the concentration associated with 0% normal embryo development (0.067 mg/L). Samples with ammonia concentrations above this threshold were considered to be outliers and not useful for further analysis.

The concentration of ammonia was measured in each SWI core tube replicate from the THS study at the beginning of each experiment and again after 72 h when the experiments were terminated. The average unionized ammonia concentration for each replicate was calculated and compared to the effects thresholds to help identify ammonia influence (Figure C-2). Twenty-seven outlier replicates (>extreme effect threshold) distributed among 12 stations were present. Outliers were detected in all replicates for samples from Stations CP2231, P03 and P10.

Data Adjustment

Twenty-four replicate samples were classified as ammonia influenced due to <80% normal development and ammonia concentrations in the range between the two thresholds (Figure C-2). The concentration of ammonia in these samples, however, was not high enough to prevent assessment of the influence of other constituents on sea urchin embryo development. The amount of toxicity due to other constituents was estimated as follows. For samples below the lower confidence limit, an adjusted development value was calculated as: 100 – (development predicted by lower confidence limit – observed development) (Figure C-3). For samples with development above the lower confidence limit, an adjustment based upon the lower 95% confidence limit would inflate the adjusted percent development above a likely value so the adjustment equation was not applied. The adjusted development for these samples was

set as equal to the average development of samples that were not influenced by ammonia in the Alternate Reference Pool (=100.3% of control development). Four Chollas THS stations and 9 Paleta THS stations had at least one replicate that exceeded the effects threshold and was adjusted. Outlier replicates were removed from one Chollas THS station and seven Paleta THS stations. Outliers accounted for all of the replicates at stations P03 and P10. Therefore, no usable data were available for the sediment-water interface test at these stations.

Due to operator error, initial ammonia concentrations were not measured for the experiment that included the Paleta THS stations and reference Station CP2238. Therefore, the initial values for these samples was estimated as the 10th percentile of measured initial values from the samples collected from the Chollas THS and other reference stations (0.012 mg/L NH_3), when the final concentrations from Paleta THS samples were low (<0.10 mg/L NH_3). For stations having a final concentration $\geq$0.10 mg/L NH_3, the average initial value from the Chollas THS samples was used (0.031 mg/L NH_3).

A complete list of station results from the sea urchin embryo normal development in sediment-water interface test is provided in Table C-3.

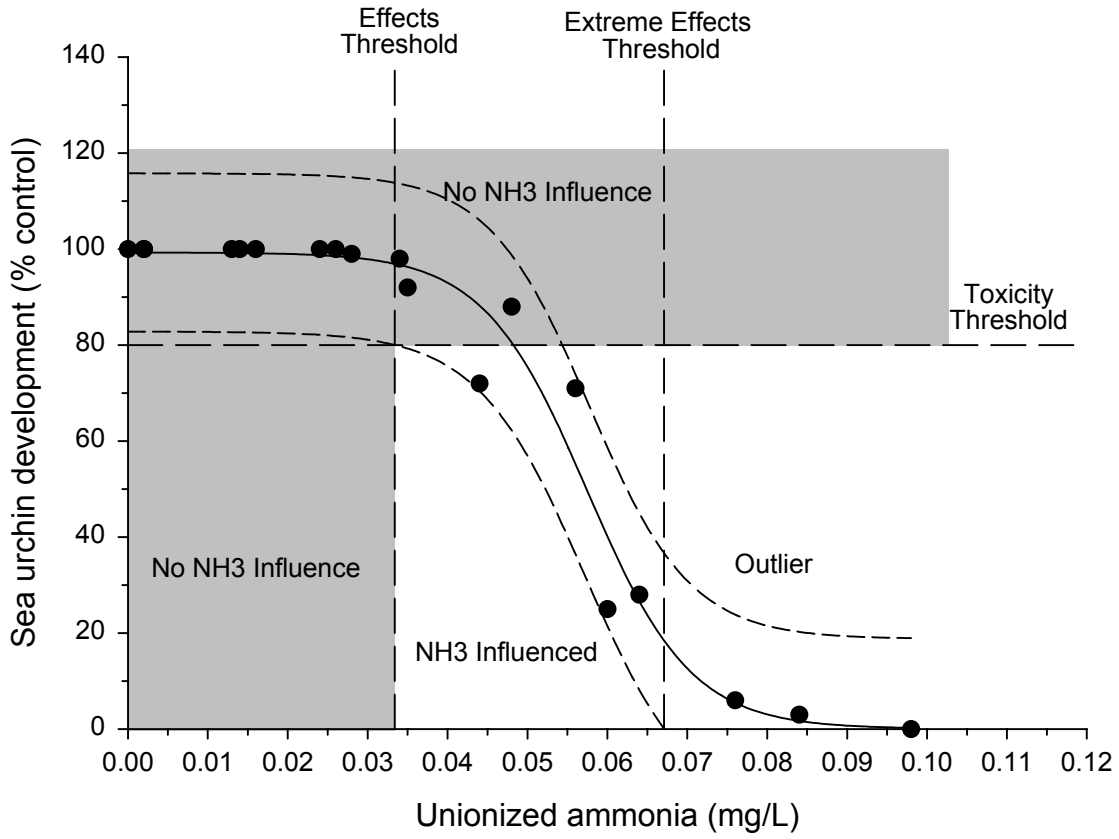


Figure C- 3. Effect of unionized ammonia on sea urchin embryo development. The plotted points are from experiments using seawater spiked with various concentrations of ammonia. The three categories (No NH_3 influence, NH_3 influenced, Outlier) reflect the concentration of unionized ammonia and level of normal embryo development observed.

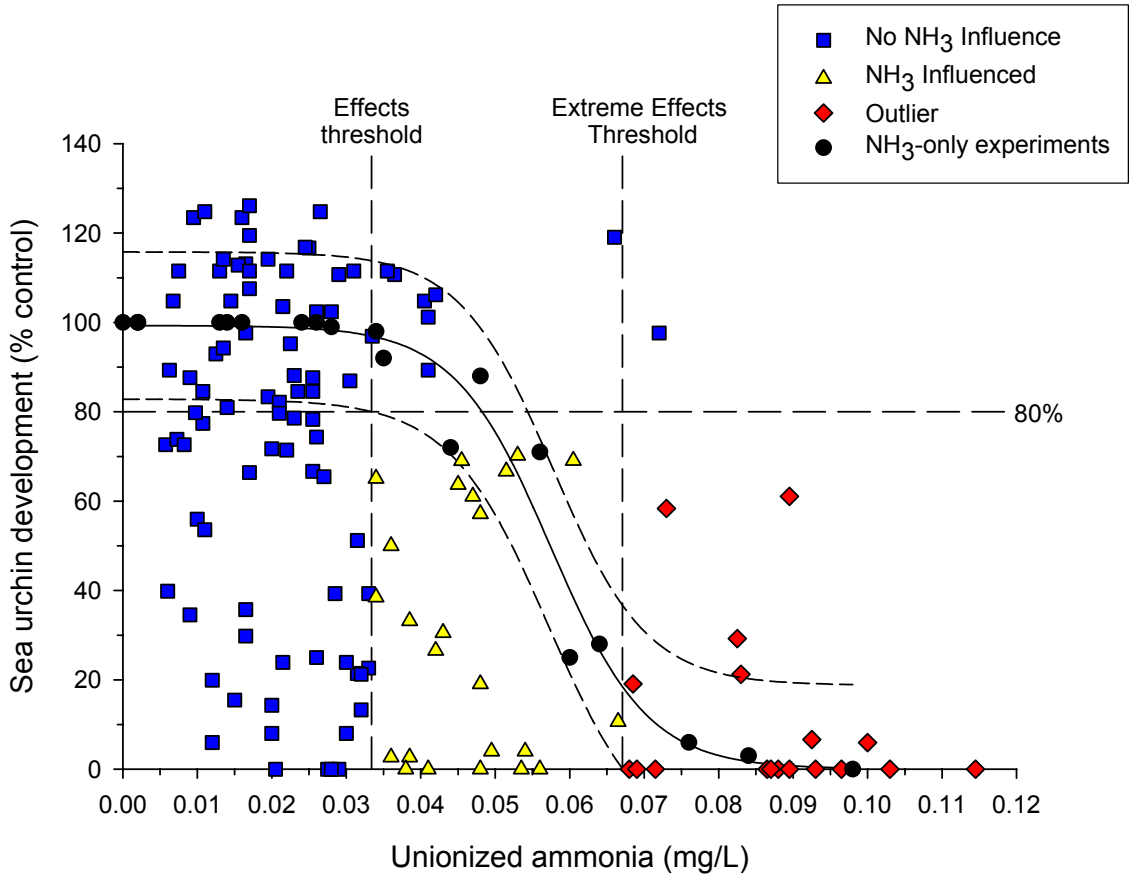


Figure C- 4 Sea urchin embryo development and unionized ammonia concentrations from Chollas and Paleta THS stations, the San Diego Bay reference stations, and ammonia-only experiments. The San Diego Bay samples are categorized by influence of ammonia.

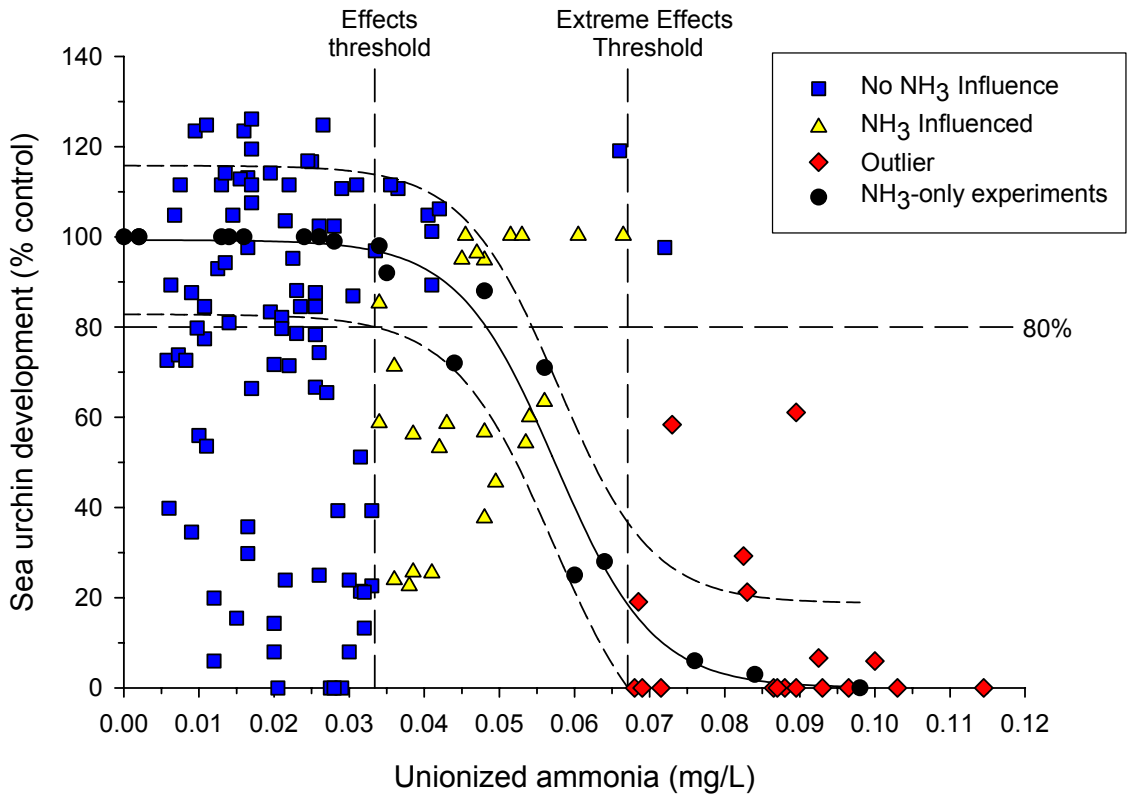


Figure C- 5. Adjusted sea urchin embryo development results that exclude the effect of ammonia for the NH_3 influenced samples.

Table C-3. Sea urchin embryo normal development in sediment-water interface test. Values are for measurements before correcting for ammonia influence, and have not been control adjusted.

Sample	Sample Type	QA Batch	Percent Normal Development	Outlier / Ammonia influence
Tube Blank	Negative control	S543	85	
Tube Blank	Negative control	S543	89	
Tube Blank	Negative control	S543	78	
C01 SWI	Result	S543	33	
C01 SWI	Result	S543	88	
C02 SWI	Result	S543	74	
C02 SWI	Result	S543	43	
C02 SWI	Result	S543	86	
C02 SWI	Result	S543	56	
C03 SWI	Result	S543	66	
C03 SWI	Result	S543	42	Ammonia Influenced
C03 SWI	Result	S543	0	Ammonia Influenced
C04 SWI	Result	S543	56	Ammonia Influenced
C04 SWI	Result	S543	0	Ammonia Influenced
C04 SWI	Result	S543	16	Ammonia Influenced
C04 SWI	Result	S543	48	Ammonia Influenced
C05 SWI	Result	S543	0	
C05 SWI	Result	S543	82	
C05 SWI	Result	S543	95	
C06 SWI	Result	S543	33	
C06 SWI	Result	S543	88	
C06 SWI	Result	S543	21	
C06 SWI	Result	S543	60	
C07 SWI	Result	S543	70	
C07 SWI	Result	S543	88	
C07 SWI	Result	S543	69	
C08 SWI	Result	S543	68	
C08 SWI	Result	S543	75	
C08 SWI	Result	S543	47	
C08 SWI	Result	S543	59	Ammonia Influenced
C09 SWI	Result	S543	45	
C09 SWI	Result	S543	5	
C09 SWI	Result	S543	0	Outlier
C09 SWI	Result	S543	30	
C10 SWI	Result	S543	55	
C10 SWI	Result	S543	61	
C10 SWI	Result	S543	25	
C10 SWI	Result	S543	71	

Sample	Sample Type	QA Batch	Percent Normal Development	Outlier / Ammonia influence
C11 SWI	Result	S543	62	
C11 SWI	Result	S543	71	
C11 SWI	Result	S543	65	
C11 SWI	Result	S543	61	
C12 SWI	Result	S543	13	
C12 SWI	Result	S543	19	
C12 SWI	Result	S543	0	Ammonia Influenced
C12 SWI	Result	S543	29	
C13 SWI	Result	S543	71	
C13 SWI	Result	S543	86	
C13 SWI	Result	S543	73	
C13 SWI	Result	S543	67	
C14 SWI	Result	S543	18	
C14 SWI	Result	S543	12	
C14 SWI	Result	S543	0	
C14 SWI	Result	S543	80	
2231 SWI	Result	S543	0	Outlier
2231 SWI	Result	S543	0	Outlier
2231 SWI	Result	S543	0	Outlier
2243 SWI	Result	S543	85	
2243 SWI	Result	S543	93	
2243 SWI	Result	S543	0	Outlier
2243 SWI	Result	S543	0	Outlier
2433 SWI	Result	S543	16	Outlier
2433 SWI	Result	S543	100	
2433 SWI	Result	S543	98	
2433 SWI	Result	S543	93	
2440 SWI	Result	S543	49	Outlier
2440 SWI	Result	S543	58	Ammonia Influenced
2440 SWI	Result	S543	82	
2441 SWI	Result	S543	5	Outlier
2441 SWI	Result	S543	75	
2441 SWI	Result	S543	0	Outlier
Tube Blank	Negative control	S557	78	
Tube Blank	Negative control	S557	70	
Tube Blank	Negative control	S557	78	
Tube Blank	Negative control	S557	91	
P01 SWI	Result	S557	90	
P01 SWI	Result	S557	56	
P01 SWI	Result	S557	6	
P01 SWI	Result	S557	88	
P02 SWI	Result	S557	86	Outlier

Sample	Sample Type	QA Batch	Percent Normal Development	Outlier / Ammonia influence
P02 SWI	Result	S557	85	Outlier
P02 SWI	Result	S557	84	Outlier
P02 SWI	Result	S557	60	Outlier
P03 SWI	Result	S557	5	
P03 SWI	Result	S557	0	
P03 SWI	Result	S557	0	
P03 SWI	Result	S557	0	
P04 SWI	Result	S557	70	Ammonia Influenced
P04 SWI	Result	S557	84	
P04 SWI	Result	S557	94	
P04 SWI	Result	S557	84	Ammonia Influenced
P05 SWI	Result	S557	20	
P05 SWI	Result	S557	71	
P05 SWI	Result	S557	66	
P05 SWI	Result	S557	49	
P06 SWI	Result	S557	93	
P06 SWI	Result	S557	73	
P06 SWI	Result	S557	59	Ammonia Influenced
P06 SWI	Result	S557	66	
P07 SWI	Result	S557	81	Ammonia Influenced
P07 SWI	Result	S557	93	Outlier
P07 SWI	Result	S557	2	
P07 SWI	Result	S557	95	
P08 SWI	Result	S557	48	
P08 SWI	Result	S557	0	
P08 SWI	Result	S557	84	
P08 SWI	Result	S557	84	
P09 SWI	Result	S557	78	Outlier
P09 SWI	Result	S557	50	Outlier
P09 SWI	Result	S557	54	Outlier
P09 SWI	Result	S557	84	Outlier
P10 SWI	Result	S557	0	Ammonia Influenced
P10 SWI	Result	S557	16	Ammonia Influenced
P10 SWI	Result	S557	0	Outlier
P10 SWI	Result	S557	22	Ammonia Influenced
P11 SWI	Result	S557	0	Outlier
P11 SWI	Result	S557	3	Ammonia Influenced
P11 SWI	Result	S557	0	Outlier
P11 SWI	Result	S557	23	Outlier
P12 SWI	Result	S557	0	Outlier
P12 SWI	Result	S557	0	Ammonia Influenced
P12 SWI	Result	S557	0	Outlier

Sample	Sample Type	QA Batch	Percent Normal Development	Outlier / Ammonia influence
P12 SWI	Result	S557	0	Outlier
P13 SWI	Result	S557	0	Ammonia Influenced
P13 SWI	Result	S557	52	Ammonia Influenced
P13 SWI	Result	S557	0	Ammonia Influenced
P13 SWI	Result	S557	46	Outlier
P14 SWI	Result	S557	25	
P14 SWI	Result	S557	3	Ammonia Influenced
P14 SWI	Result	S557	46	
P14 SWI	Result	S557	0	
P15 SWI	Result	S557	30	
P15 SWI	Result	S557	2	
P15 SWI	Result	S557	18	
P15 SWI	Result	S557	15	
P16 SWI	Result	S557	16	
P16 SWI	Result	S557	0	Ammonia Influenced
P16 SWI	Result	S557	6	
P17 SWI	Result	S557	18	
P17 SWI	Result	S557	0	
P17 SWI	Result	S557	29	
P17 SWI	Result	S557	80	Ammonia Influenced
2238 SWI	Result	S557	86	Outlier
2238 SWI	Result	S557	10	Outlier
2238 SWI	Result	S557	94	Outlier
2238 SWI	Result	S557	8	

APPENDIX D: BENTHIC ECOLOGY DATA

D1 - BENTHIC ECOLOGY DATA TABLES

Table D-1. Benthic organisms collected during July and August 2001 sampling events.

Station	Sampling Date	Species	Phylum	Abundance
2231	7/18/2001	Acidostoma hancocki	Arthropoda	1
2231	7/18/2001	Acteocina inculta	Mollusca	1
2231	7/18/2001	Ampelisca lobata	Arthropoda	4
2231	7/18/2001	Amphideutopus oculatus	Arthropoda	1
2231	7/18/2001	Amphipholis squamata	Echinodermata	5
2231	7/18/2001	Amphiporus sp	Nemertea	5
2231	7/18/2001	Amphiuridae	Echinodermata	1
2231	7/18/2001	Anthozoa	Cnidaria	1
2231	7/18/2001	Anthuridae	Arthropoda	1
2231	7/18/2001	Bathyleberis sp	Arthropoda	1
2231	7/18/2001	Bemlos sp	Arthropoda	9
2231	7/18/2001	Boccardia sp	Annelida	1
2231	7/18/2001	Brania californiensis	Annelida	1
2231	7/18/2001	Calocarides spinulicauda	Arthropoda	3
2231	7/18/2001	Ceratonereis mirabilis	Annelida	1
2231	7/18/2001	Chone minuta	Annelida	1
2231	7/18/2001	Cryptomya californica	Mollusca	1
2231	7/18/2001	Diopatra ornata	Annelida	1
2231	7/18/2001	Dorvillea (Schistomeringos) longicornis	Annelida	6
2231	7/18/2001	Drilonereis mexicana	Annelida	1
2231	7/18/2001	Ericthonius brasiliensis	Arthropoda	4
2231	7/18/2001	Eteone aestuarina	Annelida	1
2231	7/18/2001	Euchone limnicola	Annelida	1
2231	7/18/2001	Eumida longicornuta	Annelida	5
2231	7/18/2001	Eupolymnia heterobranchia	Annelida	3
2231	7/18/2001	Exogone lourei	Annelida	238
2231	7/18/2001	Fabricinuda limnicola	Annelida	1
2231	7/18/2001	Gammaropsis thompsoni	Arthropoda	2
2231	7/18/2001	Glycera americana	Annelida	1
2231	7/18/2001	Harmothoe imbricata Cmplx	Annelida	31
2231	7/18/2001	Hemipodus borealis	Annelida	15
2231	7/18/2001	Heteromysis odontops	Arthropoda	6
2231	7/18/2001	Heterophoxus oculatus	Arthropoda	23
2231	7/18/2001	Hiatella arctica	Mollusca	6
2231	7/18/2001	Hoplonemertea	Nemertea	6
2231	7/18/2001	Joeropsis dubia	Arthropoda	6
2231	7/18/2001	Kalliapsuedes crassus	Arthropoda	5128
2231	7/18/2001	Laevicardium substriatum	Mollusca	1
2231	7/18/2001	Laonice cirrata	Annelida	1
2231	7/18/2001	Leitoscoloplos pugettensis	Annelida	2
2231	7/18/2001	Leptochelia dubia	Arthropoda	114
2231	7/18/2001	Leptopecten latiauratus	Mollusca	2
2231	7/18/2001	Leucothoe alata	Arthropoda	7
2231	7/18/2001	Lophopanopeus bellus	Arthropoda	23
2231	7/18/2001	Lumbrineridae	Annelida	10
2231	7/18/2001	Lumbrineris erecta	Annelida	12
2231	7/18/2001	Lumbrineris limicola	Annelida	20
2231	7/18/2001	Maera similis	Arthropoda	5
2231	7/18/2001	Marphysa sp HYP1	Annelida	31
2231	7/18/2001	Mediomastus sp	Annelida	78
2231	7/18/2001	Melinna oculata	Annelida	1
2231	7/18/2001	Monocorophium acherusicum	Arthropoda	1
2231	7/18/2001	Musculista senhousia	Mollusca	8
2231	7/18/2001	Neanthes acuminata Cmplx	Annelida	1
2231	7/18/2001	Nereididae	Annelida	1
2231	7/18/2001	Nicolea gracilibranchus	Annelida	158
2231	7/18/2001	Notomastus sp	Annelida	1

Station	Sampling Date	Species	Phylum	Abundance
2231	7/18/2001	Odontosyllis phosphorea	Annelida	10
2231	7/18/2001	Oligochaeta	Annelida	1
2231	7/18/2001	Ophiodromus pugettensis	Annelida	1
2231	7/18/2001	Paracerceis sculpta	Arthropoda	1
2231	7/18/2001	Paranemertes californica	Nemertea	6
2231	7/18/2001	Paranthura elegans	Arthropoda	2
2231	7/18/2001	Peramphithoe sp	Arthropoda	1
2231	7/18/2001	Pherusa capulata	Annelida	8
2231	7/18/2001	Pista agassizi	Annelida	77
2231	7/18/2001	Podocerus brasiliensis	Arthropoda	2
2231	7/18/2001	Podocerus fulanus	Arthropoda	1
2231	7/18/2001	Polycirrus sp	Annelida	4
2231	7/18/2001	Polycladida	Platyhelminthes	1
2231	7/18/2001	Polydora sp	Annelida	1
2231	7/18/2001	Prionospio (Prionospio) heterobranchia	Annelida	29
2231	7/18/2001	Protothaca staminea	Mollusca	3
2231	7/18/2001	Pseudopolydora paucibranchiata	Annelida	6
2231	7/18/2001	Pyromaia tuberculata	Arthropoda	27
2231	7/18/2001	Sabellaria gracilis	Annelida	1
2231	7/18/2001	Scoletoma sp C	Annelida	52
2231	7/18/2001	Scyphoproctus oculatus	Annelida	57
2231	7/18/2001	Spiophanes duplex	Annelida	1
2231	7/18/2001	Styelidae	Chordata	3
2231	7/18/2001	Syllidae	Annelida	2
2231	7/18/2001	Syllis (Syllis) gracilis	Annelida	10
2231	7/18/2001	Syllis (Typosyllis) nipponica	Annelida	22
2231	7/18/2001	Tagelus affinis	Mollusca	1
2231	7/18/2001	Terebellidae	Annelida	2
2231	7/18/2001	Tetrastemma candidum	Nemertea	2
2231	7/18/2001	Theora lubrica	Mollusca	2
2231	7/18/2001	Turbonilla sp	Mollusca	7
2238	8/28/2001	Alpheus sp	Arthropoda	2
2238	8/28/2001	Amphipholis squamata	Echinodermata	5
2238	8/28/2001	Anthozoa	Cnidaria	1
2238	8/28/2001	Armandia brevis	Annelida	5
2238	8/28/2001	Atylus tridens	Arthropoda	1
2238	8/28/2001	Bemlos macromanus	Arthropoda	10
2238	8/28/2001	Deltamysis sp A	Arthropoda	1
2238	8/28/2001	Diplocirrus sp SD1	Annelida	2
2238	8/28/2001	Edwardsia californica	Cnidaria	5
2238	8/28/2001	Eteone aestuarina	Annelida	1
2238	8/28/2001	Exogone lourei	Annelida	2
2238	8/28/2001	Harmothoe imbricata Cmplx	Annelida	5
2238	8/28/2001	Heterophoxus oculatus	Arthropoda	3
2238	8/28/2001	Heteroserolis carinata	Arthropoda	1
2238	8/28/2001	Kalliapsuedes crassus	Arthropoda	7
2238	8/28/2001	Leitoscoloplos pugettensis	Annelida	35
2238	8/28/2001	Macoma indentata	Mollusca	2
2238	8/28/2001	Mediomastus sp	Annelida	35
2238	8/28/2001	Musculista senhousia	Mollusca	70
2238	8/28/2001	Neanthes acuminata Cmplx	Annelida	30
2238	8/28/2001	Paracerceis sculpta	Arthropoda	65
2238	8/28/2001	Paranemertes californica	Nemertea	1
2238	8/28/2001	Pherusa capulata	Annelida	6
2238	8/28/2001	Pista agassizi	Annelida	11
2238	8/28/2001	Podocerus brasiliensis	Arthropoda	4
2238	8/28/2001	Prionospio (Prionospio) heterobranchia	Annelida	5
2238	8/28/2001	Pseudopolydora paucibranchiata	Annelida	1
2238	8/28/2001	Schmittius politus	Arthropoda	1
2238	8/28/2001	Scoletoma sp C	Annelida	82
2238	8/28/2001	Scyphoproctus oculatus	Annelida	16
2238	8/28/2001	Syllis (Syllis) gracilis	Annelida	2
2238	8/28/2001	Theora lubrica	Mollusca	2
2243	7/18/2001	Amphideutopus oculatus	Arthropoda	3
2243	7/18/2001	Atylus tridens	Arthropoda	1
2243	7/18/2001	Barleeia haliotiphila	Mollusca	1
2243	7/18/2001	Caprella equilibra	Arthropoda	8

Station	Sampling Date	Species	Phylum	Abundance
2243	7/18/2001	Ceriantharia	Cnidaria	2
2243	7/18/2001	Dorvillea (Schistomeringos) longicornis	Annelida	2
2243	7/18/2001	Edwardsia californica	Cnidaria	31
2243	7/18/2001	Edwardsiidae	Cnidaria	2
2243	7/18/2001	Euchone limnicola	Annelida	1
2243	7/18/2001	Exogone lourei	Annelida	70
2243	7/18/2001	Fabricinuda limnicola	Annelida	3
2243	7/18/2001	Glycera americana	Annelida	1
2243	7/18/2001	Harmothoe imbricata Cmplx	Annelida	2
2243	7/18/2001	Hartmanodes hartmanae	Arthropoda	1
2243	7/18/2001	Heterophoxus oculatus	Arthropoda	1
2243	7/18/2001	Leitoscoloplos pugettensis	Annelida	10
2243	7/18/2001	Leptopecten latiauratus	Mollusca	1
2243	7/18/2001	Lineidae	Nemertea	1
2243	7/18/2001	Lumbrineridae	Annelida	3
2243	7/18/2001	Lumbrineris erecta	Annelida	8
2243	7/18/2001	Macoma nasuta	Mollusca	6
2243	7/18/2001	Mediomastus sp	Annelida	50
2243	7/18/2001	Musculista senhousia	Mollusca	50
2243	7/18/2001	Nassarius tiarula	Mollusca	7
2243	7/18/2001	Neanthes acuminata Cmplx	Annelida	12
2243	7/18/2001	Oligochaeta	Annelida	1
2243	7/18/2001	Oxyurostylis pacifica	Arthropoda	1
2243	7/18/2001	Paracerceis sculpta	Arthropoda	7
2243	7/18/2001	Paranemertes californica	Nemertea	1
2243	7/18/2001	Phoronis sp	Phorona	6
2243	7/18/2001	Pista agassizi	Annelida	11
2243	7/18/2001	Podocerus brasiliensis	Arthropoda	7
2243	7/18/2001	Poecilochaetus johnsoni	Annelida	1
2243	7/18/2001	Prionospio (Prionospio) heterobranchia	Annelida	7
2243	7/18/2001	Pseudopolydora paucibranchiata	Annelida	7
2243	7/18/2001	Scolanthus sp A	Cnidaria	3
2243	7/18/2001	Scoletoma sp C	Annelida	240
2243	7/18/2001	Scyphoproctus oculatus	Annelida	119
2243	7/18/2001	Theora lubrica	Mollusca	1
2433	7/18/2001	Acteocina culcitella	Mollusca	1
2433	7/18/2001	Aglaja ocelligera	Mollusca	1
2433	7/18/2001	Amaeana occidentalis	Annelida	2
2433	7/18/2001	Amphicteis scaphobranchiata	Annelida	1
2433	7/18/2001	Amphideutopus oculatus	Arthropoda	2
2433	7/18/2001	Amphiodia psara	Echinodermata	1
2433	7/18/2001	Amphiodia urtica	Echinodermata	1
2433	7/18/2001	Asteropella slatteryi	Arthropoda	1
2433	7/18/2001	Asthenothaerus diegensis	Mollusca	1
2433	7/18/2001	Chaetozone corona	Annelida	13
2433	7/18/2001	Cossura candida	Annelida	2
2433	7/18/2001	Cryptomya californica	Mollusca	4
2433	7/18/2001	Diplocirrus sp SD1	Annelida	81
2433	7/18/2001	Euchone limnicola	Annelida	1
2433	7/18/2001	Euclymeninae	Annelida	4
2433	7/18/2001	Euclymeninae sp A	Annelida	8
2433	7/18/2001	Glycera americana	Annelida	2
2433	7/18/2001	Hoplonemertea	Nemertea	1
2433	7/18/2001	Laevicardium substriatum	Mollusca	1
2433	7/18/2001	Leitoscoloplos pugettensis	Annelida	57
2433	7/18/2001	Leptosynapta sp	Echinodermata	1
2433	7/18/2001	Lucinisca nuttalli	Mollusca	1
2433	7/18/2001	Lumbrineris erecta	Annelida	1
2433	7/18/2001	Lyonsia californica	Mollusca	1
2433	7/18/2001	Macoma yoldiformis	Mollusca	2
2433	7/18/2001	Malacoplax californiensis	Arthropoda	2
2433	7/18/2001	Mediomastus sp	Annelida	28
2433	7/18/2001	Mysidopsis californica	Arthropoda	1
2433	7/18/2001	Neastacilla californica	Arthropoda	2
2433	7/18/2001	Neotrypaea gigas	Arthropoda	4
2433	7/18/2001	Neotrypaea sp	Arthropoda	7
2433	7/18/2001	Nephtys cornuta	Annelida	2

Station	Sampling Date	Species	Phylum	Abundance
2433	7/18/2001	Notomastus latericeus	Annelida	2
2433	7/18/2001	Oxyurostylis pacifica	Arthropoda	1
2433	7/18/2001	Paranemertes californica	Nemertea	1
2433	7/18/2001	Paraprionospio pinnata	Annelida	1
2433	7/18/2001	Phyllodoce hartmanae	Annelida	1
2433	7/18/2001	Pista agassizi	Annelida	5
2433	7/18/2001	Pista disjuncta	Annelida	1
2433	7/18/2001	Praxillella pacifica	Annelida	1
2433	7/18/2001	Rochefortia coani	Mollusca	2
2433	7/18/2001	Rudilemboides stenopropodus	Arthropoda	1
2433	7/18/2001	Scleroplax granulata	Arthropoda	29
2433	7/18/2001	Scoletoma sp	Annelida	23
2433	7/18/2001	Scoletoma sp A	Annelida	8
2433	7/18/2001	Scoletoma sp B	Annelida	2
2433	7/18/2001	Scoletoma sp C	Annelida	80
2433	7/18/2001	Spiophanes duplex	Annelida	2
2433	7/18/2001	Syllis (Typosyllis) nipponica	Annelida	9
2433	7/18/2001	Tagelus subteres	Mollusca	4
2433	7/18/2001	Tellina carpenteri	Mollusca	1
2433	7/18/2001	Terebellidae	Annelida	1
2433	7/18/2001	Theora lubrica	Mollusca	5
2433	7/18/2001	Thracia trapezoides	Mollusca	1
2433	7/18/2001	Tubulanus nothus	Nemertea	1
2433	7/18/2001	Zygeupolia rubens	Nemertea	1
2440	7/18/2001	Americhelidium rectipalmum	Arthropoda	4
2440	7/18/2001	Amphideutopus oculatus	Arthropoda	17
2440	7/18/2001	Amphiuridae	Echinodermata	1
2440	7/18/2001	Apoprionospio pygmaea	Annelida	2
2440	7/18/2001	Armandia brevis	Annelida	1
2440	7/18/2001	Asteropella slatteryi	Arthropoda	8
2440	7/18/2001	Atylus tridens	Arthropoda	2
2440	7/18/2001	Campylaspis rubromaculata	Arthropoda	2
2440	7/18/2001	Capitella capitata Cmplx	Annelida	2
2440	7/18/2001	Carazziella sp A	Annelida	1
2440	7/18/2001	Chaetozone corona	Annelida	3
2440	7/18/2001	Cooperella subdiaphana	Mollusca	1
2440	7/18/2001	Cossura candida	Annelida	1
2440	7/18/2001	Diopatra ornata	Annelida	1
2440	7/18/2001	Diplocirrus sp SD1	Annelida	123
2440	7/18/2001	Dorvillea (Schistomeringos) longicornis	Annelida	15
2440	7/18/2001	Eteone fauchaldi	Annelida	1
2440	7/18/2001	Euchone limnicola	Annelida	21
2440	7/18/2001	Euphilomedes carcharodonta	Arthropoda	16
2440	7/18/2001	Exogone lourei	Annelida	28
2440	7/18/2001	Fabricinuda limnicola	Annelida	2
2440	7/18/2001	Goniada littorea	Annelida	1
2440	7/18/2001	Halosydna latior	Annelida	1
2440	7/18/2001	Heterophoxus oculatus	Arthropoda	5
2440	7/18/2001	Heteroserolis carinata	Arthropoda	7
2440	7/18/2001	Laevicardium substriatum	Mollusca	1
2440	7/18/2001	Leitoscoloplos pugettensis	Annelida	117
2440	7/18/2001	Listriella melanica	Arthropoda	2
2440	7/18/2001	Lyonsia californica	Mollusca	4
2440	7/18/2001	Mediomastus sp	Annelida	117
2440	7/18/2001	Melanochlamys diomedea	Mollusca	1
2440	7/18/2001	Melinna oculata	Annelida	2
2440	7/18/2001	Micropodarke dubia	Annelida	1
2440	7/18/2001	Musculista senhousia	Mollusca	4
2440	7/18/2001	Nassarius tiarula	Mollusca	1
2440	7/18/2001	Neotrypaea sp	Arthropoda	1
2440	7/18/2001	Nephtys caecoides	Annelida	1
2440	7/18/2001	Nephtys cornuta	Annelida	3
2440	7/18/2001	Nereis procera	Annelida	3
2440	7/18/2001	Odontosyllis phosphorea	Annelida	1
2440	7/18/2001	Oligochaeta	Annelida	2
2440	7/18/2001	Paraprionospio pinnata	Annelida	1
2440	7/18/2001	Pista agassizi	Annelida	136

Station	Sampling Date	Species	Phylum	Abundance
2440	7/18/2001	Pista disjuncta	Annelida	3
2440	7/18/2001	Pista sp	Annelida	2
2440	7/18/2001	Prionospio (Minuspio) lighti	Annelida	1
2440	7/18/2001	Prionospio (Prionospio) heterobranchia	Annelida	63
2440	7/18/2001	Pseudopolydora paucibranchiata	Annelida	2
2440	7/18/2001	Pyromaia tuberculata	Arthropoda	2
2440	7/18/2001	Rochefortia grippi	Mollusca	1
2440	7/18/2001	Rudilemboides stenopropodus	Arthropoda	7
2440	7/18/2001	Scleroplax granulata	Arthropoda	1
2440	7/18/2001	Scolanthus sp A	Cnidaria	3
2440	7/18/2001	Scolelepis occidentalis	Annelida	2
2440	7/18/2001	Scoletoma sp	Annelida	15
2440	7/18/2001	Scoletoma sp A	Annelida	4
2440	7/18/2001	Scoletoma sp C	Annelida	94
2440	7/18/2001	Serpulidae	Annelida	4
2440	7/18/2001	Solen rostriformis	Mollusca	2
2440	7/18/2001	Spiophanes duplex	Annelida	8
2440	7/18/2001	Syllis (Typosyllis) nipponica	Annelida	2
2440	7/18/2001	Tagelus subteres	Mollusca	10
2440	7/18/2001	Tanaidacea	Arthropoda	8
2440	7/18/2001	Theora lubrica	Mollusca	18
2440	7/18/2001	Tubulanus frenatus	Nemertea	1
2441	7/18/2001	Amaeana occidentalis	Annelida	4
2441	7/18/2001	Ampharete labrops	Annelida	3
2441	7/18/2001	Amphicteis scaphobranchiata	Annelida	2
2441	7/18/2001	Amphiodia urtica	Echinodermata	11
2441	7/18/2001	Anoplodactylus erectus	Arthropoda	1
2441	7/18/2001	Aphelochaeta monilaris	Annelida	1
2441	7/18/2001	Aphelochaeta petersenae	Annelida	1
2441	7/18/2001	Carinoma mutabilis	Nemertea	1
2441	7/18/2001	Chaetozone corona	Annelida	11
2441	7/18/2001	Cossura candida	Annelida	12
2441	7/18/2001	Cryptomya californica	Mollusca	1
2441	7/18/2001	Diopatra ornata	Annelida	2
2441	7/18/2001	Diplocirrus sp SD1	Annelida	8
2441	7/18/2001	Dorvillea (Schistomeringos) longicornis	Annelida	3
2441	7/18/2001	Edwardsia californica	Cnidaria	2
2441	7/18/2001	Edwardsia sp G	Cnidaria	1
2441	7/18/2001	Edwardsiidae	Cnidaria	4
2441	7/18/2001	Euclymeninae sp A	Annelida	4
2441	7/18/2001	Glycera americana	Annelida	2
2441	7/18/2001	Glycera nana	Annelida	1
2441	7/18/2001	Heteroserolis carinata	Arthropoda	2
2441	7/18/2001	Leitoscoloplos pugettensis	Annelida	86
2441	7/18/2001	Leptopecten latiauratus	Mollusca	1
2441	7/18/2001	Leptosynapta sp	Echinodermata	11
2441	7/18/2001	Lineidae	Nemertea	3
2441	7/18/2001	Listriella eriopisa	Arthropoda	2
2441	7/18/2001	Listriella goleta	Arthropoda	1
2441	7/18/2001	Macoma nasuta	Mollusca	1
2441	7/18/2001	Macoma yoldiformis	Mollusca	5
2441	7/18/2001	Malmgreniella macginitiei	Annelida	3
2441	7/18/2001	Malmgreniella sp	Annelida	1
2441	7/18/2001	Malmgreniella sp A	Annelida	2
2441	7/18/2001	Mediomastus sp	Annelida	16
2441	7/18/2001	Melinna oculata	Annelida	3
2441	7/18/2001	Metasychis disparidentatus	Annelida	1
2441	7/18/2001	Microspio pigmentata	Annelida	1
2441	7/18/2001	Musculista senhousia	Mollusca	1
2441	7/18/2001	Nephtys cornuta	Annelida	1
2441	7/18/2001	Nereididae	Annelida	1
2441	7/18/2001	Nereis procera	Annelida	3
2441	7/18/2001	Notomastus sp A	Annelida	1
2441	7/18/2001	Nuculana taphria	Mollusca	1
2441	7/18/2001	Oligochaeta	Annelida	2
2441	7/18/2001	Pachycerianthus fimbriatus	Cnidaria	1
2441	7/18/2001	Paraprionospio pinnata	Annelida	2

Station	Sampling Date	Species	Phylum	Abundance
2441	7/18/2001	Parvilucina tenuisculpta	Mollusca	1
2441	7/18/2001	Pectinaria californiensis	Annelida	2
2441	7/18/2001	Philine sp	Mollusca	1
2441	7/18/2001	Pista agassizi	Annelida	7
2441	7/18/2001	Pista disjuncta	Annelida	7
2441	7/18/2001	Polycladida	Platyhelminthes	1
2441	7/18/2001	Prionospio (Minuspio) lighti	Annelida	2
2441	7/18/2001	Prionospio (Prionospio) heterobranchia	Annelida	17
2441	7/18/2001	Rochefortia compressa	Mollusca	1
2441	7/18/2001	Rochefortia tumida	Mollusca	1
2441	7/18/2001	Scolanthus sp A	Cnidaria	3
2441	7/18/2001	Scoletoma sp	Annelida	29
2441	7/18/2001	Scoletoma sp A	Annelida	9
2441	7/18/2001	Scoletoma sp B	Annelida	4
2441	7/18/2001	Scoletoma sp C	Annelida	140
2441	7/18/2001	Spiophanes duplex	Annelida	4
2441	7/18/2001	Tagelus subteres	Mollusca	7
2441	7/18/2001	Tellina modesta	Mollusca	5
2441	7/18/2001	Theora lubrica	Mollusca	3
2441	7/18/2001	Tubulanus polymorphus	Nemertea	4
C01	7/18/2001	Amphideutopus oculatus	Arthropoda	2
C01	7/18/2001	Cirratulidae	Annelida	1
C01	7/18/2001	Cossura candida	Annelida	23
C01	7/18/2001	Crucibulum spinosum	Mollusca	1
C01	7/18/2001	Diplocirrus sp SD1	Annelida	4
C01	7/18/2001	Dorvillea (Schistomeringos) longicornis	Annelida	5
C01	7/18/2001	Edwardsia californica	Cnidaria	8
C01	7/18/2001	Euchone limnicola	Annelida	3
C01	7/18/2001	Euphilomedes carcharodonta	Arthropoda	5
C01	7/18/2001	Eupolymnia heterobranchia	Annelida	1
C01	7/18/2001	Exogone lourei	Annelida	4
C01	7/18/2001	Harmothoe imbricata Cmplx	Annelida	1
C01	7/18/2001	Heterophoxus oculatus	Arthropoda	2
C01	7/18/2001	Laevicardium substriatum	Mollusca	1
C01	7/18/2001	Leitoscoloplos pugettensis	Annelida	57
C01	7/18/2001	Lumbrineridae	Annelida	3
C01	7/18/2001	Lyonsia californica	Mollusca	1
C01	7/18/2001	Mediomastus sp	Annelida	14
C01	7/18/2001	Musculista senhousia	Mollusca	40
C01	7/18/2001	Nassarius tiarula	Mollusca	1
C01	7/18/2001	Oligochaeta	Annelida	3
C01	7/18/2001	Pista agassizi	Annelida	7
C01	7/18/2001	Polycirrus sp	Annelida	1
C01	7/18/2001	Prionospio (Prionospio) heterobranchia	Annelida	56
C01	7/18/2001	Pseudopolydora paucibranchiata	Annelida	4
C01	7/18/2001	Pteropurpura festiva	Mollusca	1
C01	7/18/2001	Pyromaia tuberculata	Arthropoda	2
C01	7/18/2001	Rudilemboides stenopropodus	Arthropoda	1
C01	7/18/2001	Scolanthus sp A	Cnidaria	6
C01	7/18/2001	Scolelepis occidentalis	Annelida	1
C01	7/18/2001	Scoletoma sp C	Annelida	97
C01	7/18/2001	Syllis (Typosyllis) nipponica	Annelida	1
C01	7/18/2001	Theora lubrica	Mollusca	16
C02	7/18/2001	Americhelidium rectipalmum	Arthropoda	1
C02	7/18/2001	Amphideutopus oculatus	Arthropoda	1
C02	7/18/2001	Carinoma mutabilis	Nemertea	1
C02	7/18/2001	Ceriantharia	Cnidaria	1
C02	7/18/2001	Corymorpha sp	Cnidaria	1
C02	7/18/2001	Cossura candida	Annelida	7
C02	7/18/2001	Diplocirrus sp SD1	Annelida	1
C02	7/18/2001	Dorvillea (Schistomeringos) longicornis	Annelida	1
C02	7/18/2001	Edwardsia californica	Cnidaria	4
C02	7/18/2001	Euphilomedes carcharodonta	Arthropoda	8
C02	7/18/2001	Exogone lourei	Annelida	1
C02	7/18/2001	Glycera americana	Annelida	1
C02	7/18/2001	Hippolytidae	Arthropoda	1
C02	7/18/2001	Leitoscoloplos pugettensis	Annelida	21

Station	Sampling Date	Species	Phylum	Abundance
C02	7/18/2001	Lineidae	Nemertea	1
C02	7/18/2001	Lophopanopeus bellus	Arthropoda	2
C02	7/18/2001	Lumbrineris erecta	Annelida	1
C02	7/18/2001	Lyonsia californica	Mollusca	1
C02	7/18/2001	Mediomastus sp	Annelida	10
C02	7/18/2001	Musculista senhousia	Mollusca	7
C02	7/18/2001	Mysidopsis californica	Arthropoda	2
C02	7/18/2001	Nassarius tiarula	Mollusca	2
C02	7/18/2001	Paraprionospio pinnata	Annelida	1
C02	7/18/2001	Pista agassizi	Annelida	2
C02	7/18/2001	Prionospio (Prionospio) heterobranchia	Annelida	1
C02	7/18/2001	Pseudopolydora paucibranchiata	Annelida	10
C02	7/18/2001	Pyromaia tuberculata	Arthropoda	2
C02	7/18/2001	Scolanthus sp A	Cnidaria	1
C02	7/18/2001	Scoletoma sp	Annelida	1
C02	7/18/2001	Scoletoma sp C	Annelida	56
C02	7/18/2001	Theora lubrica	Mollusca	3
C03	7/18/2001	Amphideutopus oculatus	Arthropoda	1
C03	7/18/2001	Diplocirrus sp SD1	Annelida	2
C03	7/18/2001	Dorvillea (Schistomeringos) longicornis	Annelida	4
C03	7/18/2001	Edwardsia californica	Cnidaria	1
C03	7/18/2001	Euchone limnicola	Annelida	6
C03	7/18/2001	Euphilomedes carcharodonta	Arthropoda	2
C03	7/18/2001	Exogone lourei	Annelida	1
C03	7/18/2001	Leitoscoloplos pugettensis	Annelida	68
C03	7/18/2001	Lumbrineris erecta	Annelida	4
C03	7/18/2001	Mediomastus sp	Annelida	1
C03	7/18/2001	Musculista senhousia	Mollusca	4
C03	7/18/2001	Natantia	Arthropoda	2
C03	7/18/2001	Paranemertes californica	Nemertea	1
C03	7/18/2001	Phyllodoce hartmanae	Annelida	1
C03	7/18/2001	Pista agassizi	Annelida	3
C03	7/18/2001	Pista sp	Annelida	1
C03	7/18/2001	Prionospio (Prionospio) heterobranchia	Annelida	2
C03	7/18/2001	Pseudopolydora paucibranchiata	Annelida	21
C03	7/18/2001	Scolanthus sp A	Cnidaria	4
C03	7/18/2001	Scoletoma sp C	Annelida	29
C03	7/18/2001	Theora lubrica	Mollusca	4
C03	7/18/2001	Tubulanus polymorphus	Nemertea	1
C04	7/18/2001	Acteocina inculta	Mollusca	1
C04	7/18/2001	Aphelochaeta sp	Annelida	1
C04	7/18/2001	Cossura candida	Annelida	33
C04	7/18/2001	Diplocirrus sp SD1	Annelida	3
C04	7/18/2001	Dorvillea (Schistomeringos) longicornis	Annelida	1
C04	7/18/2001	Eteone fauchaldi	Annelida	1
C04	7/18/2001	Euchone limnicola	Annelida	7
C04	7/18/2001	Exogone lourei	Annelida	14
C04	7/18/2001	Glycera americana	Annelida	1
C04	7/18/2001	Harmothoe imbricata Cmplx	Annelida	4
C04	7/18/2001	Leitoscoloplos pugettensis	Annelida	68
C04	7/18/2001	Lumbrineridae	Annelida	1
C04	7/18/2001	Lumbrineris erecta	Annelida	10
C04	7/18/2001	Lyonsia californica	Mollusca	1
C04	7/18/2001	Mediomastus sp	Annelida	18
C04	7/18/2001	Musculista senhousia	Mollusca	83
C04	7/18/2001	Nassarius tiarula	Mollusca	2
C04	7/18/2001	Neanthes acuminata Cmplx	Annelida	1
C04	7/18/2001	Neosabellaria cementarium	Annelida	1
C04	7/18/2001	Oligochaeta	Annelida	5
C04	7/18/2001	Paranemertes californica	Nemertea	1
C04	7/18/2001	Pista agassizi	Annelida	71
C04	7/18/2001	Prionospio (Minuspio) lighti	Annelida	1
C04	7/18/2001	Prionospio (Prionospio) heterobranchia	Annelida	35
C04	7/18/2001	Pseudopolydora paucibranchiata	Annelida	7
C04	7/18/2001	Scolanthus sp A	Cnidaria	4
C04	7/18/2001	Scoletoma sp	Annelida	3
C04	7/18/2001	Scoletoma sp C	Annelida	82

Station	Sampling Date	Species	Phylum	Abundance
C04	7/18/2001	Theora lubrica	Mollusca	11
C05	7/18/2001	Cossura candida	Annelida	14
C05	7/18/2001	Diplocirrus sp SD1	Annelida	1
C05	7/18/2001	Dorvillea (Schistomeringos) longicornis	Annelida	1
C05	7/18/2001	Drilonereis mexicana	Annelida	1
C05	7/18/2001	Edwardsia californica	Cnidaria	3
C05	7/18/2001	Exogone lourei	Annelida	1
C05	7/18/2001	Gammaridea	Arthropoda	1
C05	7/18/2001	Leitoscoloplos pugettensis	Annelida	52
C05	7/18/2001	Lumbrineris erecta	Annelida	1
C05	7/18/2001	Mediomastus sp	Annelida	6
C05	7/18/2001	Nassarius tiarula	Mollusca	2
C05	7/18/2001	Prionospio (Prionospio) heterobranchia	Annelida	8
C05	7/18/2001	Pseudopolydora paucibranchiata	Annelida	2
C05	7/18/2001	Rudilemboides stenopropodus	Arthropoda	1
C05	7/18/2001	Scolanthus sp A	Cnidaria	12
C05	7/18/2001	Scoletoma sp A	Annelida	8
C05	7/18/2001	Scoletoma sp C	Annelida	86
C05	7/18/2001	Theora lubrica	Mollusca	3
C05	7/18/2001	Tubulanus frenatus	Nemertea	1
C05	7/18/2001	Tubulanus polymorphus	Nemertea	1
C06	7/18/2001	Amphideutopus oculatus	Arthropoda	12
C06	7/18/2001	Armandia brevis	Annelida	1
C06	7/18/2001	Chione sp	Mollusca	1
C06	7/18/2001	Cirratulidae	Annelida	1
C06	7/18/2001	Cossura candida	Annelida	7
C06	7/18/2001	Diplocirrus sp SD1	Annelida	11
C06	7/18/2001	Dorvillea (Schistomeringos) longicornis	Annelida	5
C06	7/18/2001	Euchone limnicola	Annelida	4
C06	7/18/2001	Euphilomedes carcharodonta	Arthropoda	1
C06	7/18/2001	Exogone lourei	Annelida	15
C06	7/18/2001	Fabricinuda limnicola	Annelida	1
C06	7/18/2001	Glycera americana	Annelida	2
C06	7/18/2001	Hartmanodes hartmanae	Arthropoda	1
C06	7/18/2001	Leitoscoloplos pugettensis	Annelida	79
C06	7/18/2001	Lumbrineris erecta	Annelida	1
C06	7/18/2001	Lyonsia californica	Mollusca	2
C06	7/18/2001	Mayerella banksia	Arthropoda	1
C06	7/18/2001	Mediomastus sp	Annelida	12
C06	7/18/2001	Musculista senhousia	Mollusca	17
C06	7/18/2001	Nephtys cornuta	Annelida	2
C06	7/18/2001	Odontosyllis phosphorea	Annelida	1
C06	7/18/2001	Paranemertes californica	Nemertea	1
C06	7/18/2001	Pista agassizi	Annelida	14
C06	7/18/2001	Prionospio (Prionospio) heterobranchia	Annelida	17
C06	7/18/2001	Pseudopolydora paucibranchiata	Annelida	14
C06	7/18/2001	Pyromaia tuberculata	Arthropoda	1
C06	7/18/2001	Rudilemboides stenopropodus	Arthropoda	4
C06	7/18/2001	Scolanthus sp A	Cnidaria	6
C06	7/18/2001	Scolelepis sp	Annelida	1
C06	7/18/2001	Scoletoma sp C	Annelida	51
C06	7/18/2001	Spiophanes duplex	Annelida	1
C06	7/18/2001	Theora lubrica	Mollusca	14
C07	7/18/2001	Amphiuridae	Echinodermata	1
C07	7/18/2001	Capitella capitata Cmplx	Annelida	3
C07	7/18/2001	Caprella californica	Arthropoda	1
C07	7/18/2001	Chaetozone corona	Annelida	2
C07	7/18/2001	Cirratulidae	Annelida	1
C07	7/18/2001	Cossura candida	Annelida	10
C07	7/18/2001	Diopatra ornata	Annelida	1
C07	7/18/2001	Diplocirrus sp SD1	Annelida	1
C07	7/18/2001	Dorvillea (Schistomeringos) longicornis	Annelida	20
C07	7/18/2001	Edwardsia californica	Cnidaria	18
C07	7/18/2001	Eteone fauchaldi	Annelida	1
C07	7/18/2001	Euchone limnicola	Annelida	1
C07	7/18/2001	Euphilomedes carcharodonta	Arthropoda	7
C07	7/18/2001	Exogone lourei	Annelida	2

Station	Sampling Date	Species	Phylum	Abundance
C07	7/18/2001	Glycera americana	Annelida	1
C07	7/18/2001	Leitoscoloplos pugettensis	Annelida	40
C07	7/18/2001	Leptosynapta sp	Echinodermata	6
C07	7/18/2001	Lumbrineridae	Annelida	1
C07	7/18/2001	Lumbrineris erecta	Annelida	2
C07	7/18/2001	Lumbrineris japonica	Annelida	1
C07	7/18/2001	Mediomastus sp	Annelida	78
C07	7/18/2001	Microspio pigmentata	Annelida	1
C07	7/18/2001	Musculista senhousia	Mollusca	1
C07	7/18/2001	Natantia	Arthropoda	1
C07	7/18/2001	Neanthes acuminata Cmplx	Annelida	4
C07	7/18/2001	Notomastus sp A	Annelida	1
C07	7/18/2001	Oligochaeta	Annelida	9
C07	7/18/2001	Paranemertes californica	Nemertea	3
C07	7/18/2001	Pista agassizi	Annelida	5
C07	7/18/2001	Pista disjuncta	Annelida	1
C07	7/18/2001	Prionospio (Prionospio) heterobranchia	Annelida	36
C07	7/18/2001	Pseudopolydora paucibranchiata	Annelida	9
C07	7/18/2001	Scolelepis occidentalis	Annelida	2
C07	7/18/2001	Scoletoma sp	Annelida	3
C07	7/18/2001	Scoletoma sp A	Annelida	4
C07	7/18/2001	Scoletoma sp C	Annelida	146
C07	7/18/2001	Tagelus subteres	Mollusca	2
C07	7/18/2001	Theora lubrica	Mollusca	2
C07	7/18/2001	Tubulanus frenatus	Nemertea	1
C07	7/18/2001	Tubulanus polymorphus	Nemertea	2
C08	7/18/2001	Cossura candida	Annelida	1
C08	7/18/2001	Edwardsia californica	Cnidaria	3
C08	7/18/2001	Glycera americana	Annelida	1
C08	7/18/2001	Leitoscoloplos pugettensis	Annelida	1
C08	7/18/2001	Pherusa capulata	Annelida	1
C08	7/18/2001	Scoletoma sp C	Annelida	13
C09	7/18/2001	Acteocina inculta	Mollusca	1
C09	7/18/2001	Americhelidium shoemakeri	Arthropoda	1
C09	7/18/2001	Ampelisca lobata	Arthropoda	1
C09	7/18/2001	Amphiodia urtica	Echinodermata	3
C09	7/18/2001	Brania californiensis	Annelida	1
C09	7/18/2001	Carinoma mutabilis	Nemertea	1
C09	7/18/2001	Cossura candida	Annelida	15
C09	7/18/2001	Diplocirrus sp SD1	Annelida	5
C09	7/18/2001	Dorvillea (Schistomeringos) longicornis	Annelida	7
C09	7/18/2001	Drilonereis mexicana	Annelida	1
C09	7/18/2001	Edwardsia californica	Cnidaria	2
C09	7/18/2001	Euchone limnicola	Annelida	8
C09	7/18/2001	Euphilomedes carcharodonta	Arthropoda	4
C09	7/18/2001	Eupolymnia heterobranchia	Annelida	3
C09	7/18/2001	Exogone lourei	Annelida	47
C09	7/18/2001	Harmothoe imbricata Cmplx	Annelida	5
C09	7/18/2001	Heterophoxus oculatus	Arthropoda	2
C09	7/18/2001	Heteroserolis carinata	Arthropoda	1
C09	7/18/2001	Laevicardium substriatum	Mollusca	1
C09	7/18/2001	Leitoscoloplos pugettensis	Annelida	97
C09	7/18/2001	Leptosynapta sp	Echinodermata	9
C09	7/18/2001	Lineidae	Nemertea	1
C09	7/18/2001	Lumbrineridae	Annelida	5
C09	7/18/2001	Lumbrineris limicola	Annelida	5
C09	7/18/2001	Macoma indentata	Mollusca	1
C09	7/18/2001	Mediomastus sp	Annelida	35
C09	7/18/2001	Musculista senhousia	Mollusca	106
C09	7/18/2001	Nassarius tiarula	Mollusca	2
C09	7/18/2001	Neanthes acuminata Cmplx	Annelida	1
C09	7/18/2001	Nephtys caecoides	Annelida	1
C09	7/18/2001	Odontosyllis phosphorea	Annelida	1
C09	7/18/2001	Oligochaeta	Annelida	2
C09	7/18/2001	Phoronis sp	Phorona	1
C09	7/18/2001	Pista agassizi	Annelida	35
C09	7/18/2001	Prionospio (Prionospio) heterobranchia	Annelida	35

Station	Sampling Date	Species	Phylum	Abundance
C09	7/18/2001	Pseudopolydora paucibranchiata	Annelida	22
C09	7/18/2001	Scolanthus sp A	Cnidaria	20
C09	7/18/2001	Scoletoma sp	Annelida	7
C09	7/18/2001	Scoletoma sp A	Annelida	14
C09	7/18/2001	Scoletoma sp C	Annelida	128
C09	7/18/2001	Theora lubrica	Mollusca	2
C09	7/18/2001	Tubulanus polymorphus	Nemertea	1
C10	7/18/2001	Amphideutopus oculatus	Arthropoda	3
C10	7/18/2001	Armandia brevis	Annelida	2
C10	7/18/2001	Calocarides spinulicauda	Arthropoda	3
C10	7/18/2001	Cossura candida	Annelida	7
C10	7/18/2001	Diplocirrus sp SD1	Annelida	7
C10	7/18/2001	Dorvillea (Schistomeringos) longicornis	Annelida	3
C10	7/18/2001	Drilonereis mexicana	Annelida	1
C10	7/18/2001	Edwardsia californica	Cnidaria	3
C10	7/18/2001	Euchone limnicola	Annelida	2
C10	7/18/2001	Euphilomedes carcharodonta	Arthropoda	7
C10	7/18/2001	Exogone lourei	Annelida	14
C10	7/18/2001	Fabricinuda limnicola	Annelida	4
C10	7/18/2001	Glycera americana	Annelida	1
C10	7/18/2001	Harmothoe imbricata Cmplx	Annelida	4
C10	7/18/2001	Heterophoxus oculatus	Arthropoda	1
C10	7/18/2001	Leitoscoloplos pugettensis	Annelida	69
C10	7/18/2001	Lumbrineridae	Annelida	1
C10	7/18/2001	Mediomastus sp	Annelida	19
C10	7/18/2001	Musculista senhousia	Mollusca	45
C10	7/18/2001	Nemertea	Nemertea	1
C10	7/18/2001	Nephtys cornuta	Annelida	1
C10	7/18/2001	Notomastus sp A	Annelida	1
C10	7/18/2001	Odontosyllis phosphorea	Annelida	2
C10	7/18/2001	Pista agassizi	Annelida	12
C10	7/18/2001	Prionospio (Prionospio) heterobranchia	Annelida	18
C10	7/18/2001	Pseudopolydora paucibranchiata	Annelida	4
C10	7/18/2001	Pyromaia tuberculata	Arthropoda	1
C10	7/18/2001	Rudilemboides stenopropodus	Arthropoda	1
C10	7/18/2001	Scolanthus sp A	Cnidaria	4
C10	7/18/2001	Scoletoma sp C	Annelida	73
C11	7/18/2001	Carinoma mutabilis	Nemertea	1
C11	7/18/2001	Euphilomedes carcharodonta	Arthropoda	1
C11	7/18/2001	Lumbrineris latreilli	Annelida	1
C11	7/18/2001	Notomastus sp	Annelida	1
C11	7/18/2001	Odontosyllis phosphorea	Annelida	1
C11	7/18/2001	Prionospio (Prionospio) heterobranchia	Annelida	1
C11	7/18/2001	Pseudopolydora paucibranchiata	Annelida	1
C12	7/18/2001	Chaetozone corona	Annelida	1
C12	7/18/2001	Cossura candida	Annelida	1
C12	7/18/2001	Diplocirrus sp SD1	Annelida	2
C12	7/18/2001	Euphilomedes carcharodonta	Arthropoda	3
C12	7/18/2001	Leitoscoloplos pugettensis	Annelida	10
C12	7/18/2001	Leptosynapta sp	Echinodermata	2
C12	7/18/2001	Lyonsia californica	Mollusca	1
C12	7/18/2001	Musculista senhousia	Mollusca	4
C12	7/18/2001	Neanthes acuminata Cmplx	Annelida	1
C12	7/18/2001	Nemertea	Nemertea	1
C12	7/18/2001	Pista agassizi	Annelida	1
C12	7/18/2001	Scoletoma sp C	Annelida	5
C12	7/18/2001	Timarete sp	Annelida	1
C13	7/18/2001	Acteocina inculta	Mollusca	4
C13	7/18/2001	Aoroides sp	Arthropoda	1
C13	7/18/2001	Bemlos sp	Arthropoda	1
C13	7/18/2001	Bulla gouldiana	Mollusca	4
C13	7/18/2001	Capitella capitata Cmplx	Annelida	75
C13	7/18/2001	Cossura candida	Annelida	1
C13	7/18/2001	Dorvillea (Schistomeringos) longicornis	Annelida	38
C13	7/18/2001	Euphilomedes carcharodonta	Arthropoda	3
C13	7/18/2001	Exogone lourei	Annelida	2
C13	7/18/2001	Grandidierella japonica	Arthropoda	2

Station	Sampling Date	Species	Phylum	Abundance
C13	7/18/2001	Hemigrapsus oregonensis	Arthropoda	1
C13	7/18/2001	Leitoscoloplos pugettensis	Annelida	1
C13	7/18/2001	Leptochelia dubia	Arthropoda	1
C13	7/18/2001	Leptosynapta sp	Echinodermata	2
C13	7/18/2001	Lineidae	Nemertea	1
C13	7/18/2001	Lumbrineris erecta	Annelida	1
C13	7/18/2001	Macoma indentata	Mollusca	1
C13	7/18/2001	Macoma nasuta	Mollusca	1
C13	7/18/2001	Musculista senhousia	Mollusca	11
C13	7/18/2001	Neanthes acuminata Cmplx	Annelida	13
C13	7/18/2001	Odontosyllis phosphorea	Annelida	1
C13	7/18/2001	Oxyurostylis pacifica	Arthropoda	2
C13	7/18/2001	Pista agassizi	Annelida	1
C13	7/18/2001	Prionospio (Prionospio) heterobranchia	Annelida	12
C13	7/18/2001	Scoletoma sp C	Annelida	3
C13	7/18/2001	Streblospio benedicti	Annelida	7
C14	7/18/2001	Bemlos sp	Arthropoda	1
C14	7/18/2001	Bulla gouldiana	Mollusca	3
C14	7/18/2001	Capitella capitata Cmplx	Annelida	501
C14	7/18/2001	Dorvillea (Schistomeringos) longicornis	Annelida	27
C14	7/18/2001	Grandidierella japonica	Arthropoda	2
C14	7/18/2001	Harmothoe imbricata Cmplx	Annelida	1
C14	7/18/2001	Nassarius tiarula	Mollusca	1
C14	7/18/2001	Neanthes acuminata Cmplx	Annelida	14
C14	7/18/2001	Oligochaeta	Annelida	2
C14	7/18/2001	Streblospio benedicti	Annelida	1
P01	8/28/2001	Amphideutopus oculatus	Arthropoda	6
P01	8/28/2001	Amphipholis squamata	Echinodermata	1
P01	8/28/2001	Chione californiensis	Mollusca	1
P01	8/28/2001	Crucibulum spinosum	Mollusca	4
P01	8/28/2001	Diopatra ornata	Annelida	2
P01	8/28/2001	Diplocirrus sp SD1	Annelida	4
P01	8/28/2001	Drilonereis mexicana	Annelida	1
P01	8/28/2001	Euphilomedes carcharodonta	Arthropoda	1
P01	8/28/2001	Glycera americana	Annelida	1
P01	8/28/2001	Heterophoxus oculatus	Arthropoda	1
P01	8/28/2001	Heteroserolis carinata	Arthropoda	1
P01	8/28/2001	Laevicardium substriatum	Mollusca	3
P01	8/28/2001	Leitoscoloplos pugettensis	Annelida	9
P01	8/28/2001	Lyonsia californica	Mollusca	5
P01	8/28/2001	Mediomastus sp	Annelida	11
P01	8/28/2001	Musculista senhousia	Mollusca	3
P01	8/28/2001	Nassarius tiarula	Mollusca	4
P01	8/28/2001	Odontosyllis phosphorea	Annelida	1
P01	8/28/2001	Ostrea sp	Mollusca	1
P01	8/28/2001	Paranemertes californica	Nemertea	2
P01	8/28/2001	Piromis sp	Annelida	1
P01	8/28/2001	Pista agassizi	Annelida	9
P01	8/28/2001	Polydora sp	Annelida	1
P01	8/28/2001	Prionospio (Prionospio) heterobranchia	Annelida	4
P01	8/28/2001	Pseudopolydora paucibranchiata	Annelida	7
P01	8/28/2001	Scolanthus sp A	Cnidaria	6
P01	8/28/2001	Scoletoma sp C	Annelida	31
P01	8/28/2001	Tagelus affinis	Mollusca	1
P01	8/28/2001	Theora lubrica	Mollusca	31
P01	8/28/2001	Thracia sp	Mollusca	1
P02	8/28/2001	Amphideutopus oculatus	Arthropoda	5
P02	8/28/2001	Ceriantharia	Cnidaria	1
P02	8/28/2001	Chione californiensis	Mollusca	1
P02	8/28/2001	Diplocirrus sp SD1	Annelida	12
P02	8/28/2001	Exogone lourei	Annelida	1
P02	8/28/2001	Glycera americana	Annelida	1
P02	8/28/2001	Heteroserolis carinata	Arthropoda	2
P02	8/28/2001	Laevicardium substriatum	Mollusca	1
P02	8/28/2001	Leitoscoloplos pugettensis	Annelida	21
P02	8/28/2001	Mediomastus sp	Annelida	19
P02	8/28/2001	Musculista senhousia	Mollusca	8

Station	Sampling Date	Species	Phylum	Abundance
P02	8/28/2001	Nassarius tiarula	Mollusca	2
P02	8/28/2001	Odontosyllis phosphorea	Annelida	1
P02	8/28/2001	Pista agassizi	Annelida	3
P02	8/28/2001	Poecilochaetus sp A	Annelida	1
P02	8/28/2001	Prionospio (Prionospio) heterobranchia	Annelida	4
P02	8/28/2001	Pseudopolydora paucibranchiata	Annelida	3
P02	8/28/2001	Rudilemboides stenopropodus	Arthropoda	2
P02	8/28/2001	Scolanthus sp A	Cnidaria	2
P02	8/28/2001	Scoletoma sp C	Annelida	27
P02	8/28/2001	Theora lubrica	Mollusca	7
P03	8/28/2001	Ambidexter panamensis	Arthropoda	3
P03	8/28/2001	Amphideutopus oculatus	Arthropoda	1
P03	8/28/2001	Amphipoda	Arthropoda	1
P03	8/28/2001	Bemlos sp	Arthropoda	1
P03	8/28/2001	Ceriantharia	Cnidaria	1
P03	8/28/2001	Chione californiensis	Mollusca	1
P03	8/28/2001	Diplocirrus sp SD1	Annelida	1
P03	8/28/2001	Dorvillea (Schistomeringos) longicornis	Annelida	1
P03	8/28/2001	Euchone limnicola	Annelida	2
P03	8/28/2001	Exogone lourei	Annelida	7
P03	8/28/2001	Heterophoxus oculatus	Arthropoda	3
P03	8/28/2001	Leitoscoloplos pugettensis	Annelida	24
P03	8/28/2001	Lineidae	Nemertea	2
P03	8/28/2001	Lumbrineris erecta	Annelida	3
P03	8/28/2001	Mediomastus sp	Annelida	55
P03	8/28/2001	Microspio pigmentata	Annelida	1
P03	8/28/2001	Musculista senhousia	Mollusca	43
P03	8/28/2001	Nassarius tiarula	Mollusca	9
P03	8/28/2001	Nereididae	Annelida	1
P03	8/28/2001	Nicolea gracilibranchus	Annelida	1
P03	8/28/2001	Paracerceis sculpta	Arthropoda	2
P03	8/28/2001	Paranemertes californica	Nemertea	1
P03	8/28/2001	Pista agassizi	Annelida	11
P03	8/28/2001	Podocerus brasiliensis	Arthropoda	2
P03	8/28/2001	Prionospio (Prionospio) heterobranchia	Annelida	5
P03	8/28/2001	Protocirrineris sp A	Annelida	1
P03	8/28/2001	Pseudopolydora paucibranchiata	Annelida	6
P03	8/28/2001	Scolanthus sp A	Cnidaria	3
P03	8/28/2001	Scoletoma sp C	Annelida	57
P03	8/28/2001	Scyphoproctus oculatus	Annelida	4
P04	8/28/2001	Alpheus sp	Arthropoda	1
P04	8/28/2001	Amphideutopus oculatus	Arthropoda	8
P04	8/28/2001	Bemlos sp	Arthropoda	2
P04	8/28/2001	Euchone limnicola	Annelida	1
P04	8/28/2001	Euphilomedes carcharodonta	Arthropoda	3
P04	8/28/2001	Exogone lourei	Annelida	6
P04	8/28/2001	Heterophoxus oculatus	Arthropoda	1
P04	8/28/2001	Leitoscoloplos pugettensis	Annelida	52
P04	8/28/2001	Lumbrineris erecta	Annelida	1
P04	8/28/2001	Mediomastus sp	Annelida	27
P04	8/28/2001	Musculista senhousia	Mollusca	5
P04	8/28/2001	Odontosyllis phosphorea	Annelida	1
P04	8/28/2001	Paranemertes californica	Nemertea	4
P04	8/28/2001	Pista agassizi	Annelida	3
P04	8/28/2001	Poecilochaetus sp A	Annelida	1
P04	8/28/2001	Prionospio (Prionospio) heterobranchia	Annelida	6
P04	8/28/2001	Pseudopolydora paucibranchiata	Annelida	23
P04	8/28/2001	Pyromaia tuberculata	Arthropoda	1
P04	8/28/2001	Scolanthus sp A	Cnidaria	5
P04	8/28/2001	Scoletoma sp	Annelida	1
P04	8/28/2001	Scoletoma sp C	Annelida	53
P04	8/28/2001	Spiophanes duplex	Annelida	1
P04	8/28/2001	Theora lubrica	Mollusca	3
P04	8/28/2001	Tubulanus polymorphus	Nemertea	1
P05	8/28/2001	Amphideutopus oculatus	Arthropoda	1
P05	8/28/2001	Aphelochaeta sp	Annelida	1
P05	8/28/2001	Cossura candida	Annelida	1

Station	Sampling Date	Species	Phylum	Abundance
P05	8/28/2001	Decapoda	Arthropoda	1
P05	8/28/2001	Euphilomedes carcharodonta	Arthropoda	1
P05	8/28/2001	Exogone lourei	Annelida	1
P05	8/28/2001	Glycera americana	Annelida	1
P05	8/28/2001	Leitoscoloplos pugettensis	Annelida	17
P05	8/28/2001	Mediomastus sp	Annelida	23
P05	8/28/2001	Musculista senhousia	Mollusca	17
P05	8/28/2001	Nassarius tiarula	Mollusca	2
P05	8/28/2001	Pista agassizi	Annelida	5
P05	8/28/2001	Pseudopolydora paucibranchiata	Annelida	2
P05	8/28/2001	Rudilemboides stenopropodus	Arthropoda	1
P05	8/28/2001	Scoletoma sp C	Annelida	52
P05	8/28/2001	Theora lubrica	Mollusca	1
P06	8/28/2001	Ambidexter panamensis	Arthropoda	3
P06	8/28/2001	Amphideutopus oculatus	Arthropoda	1
P06	8/28/2001	Diplocirrus sp SD1	Annelida	1
P06	8/28/2001	Euchone limnicola	Annelida	1
P06	8/28/2001	Exogone lourei	Annelida	2
P06	8/28/2001	Glycera americana	Annelida	1
P06	8/28/2001	Leitoscoloplos pugettensis	Annelida	21
P06	8/28/2001	Mediomastus sp	Annelida	10
P06	8/28/2001	Musculista senhousia	Mollusca	9
P06	8/28/2001	Paranemertes californica	Nemertea	1
P06	8/28/2001	Pista agassizi	Annelida	2
P06	8/28/2001	Prionospio (Prionospio) heterobranchia	Annelida	1
P06	8/28/2001	Scolanthus sp A	Cnidaria	1
P06	8/28/2001	Scoletoma sp	Annelida	2
P06	8/28/2001	Scoletoma sp C	Annelida	14
P07	8/28/2001	Amphideutopus oculatus	Arthropoda	3
P07	8/28/2001	Calocarides sp	Arthropoda	1
P07	8/28/2001	Diplocirrus sp SD1	Annelida	1
P07	8/28/2001	Dorvillea (Schistomeringos) longicornis	Annelida	1
P07	8/28/2001	Euphilomedes carcharodonta	Arthropoda	3
P07	8/28/2001	Exogone lourei	Annelida	3
P07	8/28/2001	Heterophoxus oculatus	Arthropoda	1
P07	8/28/2001	Leitoscoloplos pugettensis	Annelida	34
P07	8/28/2001	Mediomastus sp	Annelida	33
P07	8/28/2001	Musculista senhousia	Mollusca	11
P07	8/28/2001	Oligochaeta	Annelida	3
P07	8/28/2001	Paranemertes californica	Nemertea	1
P07	8/28/2001	Paraprionospio pinnata	Annelida	1
P07	8/28/2001	Pista agassizi	Annelida	6
P07	8/28/2001	Prionospio (Prionospio) heterobranchia	Annelida	9
P07	8/28/2001	Pseudopolydora paucibranchiata	Annelida	6
P07	8/28/2001	Scolanthus sp A	Cnidaria	2
P07	8/28/2001	Scolelepis sp	Annelida	14
P07	8/28/2001	Scoletoma sp C	Annelida	58
P07	8/28/2001	Theora lubrica	Mollusca	3
P07	8/28/2001	Tubulanus nothus	Nemertea	1
P07	8/28/2001	Tubulanus polymorphus	Nemertea	1
P08	8/28/2001	Alpheus sp	Arthropoda	1
P08	8/28/2001	Amphideutopus oculatus	Arthropoda	16
P08	8/28/2001	Bemlos sp	Arthropoda	1
P08	8/28/2001	Ceriantharia	Cnidaria	1
P08	8/28/2001	Crucibulum spinosum	Mollusca	3
P08	8/28/2001	Diplocirrus sp SD1	Annelida	1
P08	8/28/2001	Dorvillea (Schistomeringos) longicornis	Annelida	5
P08	8/28/2001	Edwardsia californica	Cnidaria	1
P08	8/28/2001	Euphilomedes carcharodonta	Arthropoda	3
P08	8/28/2001	Exogone lourei	Annelida	74
P08	8/28/2001	Glycera americana	Annelida	1
P08	8/28/2001	Harmothoe imbricata Cmplx	Annelida	4
P08	8/28/2001	Heteroserolis carinata	Arthropoda	1
P08	8/28/2001	Leitoscoloplos pugettensis	Annelida	61
P08	8/28/2001	Leptochelia dubia	Arthropoda	1
P08	8/28/2001	Lumbrineris erecta	Annelida	13
P08	8/28/2001	Lyonsia californica	Mollusca	5

Station	Sampling Date	Species	Phylum	Abundance
P08	8/28/2001	Malacoplax californiensis	Arthropoda	1
P08	8/28/2001	Mediomastus sp	Annelida	263
P08	8/28/2001	Musculista senhousia	Mollusca	103
P08	8/28/2001	Odontosyllis phosphorea	Annelida	1
P08	8/28/2001	Oligochaeta	Annelida	3
P08	8/28/2001	Paranemertes californica	Nemertea	2
P08	8/28/2001	Phoronis sp	Phorona	1
P08	8/28/2001	Pista agassizi	Annelida	44
P08	8/28/2001	Prionospio (Prionospio) heterobranchia	Annelida	19
P08	8/28/2001	Pseudopolydora paucibranchiata	Annelida	29
P08	8/28/2001	Rudilemboides stenopropodus	Arthropoda	3
P08	8/28/2001	Scolanthus sp A	Cnidaria	3
P08	8/28/2001	Scoletoma sp A	Annelida	2
P08	8/28/2001	Scoletoma sp C	Annelida	103
P08	8/28/2001	Tetrastemma candidum	Nemertea	2
P09	8/28/2001	Calocarides spinulicauda	Arthropoda	2
P09	8/28/2001	Caulleriella pacifica	Annelida	1
P09	8/28/2001	Chione californiensis	Mollusca	1
P09	8/28/2001	Crucibulum spinosum	Mollusca	1
P09	8/28/2001	Euphilomedes carcharodonta	Arthropoda	1
P09	8/28/2001	Heteromysis odontops	Arthropoda	2
P09	8/28/2001	Leitoscoloplos pugettensis	Annelida	3
P09	8/28/2001	Lumbrineris erecta	Annelida	4
P09	8/28/2001	Lyonsia californica	Mollusca	3
P09	8/28/2001	Mediomastus sp	Annelida	1
P09	8/28/2001	Musculista senhousia	Mollusca	1
P09	8/28/2001	Paranemertes californica	Nemertea	1
P09	8/28/2001	Pista agassizi	Annelida	1
P09	8/28/2001	Prionospio (Prionospio) heterobranchia	Annelida	4
P09	8/28/2001	Pseudopolydora paucibranchiata	Annelida	3
P09	8/28/2001	Rudilemboides stenopropodus	Arthropoda	2
P09	8/28/2001	Scoletoma sp A	Annelida	1
P09	8/28/2001	Scoletoma sp C	Annelida	7
P10	8/28/2001	Amphideutopus oculatus	Arthropoda	17
P10	8/28/2001	Armandia brevis	Annelida	1
P10	8/28/2001	Bemlos macromanus	Arthropoda	1
P10	8/28/2001	Calocarides spinulicauda	Arthropoda	1
P10	8/28/2001	Diplocirrus sp SD1	Annelida	1
P10	8/28/2001	Dorvillea (Schistomeringos) longicornis	Annelida	1
P10	8/28/2001	Euphilomedes carcharodonta	Arthropoda	5
P10	8/28/2001	Exogone lourei	Annelida	7
P10	8/28/2001	Harmothoe imbricata Cmplx	Annelida	1
P10	8/28/2001	Leitoscoloplos pugettensis	Annelida	49
P10	8/28/2001	Lumbrineris erecta	Annelida	10
P10	8/28/2001	Mediomastus sp	Annelida	51
P10	8/28/2001	Musculista senhousia	Mollusca	29
P10	8/28/2001	Nassarius tiarula	Mollusca	4
P10	8/28/2001	Odontosyllis phosphorea	Annelida	1
P10	8/28/2001	Paranemertes californica	Nemertea	6
P10	8/28/2001	Phoronis sp	Phorona	1
P10	8/28/2001	Pista agassizi	Annelida	11
P10	8/28/2001	Prionospio (Prionospio) heterobranchia	Annelida	7
P10	8/28/2001	Pseudopolydora paucibranchiata	Annelida	5
P10	8/28/2001	Pyromaia tuberculata	Arthropoda	1
P10	8/28/2001	Scolanthus sp A	Cnidaria	1
P10	8/28/2001	Scoletoma sp C	Annelida	27
P10	8/28/2001	Theora lubrica	Mollusca	15
P11	8/28/2001	Ambidexter panamensis	Arthropoda	1
P11	8/28/2001	Bulla gouldiana	Mollusca	3
P11	8/28/2001	Cryptomya californica	Mollusca	1
P11	8/28/2001	Diplocirrus sp SD1	Annelida	1
P11	8/28/2001	Dorvillea (Schistomeringos) longicornis	Annelida	1
P11	8/28/2001	Euphilomedes carcharodonta	Arthropoda	6
P11	8/28/2001	Leitoscoloplos pugettensis	Annelida	12
P11	8/28/2001	Lumbrineris erecta	Annelida	5
P11	8/28/2001	Lyonsia californica	Mollusca	4
P11	8/28/2001	Mediomastus sp	Annelida	10

Station	Sampling Date	Species	Phylum	Abundance
P11	8/28/2001	Musculista senhousia	Mollusca	3
P11	8/28/2001	Nassarius tiarula	Mollusca	1
P11	8/28/2001	Odontosyllis phosphorea	Annelida	1
P11	8/28/2001	Palaeonemertea	Nemertea	1
P11	8/28/2001	Paranemertes californica	Nemertea	2
P11	8/28/2001	Pista agassizi	Annelida	5
P11	8/28/2001	Prionospio (Prionospio) heterobranchia	Annelida	6
P11	8/28/2001	Pseudopolydora paucibranchiata	Annelida	1
P11	8/28/2001	Pyromaia tuberculata	Arthropoda	1
P11	8/28/2001	Scoletoma sp	Annelida	4
P11	8/28/2001	Scoletoma sp C	Annelida	10
P11	8/28/2001	Tetrastemma candidum	Nemertea	1
P11	8/28/2001	Theora lubrica	Mollusca	7
P11	8/28/2001	Zygeupolia rubens	Nemertea	1
P12	8/28/2001	Amphideutopus oculatus	Arthropoda	35
P12	8/28/2001	Bulla gouldiana	Mollusca	2
P12	8/28/2001	Crucibulum spinosum	Mollusca	2
P12	8/28/2001	Diplocirrus sp SD1	Annelida	1
P12	8/28/2001	Dorvillea (Schistomeringos) longicornis	Annelida	6
P12	8/28/2001	Drilonereis mexicana	Annelida	1
P12	8/28/2001	Edwardsia californica	Cnidaria	2
P12	8/28/2001	Eumida longicornuta	Annelida	1
P12	8/28/2001	Euphilomedes carcharodonta	Arthropoda	40
P12	8/28/2001	Exogone lourei	Annelida	1
P12	8/28/2001	Glycera americana	Annelida	1
P12	8/28/2001	Heteroserolis carinata	Arthropoda	2
P12	8/28/2001	Kalliapsuedes crassus	Arthropoda	4
P12	8/28/2001	Laevicardium substriatum	Mollusca	1
P12	8/28/2001	Leitoscoloplos pugettensis	Annelida	14
P12	8/28/2001	Leptochelia dubia	Arthropoda	1
P12	8/28/2001	Lumbrineris erecta	Annelida	2
P12	8/28/2001	Lyonsia californica	Mollusca	2
P12	8/28/2001	Mediomastus sp	Annelida	68
P12	8/28/2001	Musculista senhousia	Mollusca	7
P12	8/28/2001	Nassarius tiarula	Mollusca	2
P12	8/28/2001	Neanthes acuminata Cmplx	Annelida	1
P12	8/28/2001	Odontosyllis phosphorea	Annelida	1
P12	8/28/2001	Paranemertes californica	Nemertea	1
P12	8/28/2001	Phoronis sp	Phorona	4
P12	8/28/2001	Pista agassizi	Annelida	15
P12	8/28/2001	Prionospio (Prionospio) heterobranchia	Annelida	7
P12	8/28/2001	Pseudopolydora paucibranchiata	Annelida	15
P12	8/28/2001	Pyromaia tuberculata	Arthropoda	2
P12	8/28/2001	Rudilemboides stenopropodus	Arthropoda	4
P12	8/28/2001	Scolanthus sp A	Cnidaria	1
P12	8/28/2001	Scoletoma sp	Annelida	4
P12	8/28/2001	Scoletoma sp A	Annelida	7
P12	8/28/2001	Scoletoma sp C	Annelida	40
P12	8/28/2001	Theora lubrica	Mollusca	6
P13	8/28/2001	Alpheus bellimanus	Arthropoda	2
P13	8/28/2001	Ambidexter panamensis	Arthropoda	2
P13	8/28/2001	Amphideutopus oculatus	Arthropoda	50
P13	8/28/2001	Aphelochaeta sp	Annelida	4
P13	8/28/2001	Bulla gouldiana	Mollusca	1
P13	8/28/2001	Chione undatella	Mollusca	1
P13	8/28/2001	Crucibulum spinosum	Mollusca	2
P13	8/28/2001	Dorvillea (Schistomeringos) longicornis	Annelida	8
P13	8/28/2001	Edwardsia californica	Cnidaria	1
P13	8/28/2001	Eteone fauchaldi	Annelida	1
P13	8/28/2001	Euphilomedes carcharodonta	Arthropoda	4
P13	8/28/2001	Exogone lourei	Annelida	3
P13	8/28/2001	Glycera americana	Annelida	1
P13	8/28/2001	Harmothoe imbricata Cmplx	Annelida	3
P13	8/28/2001	Heteroserolis carinata	Arthropoda	1
P13	8/28/2001	Leitoscoloplos pugettensis	Annelida	70
P13	8/28/2001	Lineidae	Nemertea	1
P13	8/28/2001	Lumbrineris erecta	Annelida	34

Station	Sampling Date	Species	Phylum	Abundance
P13	8/28/2001	Lyonsia californica	Mollusca	2
P13	8/28/2001	Mediomastus sp	Annelida	60
P13	8/28/2001	Musculista senhousia	Mollusca	147
P13	8/28/2001	Mysidopsis sp	Arthropoda	1
P13	8/28/2001	Nereis procera	Annelida	1
P13	8/28/2001	Odontosyllis phosphorea	Annelida	5
P13	8/28/2001	Oligochaeta	Annelida	2
P13	8/28/2001	Paranemertes californica	Nemertea	3
P13	8/28/2001	Pista agassizi	Annelida	178
P13	8/28/2001	Prionospio (Prionospio) heterobranchia	Annelida	38
P13	8/28/2001	Protocirrineris sp A	Annelida	1
P13	8/28/2001	Pseudopolydora paucibranchiata	Annelida	4
P13	8/28/2001	Rudilemboides stenopropodus	Arthropoda	10
P13	8/28/2001	Scolanthus sp A	Cnidaria	5
P13	8/28/2001	Scoletoma sp C	Annelida	115
P13	8/28/2001	Theora lubrica	Mollusca	6
P14	8/28/2001	Acteocina inculta	Mollusca	1
P14	8/28/2001	Alpheus bellimanus	Arthropoda	3
P14	8/28/2001	Ambidexter panamensis	Arthropoda	5
P14	8/28/2001	Amphideutopus oculatus	Arthropoda	21
P14	8/28/2001	Aphelochaeta sp	Annelida	4
P14	8/28/2001	Crepidula norrisiarum	Mollusca	1
P14	8/28/2001	Crucibulum spinosum	Mollusca	1
P14	8/28/2001	Diplocirrus sp SD1	Annelida	1
P14	8/28/2001	Edwardsia californica	Cnidaria	1
P14	8/28/2001	Euphilomedes carcharodonta	Arthropoda	1
P14	8/28/2001	Exogone lourei	Annelida	5
P14	8/28/2001	Harmothoe imbricata Cmplx	Annelida	1
P14	8/28/2001	Heterophoxus oculatus	Arthropoda	1
P14	8/28/2001	Heteroserolis carinata	Arthropoda	1
P14	8/28/2001	Leitoscoloplos pugettensis	Annelida	64
P14	8/28/2001	Lumbrineris erecta	Annelida	19
P14	8/28/2001	Lyonsia californica	Mollusca	1
P14	8/28/2001	Macoma nasuta	Mollusca	1
P14	8/28/2001	Mayerella banksia	Arthropoda	1
P14	8/28/2001	Mediomastus sp	Annelida	58
P14	8/28/2001	Musculista senhousia	Mollusca	79
P14	8/28/2001	Nassarius tiarula	Mollusca	1
P14	8/28/2001	Odontosyllis phosphorea	Annelida	1
P14	8/28/2001	Oligochaeta	Annelida	1
P14	8/28/2001	Paranemertes californica	Nemertea	2
P14	8/28/2001	Pista agassizi	Annelida	67
P14	8/28/2001	Prionospio (Prionospio) heterobranchia	Annelida	13
P14	8/28/2001	Protocirrineris sp A	Annelida	2
P14	8/28/2001	Pseudopolydora paucibranchiata	Annelida	3
P14	8/28/2001	Rudilemboides stenopropodus	Arthropoda	6
P14	8/28/2001	Schmittius politus	Arthropoda	1
P14	8/28/2001	Scolanthus sp A	Cnidaria	3
P14	8/28/2001	Scoletoma sp C	Annelida	104
P14	8/28/2001	Scoletoma tetraura Cmplx	Annelida	2
P14	8/28/2001	Theora lubrica	Mollusca	10
P14	8/28/2001	Tubulanus polymorphus	Nemertea	1
P15	8/28/2001	Ambidexter panamensis	Arthropoda	1
P15	8/28/2001	Amphideutopus oculatus	Arthropoda	2
P15	8/28/2001	Aphelochaeta sp	Annelida	8
P15	8/28/2001	Bulla gouldiana	Mollusca	1
P15	8/28/2001	Corymorphidae	Cnidaria	1
P15	8/28/2001	Diplocirrus sp SD1	Annelida	1
P15	8/28/2001	Drilonereis sp	Annelida	1
P15	8/28/2001	Exogone lourei	Annelida	1
P15	8/28/2001	Heteroserolis carinata	Arthropoda	1
P15	8/28/2001	Leitoscoloplos pugettensis	Annelida	17
P15	8/28/2001	Lumbrineris erecta	Annelida	6
P15	8/28/2001	Macoma nasuta	Mollusca	1
P15	8/28/2001	Mediomastus sp	Annelida	14
P15	8/28/2001	Nassarius tiarula	Mollusca	1
P15	8/28/2001	Pista agassizi	Annelida	1

Station	Sampling Date	Species	Phylum	Abundance
P15	8/28/2001	Prionospio (Prionospio) heterobranchia	Annelida	3
P15	8/28/2001	Scolanthus sp A	Cnidaria	1
P15	8/28/2001	Scoletoma sp	Annelida	7
P15	8/28/2001	Scoletoma sp A	Annelida	6
P15	8/28/2001	Scoletoma sp C	Annelida	39
P16	8/28/2001	Ambidexter panamensis	Arthropoda	1
P16	8/28/2001	Aphelochaeta sp	Annelida	25
P16	8/28/2001	Calocarides spinulicauda	Arthropoda	1
P16	8/28/2001	Euchone limnicola	Annelida	1
P16	8/28/2001	Glycera americana	Annelida	1
P16	8/28/2001	Harmothoe imbricata Cmplx	Annelida	1
P16	8/28/2001	Leitoscoloplos pugettensis	Annelida	35
P16	8/28/2001	Lumbrineris erecta	Annelida	5
P16	8/28/2001	Mediomastus sp	Annelida	2
P16	8/28/2001	Musculista senhousia	Mollusca	3
P16	8/28/2001	Pista agassizi	Annelida	23
P16	8/28/2001	Prionospio (Prionospio) heterobranchia	Annelida	5
P16	8/28/2001	Schmittius politus	Arthropoda	1
P16	8/28/2001	Scolanthus sp A	Cnidaria	3
P16	8/28/2001	Scoletoma sp	Annelida	2
P16	8/28/2001	Scoletoma sp A	Annelida	1
P16	8/28/2001	Scoletoma sp C	Annelida	41
P16	8/28/2001	Theora lubrica	Mollusca	1
P17	8/28/2001	Acteocina inculta	Mollusca	4
P17	8/28/2001	Ambidexter panamensis	Arthropoda	1
P17	8/28/2001	Aphelochaeta sp	Annelida	10
P17	8/28/2001	Bulla gouldiana	Mollusca	11
P17	8/28/2001	Caulleriella pacifica	Annelida	2
P17	8/28/2001	Euphilomedes carcharodonta	Arthropoda	21
P17	8/28/2001	Leitoscoloplos pugettensis	Annelida	13
P17	8/28/2001	Lumbrineris erecta	Annelida	3
P17	8/28/2001	Macoma indentata	Mollusca	1
P17	8/28/2001	Mediomastus sp	Annelida	9
P17	8/28/2001	Musculista senhousia	Mollusca	21
P17	8/28/2001	Nassarius tiarula	Mollusca	2
P17	8/28/2001	Natantia	Arthropoda	1
P17	8/28/2001	Pista agassizi	Annelida	8
P17	8/28/2001	Prionospio (Prionospio) heterobranchia	Annelida	8
P17	8/28/2001	Pseudopolydora paucibranchiata	Annelida	2
P17	8/28/2001	Scoletoma sp	Annelida	4
P17	8/28/2001	Scoletoma sp A	Annelida	1
P17	8/28/2001	Scoletoma sp C	Annelida	16
P17	8/28/2001	Theora lubrica	Mollusca	13

APPENDIX E: DEVELOPMENT OF REFERENCE AND BASELINE POOLS

E1 - DISTANCE-FROM-SHORE APPROACH TO IDENTIFY BIGHT'98 REFERENCE STATIONS IN SAN DIEGO BAY

Steve Bay and Jeff Brown, SCCWRP
January 8, 2003 (*revised March 2004)*

Introduction

An approach to identify potential reference stations in San Diego Bay was created with the assumption that most contaminants in the bay's sediments originate from land-based discharges. Following this assumption, contaminant concentrations in sediments should diminish with distance from land, and eventually reach levels consistent with bay-wide ambient levels. By identifying background levels of contaminants, stations with contamination below the concentration threshold (regardless of distance from shore) can be used as appropriate reference stations. This summary describes the distance-from-shore approach that was used with Bight'98 data to identify reference stations in San Diego Bay.

Methods

The relationship between contaminant concentration and distance from shore was examined for 38 non-marina stations in San Diego Bay sampled during Bight'98. Seven contaminants were examined, including five metals (Cu, Cr, Hg, Pb, Zn) and two organics (total PAHs, total PCBs). Metal concentrations were iron-normalized and plotted versus distance from shore. Iron normalization was used in order to minimize the bias of selecting only stations with larger grain sizes, since concentrations of metals tend to increase naturally in finer grain sediments. Iron has been shown to be a conservative tracer that can help differentiate natural from anthropogenic concentrations of metals in the Southern California Bight. Iron normalization consists of dividing the concentration of a given metal (mg/kg) by the concentration of iron present (mg/kg). The organics data were not normalized. Non-detect values were substituted with the method detection limit.

Results

Each of the seven constituents tended to have diminished concentrations with distance from shore (Figure E1-1 thru Figure E1-7). For metals, concentrations appeared to level off at around 240 m for Cu, 160 m for Cr, and 150 m for Hg, Pb and Zn. For the

organics, concentrations leveled off at around 290 m and 170 m for PAHs and PCBs, respectively.

Based on the plots, stations that are 290 m or greater from shore were determined to represent ambient conditions. An upper threshold concentration was developed for Cu, Cr, Hg, Pb, Zn, and PAHs by using the mean concentration + 1.64 standard deviations for stations that are $\geq$290 m from shore (equivalent to the one-tailed upper 95% confidence limit). The threshold for PCBs was derived from the maximum value for stations $\geq$290 m because PCB values were below the detection limit at a majority of stations, and the upper 95% confidence limit could not be calculated. The following upper threshold values were obtained: PAHs = 1040 ng/g, PCBs = 101.6 ng/g, Fe normalized Cr = 0.0022, Fe normalized Cu = 0.0044, Fe normalized Hg = 2.3×10^{-5}, Fe normalized Pb = 0.0020, Fe normalized Zn = 0.0073. All stations below the threshold levels for any of the seven indicator contaminants were then identified, regardless of distance from shore (Table E1-1). Those stations with constituents below the threshold concentrations for all of the indicators (Cr, Cu, Hg, Pb, Zn, PAHs, and PCBs) were considered to be representative of bay-wide ambient conditions. Twenty-two stations were identified as revised reference stations, ranging from 10-1080 m from shore (Table E1-1). The location of these stations in San Diego Bay is shown in Figure E1-8.

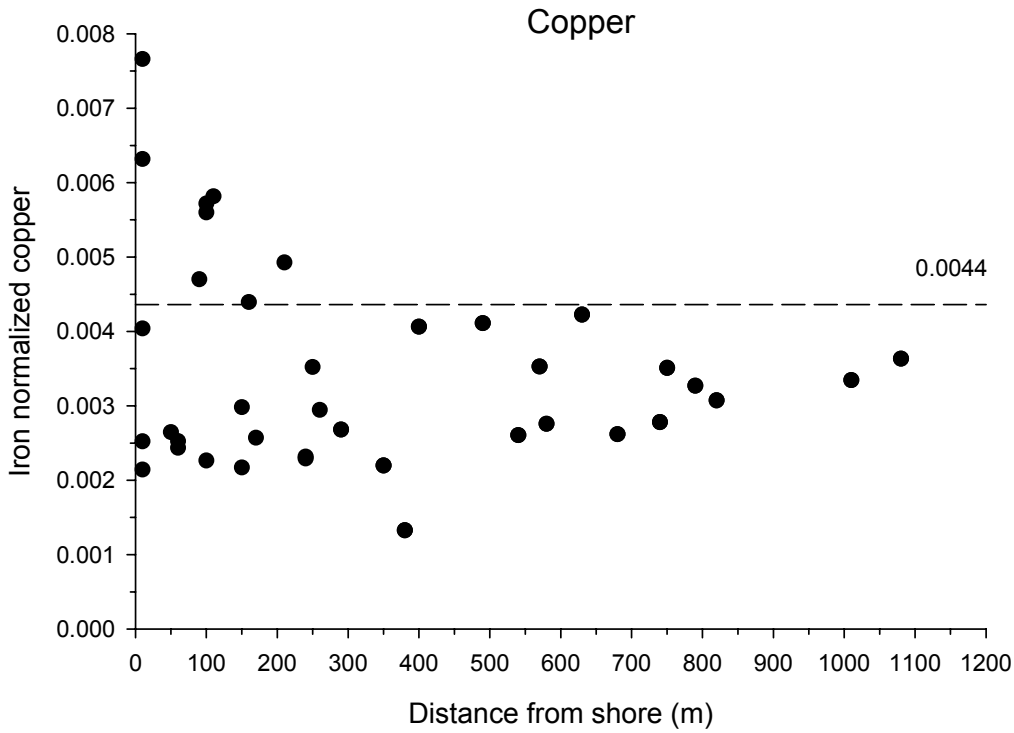


Figure E1- 1. Relationship between the concentration of iron normalized copper and distance from shore. The dashed line indicates the upper threshold concentration.

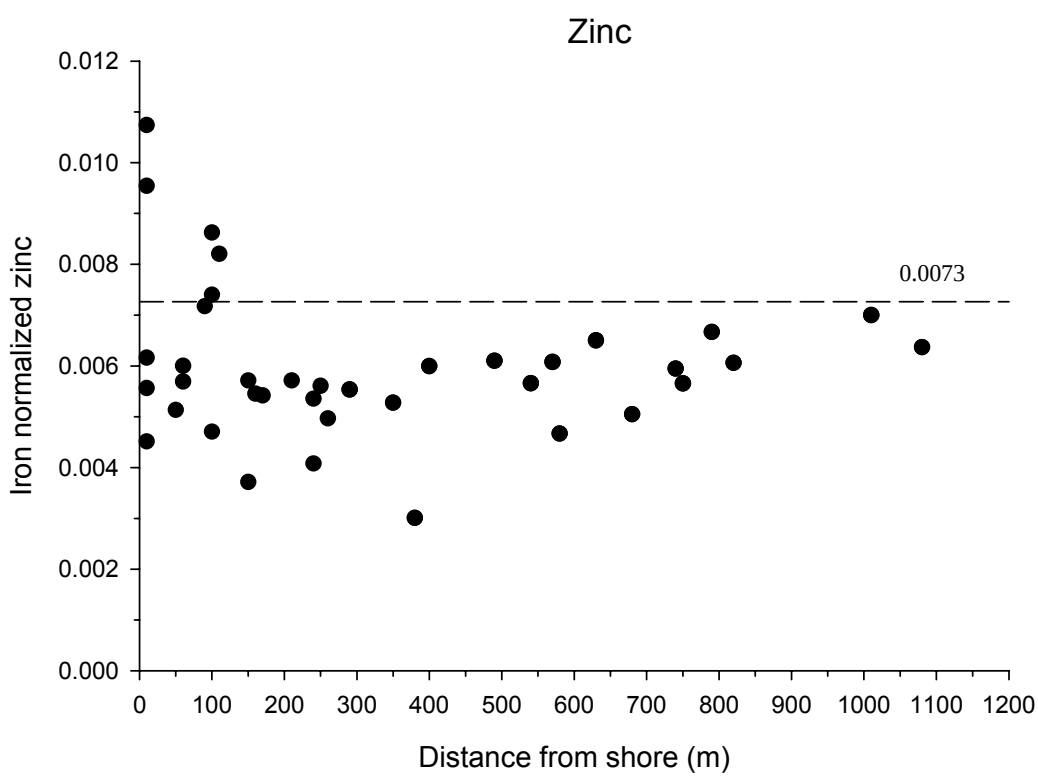


Figure E1- 2. Relationship between the concentration of iron normalized zinc and distance from shore. The dashed line indicates the upper threshold concentration.

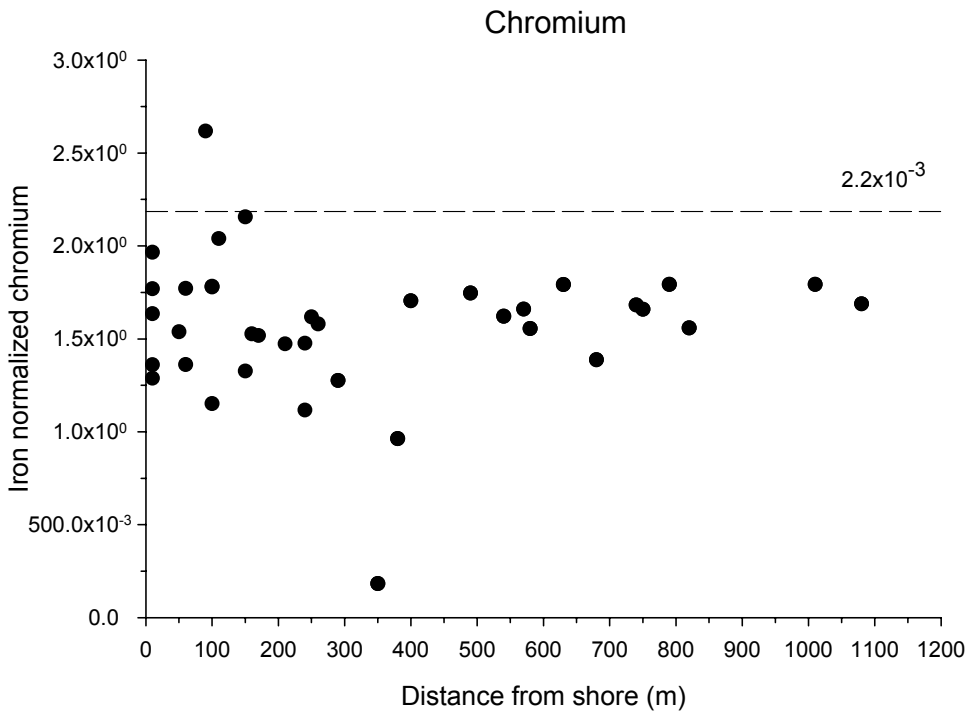


Figure E1- 3. Relationship between the concentration of iron normalized chromium and distance from shore. The dashed line indicates the upper threshold concentration.

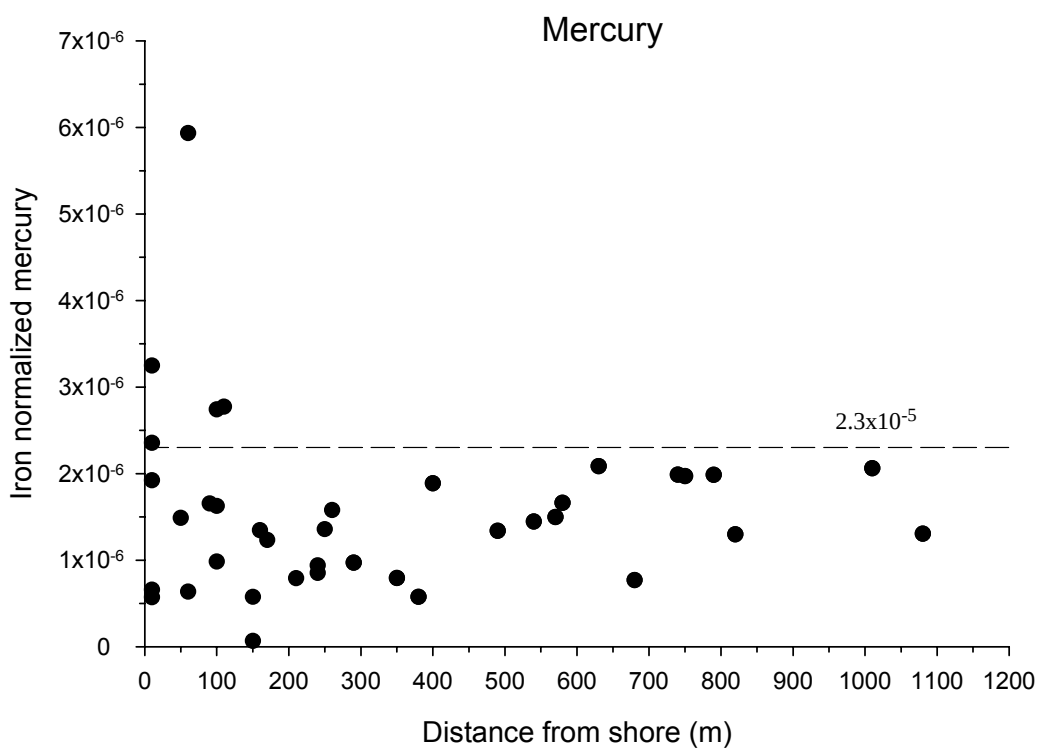


Figure E1- 4. Relationship between the concentration of iron normalized mercury and distance from shore. The dashed line indicates the upper threshold concentration.

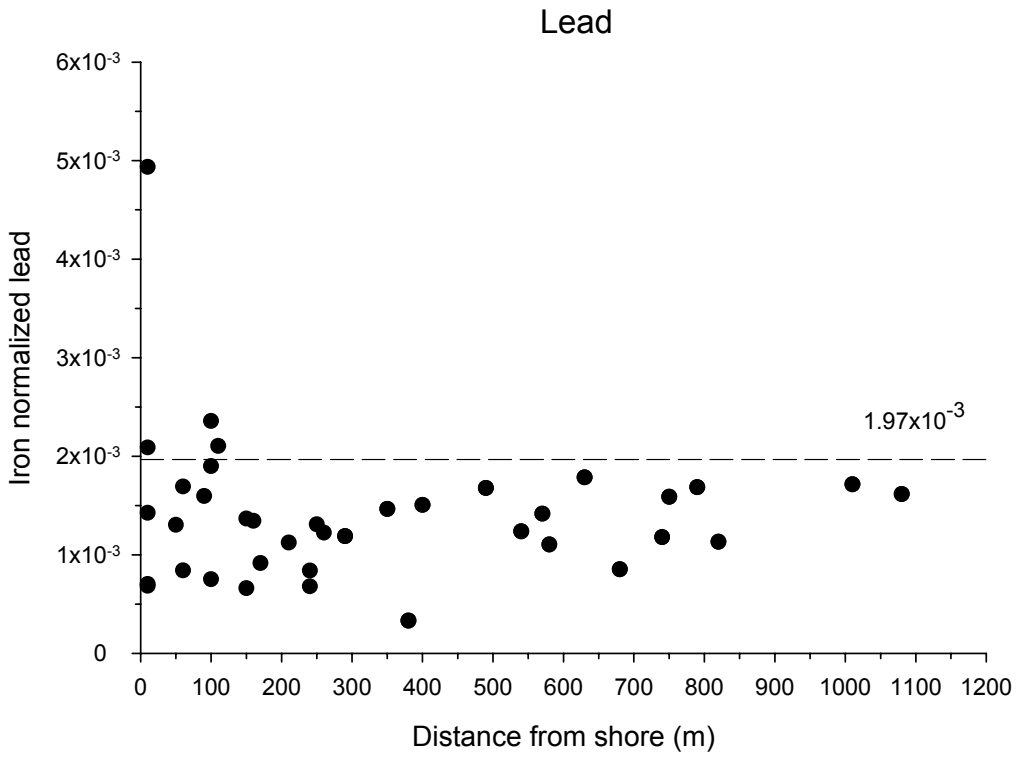


Figure E1- 5. Relationship between the concentration of iron normalized lead and distance from shore. The dashed line indicates the upper threshold concentration.

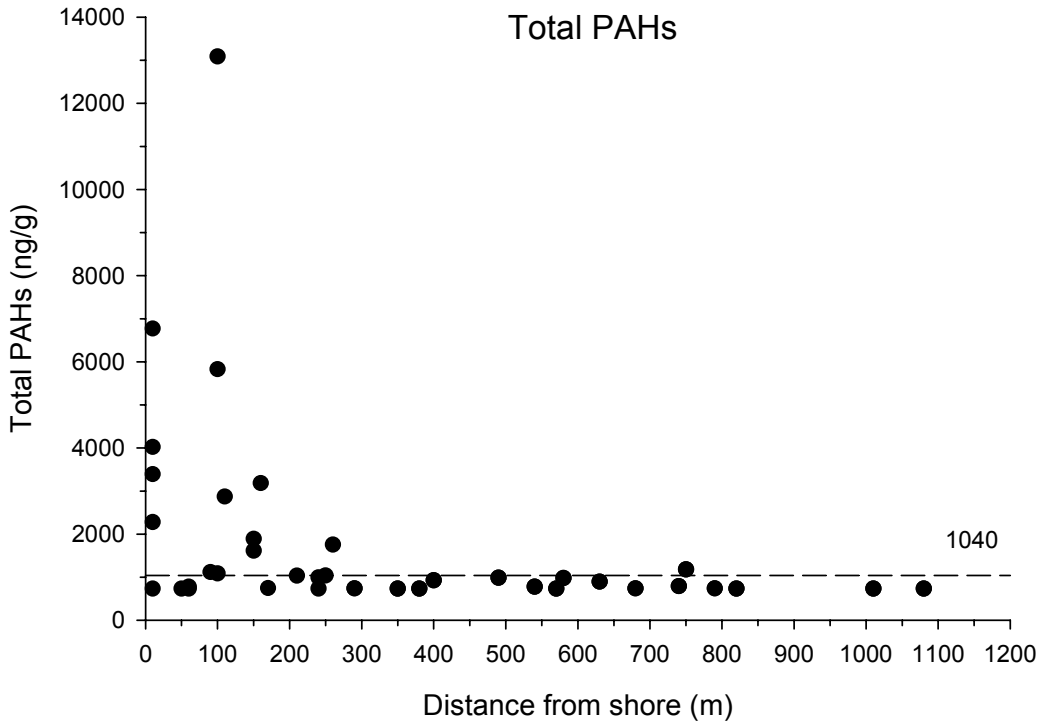


Figure E1- 6. Relationship between the concentration of total PAHs and distance from shore. The dashed line indicates the upper threshold concentration. Non-detects were treated as equal to the method detection limit.

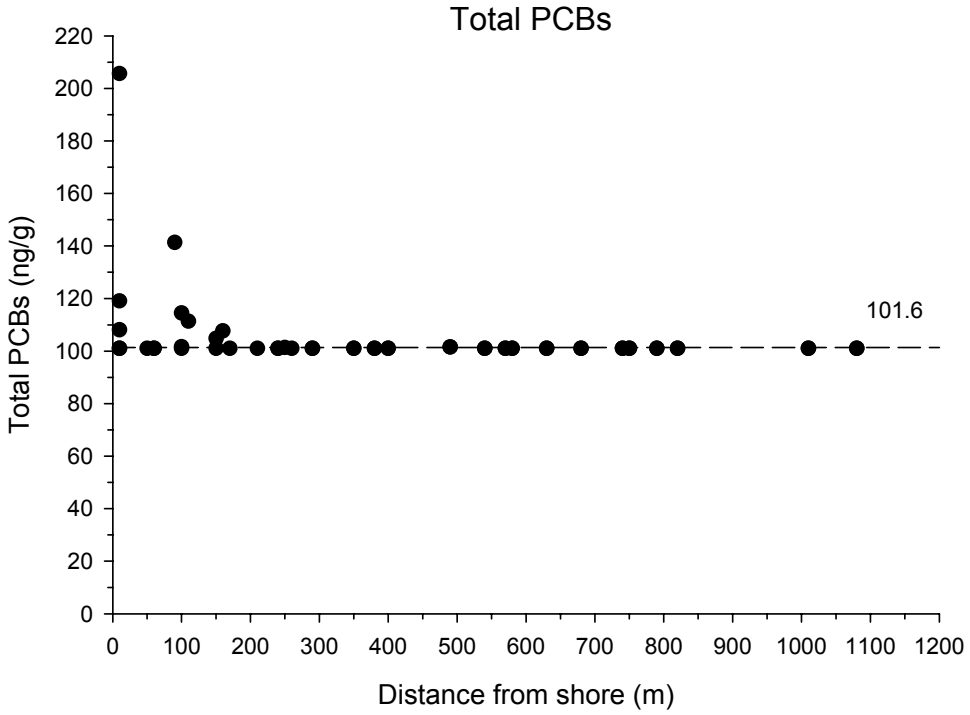


Figure E1- 7. Relationship between the concentration of total PCBs and distance from shore. The dashed line indicates the threshold concentration. Non-detects were treated as equal to the method detection limit

Table E1- 1. Data used for selection of reference stations from the Bight'98 survey. Concentrations of Cu, Cr, Hg, Pb, Zn, PAHs or PCBs below the upper thresholds are indicated in grey. Stations where the concentrations are below the threshold for each of these constituents are considered to represent bay-wide ambient conditions; these stations are indicated with a Y in the Revised Reference station column. Iron normalized data have been multiplied by 1000 for convenience. The method detection limit was substituted for non-detect values.

Station	Distance from nearest shore (m)	Sampling Plan Reference station	Revised Reference station	Cu/Fe $x10^3$	Cr/Fe $x10^3$	Hg/Fe $x10^3$	Pb/Fe $x10^3$	Zn/Fe $x10^3$	Total PAHs ng/g	Total PCBs ng/g	Fe mg/kg	% Fines	% TOC
2238	10	Y	Y	2.1	1.29	0.007	0.70	5.6	735	101.1	25700	57	0.96
2253	10			7.7	1.64	0.032	2.09	9.5	2279	205.7	32900	66	1.57
2263	10			4.0	1.97	0.024	1.42	6.2	3389	108.1	29200	73	1.25
2264	10			6.3	1.77	0.019	4.94	10.7	4020	119.1	39100	73	2.01
2442	10			2.5	1.36	0.006	0.69	4.5	6771	101.1	30800	79	1.99
2440	50	Y	Y	2.6	1.54	0.015	1.30	5.1	735	101.1	15800	38	0.50
2230	60			2.5	1.77	0.059	1.69	6.0	735	101.1	6380	10	0.20
2249	60		Y	2.4	1.36	0.006	0.84	5.7	778	101.1	34600	72	1.35
2439	90			4.7	2.62	0.017	1.60	7.2	1119	141.3	28300	53	1.03
2227	100	Y		2.3	1.15	0.010	0.75	4.7	1088	101.1	23800	50	0.93
2251	100			5.6	1.78	0.016	2.36	7.4	5825	114.5	35000	72	1.99
2254	100			5.7	1.78	0.027	1.90	8.6	13087	101.7	13100	35	0.66
2255	110			5.8	2.04	0.028	2.10	8.2	2871	111.4	25100	59	1.18
2434	150			3.0	2.16	0.001	1.37	5.7	1614	104.8	23100	45	0.71
2441	150	Y		2.2	1.33	0.006	0.66	3.7	1890	101.1	33100	79	1.97
2259	160			4.4	1.53	0.013	1.35	5.5	3182	107.7	33000	68	1.24
2245	170		Y	2.6	1.52	0.012	0.92	5.4	745	101.1	26850	60	0.78
2262	210			4.9	1.47	0.008	1.12	5.7	1036	101.1	40600	74	1.64
2235	240		Y	2.3	1.48	0.009	0.84	5.4	735	101.1	25400	45	0.64
2433	240	Y	Y	2.3	1.12	0.009	0.68	4.1	994	101.1	30900	71	1.17
2231	250	Y	Y	3.5	1.62	0.014	1.31	5.6	1037	101.4	16500	31	0.64
2229	260	Y		2.9	1.58	0.016	1.23	5.0	1753	101.1	20000	43	0.92
2252	290		Y	2.7	1.28	0.010	1.19	5.5	737	101.1	11600	16	0.59

Station	Distance from nearest shore (m)	Sampling Plan Reference station	Revised Reference station	Cu/Fe x10^3	Cr/Fe x10^3	Hg/Fe x10^3	Pb/Fe x10^3	Zn/Fe x10^3	Total PAHs ng/g	Total PCBs ng/g	Fe mg/kg	% Fines	% TOC
2265	350		Y	2.2	0.18	0.008	1.47	5.3	735	101.1	8190	13	0.35
2435	380	Y	Y	1.3	0.96	0.006	0.33	3.0	735	101.1	21400	49	0.55
2258	400		Y	4.1	1.70	0.019	1.51	6.0	925	101.1	35200	71	1.44
2257	490		Y	4.1	1.75	0.013	1.68	6.1	987	101.6	38200	77	1.63
2240	540	Y	Y	2.6	1.62	0.014	1.24	5.7	777	101.1	18200	44	0.55
2260	570		Y	3.5	1.66	0.015	1.42	6.1	735	101.1	14400	27	0.51
2436	580		Y	2.8	1.56	0.017	1.10	4.7	977	101.1	31133	55	1.36
2256	630		Y	4.2	1.79	0.021	1.79	6.5	895	101.1	30300	67	1.26
2247	680		Y	2.6	1.39	0.008	0.85	5.0	738	101.1	20400	44	0.58
2242	740		Y	2.8	1.68	0.020	1.18	5.9	791	101.1	15100	31	0.74
2239	750			3.5	1.66	0.020	1.59	5.7	1178	101.1	21400	34	0.72
2233	790		Y	3.3	1.79	0.020	1.69	6.7	738	101.1	15900	36	0.45
2244	820		Y	3.1	1.56	0.013	1.13	6.1	735	101.1	13600	20	0.30
2243	1010	Y	Y	3.3	1.79	0.021	1.72	7.0	735	101.1	11600	35	0.49
2241	1080		Y	3.6	1.69	0.013	1.62	6.4	735	101.1	16290	18	0.52

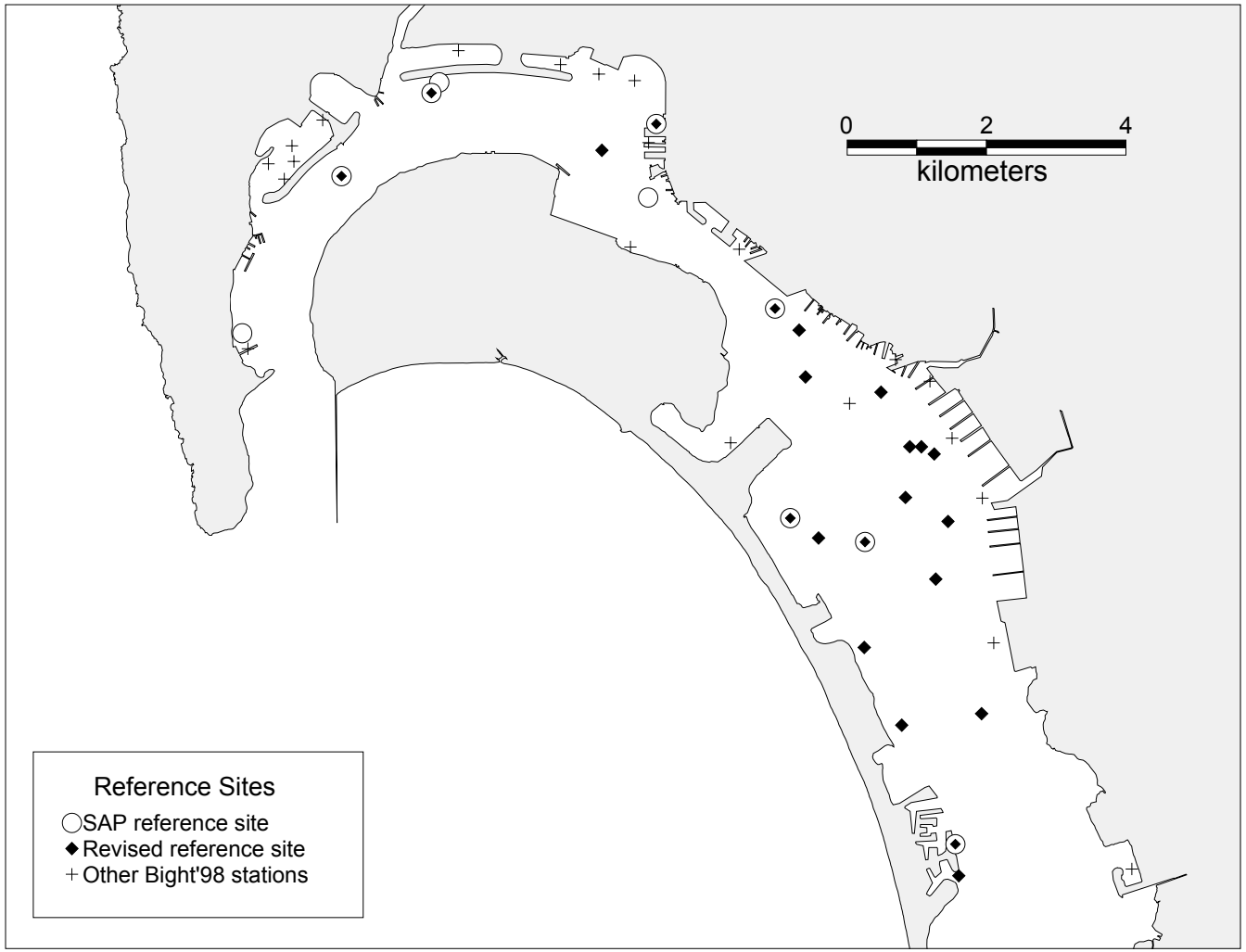


Figure E1- 8. Bight'98 stations in San Diego Bay. Stations that represent bay-wide ambient conditions, based on the distance-from-shore approach, are indicated by diamonds. The ten reference stations identified in the Chollas/Paleta Sampling and Analysis Plan (SAP) are indicated by open circles. The remaining Bight'98 stations in San Diego Bay are indicated by crosses.

E2 - CONSENSUS EVALUATION OF CANDIDATE REFERENCE STATIONS FOR USE IN EVALUATING DATA FROM THE NASSCO/SWM SHIPYARD AND CHOLLAS/PALETA THS AREAS

Steve Bay, SCCWRP
April 10, 2003 (*some text revised to better match terms used in main document March 2004)*

Background

This document summarizes the analyses conducted by SCCWRP, SSC, and Exponent in response to the 2/3/03 request by the San Diego Regional Water Quality Control Board to evaluate various reference data pools. These analyses had two objectives: to provide recommendations regarding the inclusion of candidate reference stations sampled in 2001 into an analysis pool (2A) and to summarize the characteristics of several combinations of reference stations using various measures of variability and prediction.

The information presented here represents the combined recommendations of SCCWRP, SSC, and Exponent specifically with regard to the evaluation of data from the NASSCO/SWM Shipyard and Chollas/Paleta Toxic Hot Spot (THS) assessment studies. While these recommendations may be applicable to the establishment of a regional reference data pool for other areas of San Diego Bay, decisions regarding the establishment of a regional reference data pool should include consideration of additional data and factors that have not been included here.

Candidate Reference Pool 2A

Methods

Statistical analyses were conducted in order to describe the similarity of chemical, biological, and toxicological characteristics of the 2001 reference stations to expectations based on prior data. These analyses followed steps 1-6 of the process developed during the January 22-23 2003 meeting on reference stations, as modified on February 7. These steps were:

Step 1. Compile data from the relevant studies. Data for the contaminants of concern (specified in the 2/3/03 instructions from the Regional Board), benthos (abundance, number of taxa, and diversity), and toxicity (amphipod survival) were compiled for the six 2001 Chollas/Paleta reference stations, five 2001 (phase I) and 12 2002 (phase II) Shipyard reference stations, selected Bight'98 candidate reference stations, and seven BPTCP reference stations. One-half of the method detection limit was substituted for nondetect values, except for the shipyard data, where one-half of the reporting limit was used. Sums of some organic contaminant groups were calculated as follows: total PCB = sum of measured congeners, total DDT or Chlordane = sum of measured isomers/metabolites, total PPAH = sum of priority pollutant PAHs. The individual constituents comprising each of these sums and the raw data are shown in the enclosed workbook (ReferenceEnvelope_Sc_Nv_Ex.xls). Amphipod survival data are expressed as a percentage of the control sample to facilitate comparisons among datasets. In addition, the survival data for the CP stations has been modified by the removal of outlier replicates as endorsed by the Regional Board.

Step 2. Confirm normal distribution of the chemistry data. The Bight'98 chemistry data for non-marina stations within San Diego Bay were analyzed using the Kolmogorov-Smirnov (K-S) test

for normality. Separate tests were conducted for untransformed and natural log transformed data.

Step 3. Calculate one-tailed 95% prediction intervals for the Bight98, phase II, or BPTCP data. Three types of prediction intervals were calculated. The 95% one-tailed prediction interval was calculated without adjustment for multiple comparisons. A multiple comparison prediction interval was also calculated by adjusting the alpha level of the test for the number of expected comparisons to the 2001 reference stations. In most cases, this adjustment was accomplished by using an alpha of 0.004 (0.05/11) for the prediction interval calculation.

Finally, the tolerance limit was calculated for each parameter in order to resolve uncertainty regarding the appropriate adjustment of the prediction interval for multiple comparisons. Whereas the prediction interval gives us a concentration that the next sample (or next n samples) will not exceed (with a given level of confidence), the tolerance limit gives us a concentration that a specified fraction of the population will not exceed (with a given level of confidence). Because the number of candidate reference stations that may ultimately be compared to the screening level is indefinite, the tolerance limit is most appropriate to characterize the expected results of an indefinite number of future comparisons to the reference area population. Use of tolerance limits to screen data requires an explicit recognition that there is a specific expected error rate, which is analogous to the type I and II errors associated with other statistical tests. The parameters used here represent 95% coverage of reference area conditions (i.e. an alpha of 0.05), with 99% confidence. These parameters produce tolerance limits that are, in most cases, comparable to the multiple-comparison-corrected upper prediction limit. Calculations of the tolerance interval are based on: Natrella, M.G. 1963. Experimental Statistics. National Bureau of Standards Handbook 91. National Bureau of Standards., U.S. Department of Commerce, Washington, D.C.

All metals data were normalized to the percent fines before statistical analysis.

Step 4. Compare the prediction/tolerance intervals to the 2001 data. The number of exceedences for each of the identified parameters was tabulated for each station using each of the three types of intervals. Comparisons involving the shipyard phase II data set excluded station 2440 since this station has been identified in previous discussions as probably not representative of ambient reference conditions in San Diego Bay.

Steps 5 & 6. Use best professional judgment to evaluate the statistical comparison results and decide on the suitability of each 2001 reference station. Factors considered in the evaluation included: the number and type of intervals exceeded (e.g. unadjusted/adjusted prediction interval and tolerance interval) and the magnitude of the deviation in relation to ER-M/ER-L sediment guidelines or to the mean of the data. Separate evaluations were conducted for the chemistry, benthos, and toxicity data.

Results

Step 1. The compiled data is shown in the sheet named "total .5mdl" of the "Reference Envelope.." workbook. Additional sheets showing each individual data sheet are also included.

Step 2. The results of the K-S normality test of the Bight'98 data are shown in Table E2-1. Analyses are shown only for metal constituents of concern. Analyses could not be conducted for PAHs, DDTs, Chlordane, or PCBs due to the presence of multiple nondetect values in the dataset. Non-normality was indicated for arsenic and mercury. A retest of natural log transformed data resulted in a better fit to a normal distribution for As and Hg ($p>0.05$). Consequently all subsequent analyses were conducted with transformed data for these two metals. Data for tributyltin was also natural log transformed, based on prior studies by Exponent indicating that this constituent usually had a log normal distribution in environmental samples. No transformation was applied to any of the other chemical constituents because there was no conclusive indication from the Bight98 San Diego Bay dataset indicating non-normality.

Table E2- 1. Results of K-S normality test on Bight'98 data (marina stations excluded). Boxed cells indicate parameters where non-normality is indicated in non-transformed data. Normality of organics data could not be evaluated due to the relatively high number of nondetect values.

	Non-transformed	Natural log transformed
Ag	>0.15	<0.0100
As	**0.0259**	**>0.15**
Cd	0.0811	<0.0100
Cr	>0.15	0.0373
Cu	>0.15	>0.15
Hg	**<0.0100**	**0.072**
Ni	>0.15	0.1045
Pb	>0.15	>0.15
Zn	0.0983	>0.15

Step 3. The data and resulting prediction interval calculations are shown (magenta highlight) in the sheet named "calcs as per 23 jan meeting" of the "ReferenceEnvelope…" workbook. The tolerance interval calculations are shown (yellow highlight) in the "data for calcs" sheet. A summary of the prediction/tolerance intervals and a tabulation of the number of exceedences for each station is shown in the sheet named "site comparisons". The total number of interval exceedences is summarized in Table E2-2.

Each of the stations, except for CP 2238, had at least one exceedance of the non-adjusted prediction interval. The number of exceedences declined for the adjusted PI and tolerance interval, indicating that some of these exceedences may be due to random variability in the data. Station 2440 for both the CP and SY datasets demonstrated the highest number of exceedences for each type of interval. Almost all of the interval exceedences were due to elevated chemistry. Benthic parameter intervals were only exceeded for reduced diversity at station 2231, which has been identified previously as having an atypical fauna dominated by a

crustacean species. Several stations exceeded the unadjusted PI for reduced amphipod survival (2231, CP 2433, and CP 2441), but no exceedences for toxicity using the adjusted PI or tolerance interval were present.

Table E2- 2. Results of prediction and tolerance limit comparison for each 2001 reference station.

Study	Station	# over Unadjusted PI	# over Adjusted PI	# over Tolerance Interval	# total possible
CP	2231	8	3	2	17
CP	2243	8	3	1	17
CP	2433	5	1	1	17
CP	2440	10	9	8	17
CP	2441	3	1	1	17
CP	2238	0	0	0	17
SY I	2231	7	1	1	16
SY I	2243	2	0	0	16
SY I	2433	1	1	1	16
SY I	2440	6	5	4	16
SY I	2441	1	1	1	16

Steps 4 & 5. The consensus results of the evaluation of the data regarding inclusion of the reference stations in pool 2A are summarized in Table E2-3. The pool 2A recommendations agree with the pool 1A recommendations for 8 of 11 stations and no additional discussion of these stations is therefore needed. Discussion of the three stations showing different recommendations is provided below.

CP 2231: The pool 2A recommendation is to include this station in the dataset. The benthos community at this station is atypical of other reference areas and those data should be excluded from a general reference data pool. However, the chemistry and toxicity data are consistent with other reference areas and these data should be retained because this station has high temporal and method comparability with the CP study stations. Examination of the number of unadjusted and adjusted PI exceedences shows that the concentrations of Cd, Cr, Ni, and DDT are relatively small; equal to or less than the adjusted PI. Thus, these exceedences are likely due to low variability in the data and the application of multiple statistical comparisons, not the presence of site-specific contamination. Similarly, the reduced amphipod survival reported for this station (76% of control) is a marginal decrease that is within the test-to-test variability observed in other studies. The concentration of PPAH at CP 2231 is substantially elevated relative to the comparison dataset. However, the PPAH concentration is well below the ERL, indicating a low potential for toxicity, and within a factor of 2 of the concentration reported for SY 2231. It is concluded that the CP 2231 PPAH is a marginal exceedance that may be due to analytical lab variability and not of sufficient biological significance to outweigh the benefits of including the data.

CP 2441: The pool 2A recommendation is to include this station in the dataset. This station shows exceedences of the unadjusted PI for Cd, PPAH, and toxicity. The Cd and toxicity deviations are small and likely due to statistical artifacts (low data variability and multiple

comparisons) since they do not exceed the adjusted PI. The PPAH concentration of 2143 ug/kg is above the tolerance interval and is considered a substantial elevation relative to the dataset. However, this station contains a relatively high TOC content that is likely to account for the elevated concentration. Figure E2-1 shows the relationship of PPAH concentration to TOC. A general direct relationship is evident and station CP 2441 lies close to the apparent regression line, while the points for the clearly contaminated stations CP 2440 and SY 2440 lie much further from the regression line. This plot shows that variation in TOC is a likely contributing factor to the PPAH data variation. A similar trend is also present for grain size, as shown in the plot in the enclosed workbook named “RefPAHAnalysis.xls”. Normalization of the data to TOC (Figure E2-2) or percent fines shows that the PPAH concentration is similar to that of other stations with acceptable non-normalized PPAH concentrations (e.g., 2433). An analysis of the pattern (i.e., fingerprint) of PAH compounds also indicates that CP 2441 is similar to other acceptable reference stations. The relative (%) concentration of each parent PAH to the total PPAH is shown in Figure E2-3. Station CP 2441 has a relative PAH concentration that is similar to the values for the three stations with the lowest total PPAH concentrations (2243, 2433, 2238) for 16 of 20 analytes, whereas CP 2440 is similar for only 9 analytes. This figure demonstrates that the source of PAH at CP 2441 is similar to that of other less contaminated stations, indicating that this station reflects ambient PAH exposure, not a site-specific source.

SY 2231: This station shows an atypical benthos community and those specific data should not be included in a general reference pool. Exceedences of the unadjusted PI were also present for As, Pb, PPAH, PCB, toxicity, and TBT, but these parameters did not exceed the adjusted PI, which indicates that statistical artifacts were likely responsible. The chemistry and toxicity data for this station should be included in the general data pool because the benefit of including data with high comparability to the CP and SY studies is greater than the negative impact of including a station with marginal elevated contaminants. This station also includes a relatively high TOC and fines content, which makes it valuable for data interpretation.

Table E2- 3. Station inclusion recommendations for reference pool 2A based on **Table E2- 2** results and best professional judgment. Pool 1A inclusion based on results of Jan 23rd meeting as modified by the Regional Board. Areas of difference between pool 1A and 2A designations are highlighted within boxes.

Study	StationID	%FINES	%TOC	Chemistry	Toxicity	Benthos	Overall	Pool 1A Inclusion
CP	2231	41.24	1	yes	yes	N/A	*yes	no
CP	2243	30.25	0.56	yes	yes	yes	yes	yes
CP	2433	38.44	0.53	yes	yes	yes	yes	yes
CP	2440	26.4	1.04	no	yes	yes	no	no
CP	2441	82.83	1.82	yes	yes	yes	yes	no
CP	2238	69	1.01	yes	yes	yes	yes	yes
SY I	2231	45	1.3	yes	yes	N/A	*yes	no
SY I	2243	28	0.51	yes	yes	yes	yes	yes
SY I	2433	41	0.67	yes	yes	yes	yes	yes
SY I	2440	32	1.62	no	yes	yes	no	no
SY I	2441	41	1.1	yes	yes	yes	yes	yes

* Not suitable for overall benthos evaluation in this study.

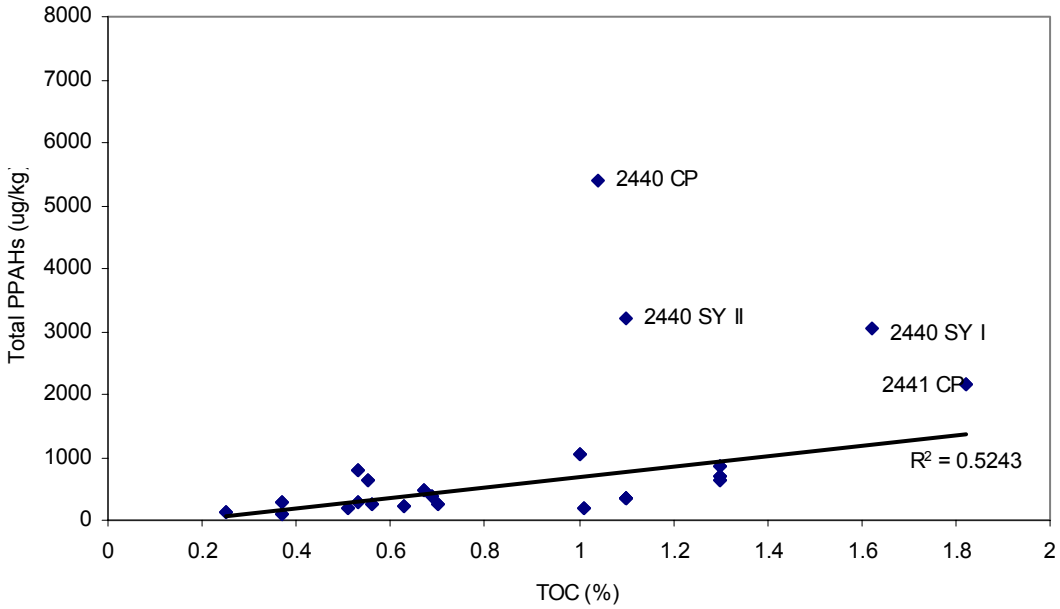


Figure E2- 1. Relationship of total PPAHs to TOC for 2001/2002 reference stations.

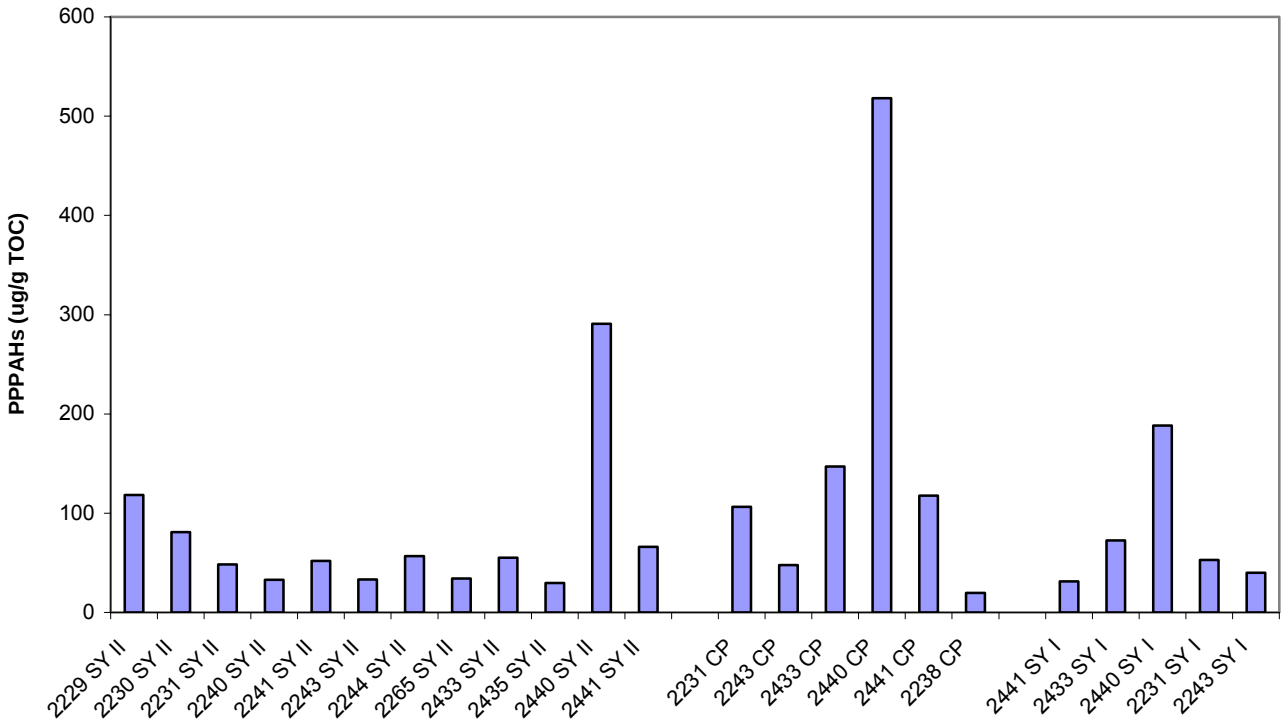


Figure E2- 2. TOC-normalized total PPAHs for the 2001/2002 reference stations.

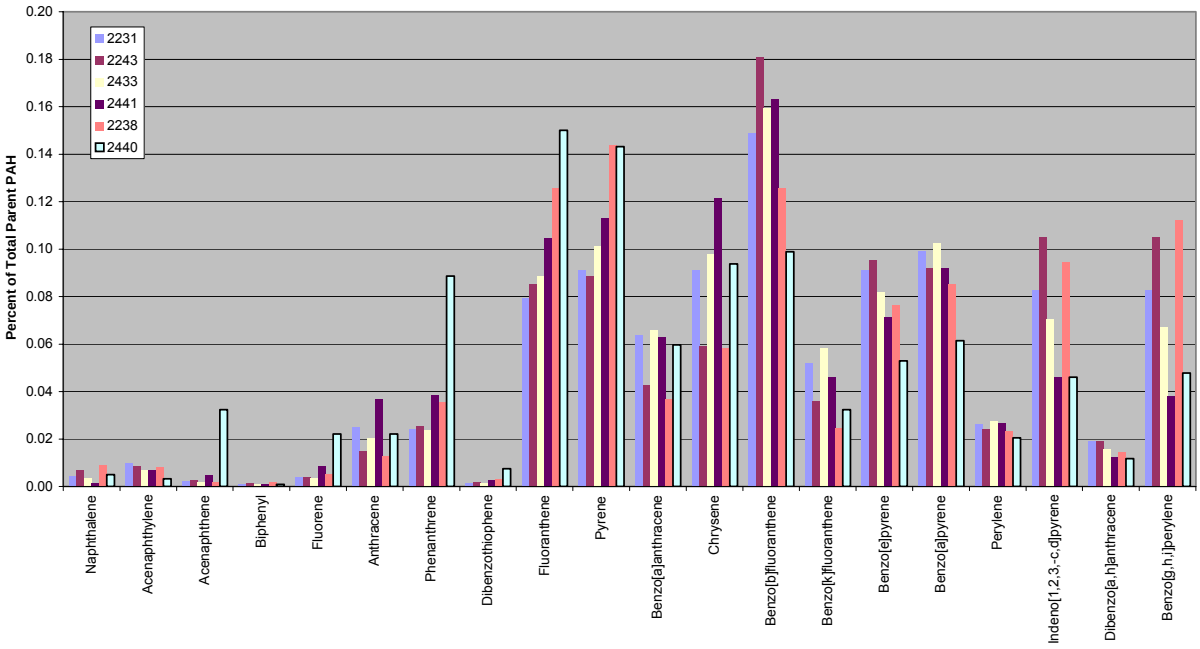


Figure E2- 3. Relative composition of parent PAH compounds at the Chollas/Paleta reference stations.

Summary of Reference Data Pools

Methods

Calculations of the unadjusted/adjusted 95% PI and tolerance intervals were conducted using the same methods as for the evaluation of reference pool 2A (described previously). The adjusted PI calculations assumed that 31 station comparisons would be carried out, which is equivalent to the maximum number of stations at either the shipyard or Chollas/Paleta study sites. All calculations for As, Hg, and TBT were conducted using ln transformed data, but the results have been converted to the untransformed state for presentation in the tables. The calculations for pools 2A and 2B incorporate the recommendations for station inclusion described above. The workbook named “ReferenceEnvelope…” shows contains the calculations for all of the statistics.

Results

The descriptive statistics and prediction/tolerance intervals for each of the 4 reference pools is summarized in Table E2-4. Bar plots of the intervals for most of the parameters are contained in the sheet named “envelope summary” in the workbook “ReferenceEnvelope…”.

Table E2- 4. Descriptive statistics for the various reference data pools. Tolerance values could not be determined for some parameters in pools 1A or 2A due to a sample size less than 4.

		Ag norm	*As norm	Cd norm	Cr norm	Cu norm	*Hg norm	Ni norm	Pb norm	Zn norm	*TBT
1A	N	6	6	6	6	6	6	6	6	6	3
1B	N	28	28	28	28	28	28	28	28	28	3
2A	N	9	9	9	9	9	9	9	9	9	4
2B	N	31	31	31	31	31	31	31	31	31	4
1A	Mean	1.2	13.9	0.5	87.1	126.3	0.6	24.8	59.5	295.6	3.2
1B	Mean	1.4	13.8	0.3	78.6	147.8	0.6	23.4	62.8	293.5	3.2
2A	Mean	1.0	14.4	0.4	87.0	134.1	0.6	24.4	64.4	280.6	4.7
2B	Mean	1.3	14.0	0.3	79.4	148.0	0.6	23.4	63.9	289.4	4.7
1A	SD	0.7	1.2	0.2	30.2	40.5	1.5	5.8	25.6	78.2	1.2
1B	SD	0.9	1.3	0.2	27.4	55.1	1.5	5.7	27.0	86.1	1.2
2A	SD	0.6	1.3	0.2	26.8	41.7	1.6	4.9	28.3	74.8	2.2
2B	SD	0.8	1.3	0.2	26.9	53.8	1.6	5.5	27.5	84.7	2.2
1A	95% PI Uncorr.	2.7	22.0	1.0	152.9	214.4	1.6	37.4	115.1	465.7	5.8
1B	95% PI Uncorr.	2.8	22.1	0.7	126.2	243.4	1.3	33.3	109.6	442.7	5.8
2A	95% PI Uncorr.	2.2	23.0	0.9	139.5	215.8	1.6	34.1	119.9	427.3	37.5
2B	95% PI Uncorr.	2.7	22.3	0.6	125.7	240.7	1.3	32.9	111.4	435.4	37.5
1A	95% PI Corr.	5.1	46.4	1.8	259.7	357.6	7.3	57.8	205.4	742.1	121.9
1B	95% PI Corr.	4.2	33.5	0.9	168.8	329.2	2.6	42.2	151.6	576.7	121.9
2A	95% PI Corr.	3.7	40.9	1.5	204.1	316.4	5.0	46.1	188.0	607.6	10054.7
2B	95% PI Corr.	4.0	33.8	0.9	166.8	322.9	2.6	41.3	153.5	564.9	10054.7
1A	Tolerance limit	5.6	55.6	2.0	285.7	392.5	10.6	62.8	227.4	809.4	
1B	Tolerance limit	3.6	27.6	0.8	149.1	289.5	1.9	38.0	132.2	514.7	
2A	Tolerance limit	3.7	39.4	1.5	200.0	310.0	4.6	45.3	183.7	596.2	1.2E12
2B	Tolerance limit	3.4	27.6	0.8	146.7	282.7	1.9	37.2	132.9	501.6	1.2E12

		PPPAHs	PCBs	Chlordane	DDT	Abundance	# Taxa	S-W Diversity	Survival
1A	N	6	6	3	3	6	6	6	6
1B	N	6	6	3	3	28	28	28	28
2A	N	9	9	5	5	9	9	9	9
2B	N	9	9	5	5	31	31	31	31
1A	Mean	379.7	18.8	0.3	1.6	577.8	65.5	2.6	90.2
1B	Mean	379.7	18.8	0.3	1.6	820.4	47.7	2.5	91.5
2A	Mean		29.6	0.5	3.9	563.3	65.6	2.6	87.1
2B	Mean	685.7	29.6	0.5	3.9	808.5	48.3	2.5	90.4
1A	SD	223.0	6.5	0.2	0.4	226.1	27.9	0.2	5.1
1B	SD	223.0	6.5	0.2	0.4	473.8	18.5	0.4	8.7
2A	SD	620.3	20.5	0.3	4.0	209.9	25.5	0.2	6.6
2B	SD	620.3	20.5	0.3	4.0	469.6	18.5	0.4	9.0
1A	95% PI Uncorr.	865.1	33.0	1.1	3.0	85.7	4.8	2.2	79.2
1B	95% PI Uncorr.	865.1	33.0	1.1	3.0	-0.8	15.6	1.9	76.3
2A	95% PI Uncorr.	1901.5	69.7	1.3	13.2	151.7	15.7	2.2	74.2
2B	95% PI Uncorr.	1901.5	69.7	1.3	13.2	-1.3	16.5	1.9	75.0
1A	95% PI Corr.	1653.3	56.0	4.7	10.0	-713.4	-93.8	1.5	61.2
1B	95% PI Corr.	1653.3	56.0	4.7	10.0	-738.2	-13.1	1.2	62.7
2A	95% PI Corr.	3396.5	119.0	2.9	31.5	-354.3	-45.7	1.7	58.3
2B	95% PI Corr.	3396.5	119.0	2.9	31.5	-719.0	-11.8	1.3	61.3
1A	Tolerance limit	1845.3	61.6			-908.0	-117.8	1.4	56.8
1B	Tolerance limit	1845.3	61.6			-397.0	0.2	1.5	69.0
2A	Tolerance limit	3301.4	115.9	3.8	42.4	-322.1	-41.8	1.8	59.3
2B	Tolerance limit	3301.4	115.9	3.8	42.4	-368.1	2.0	1.6	68.0

E3 - COMPARISON OF STATIONS INCLUDED IN THE REFERENCE OR BASELINE POOLS

The following table compares the stations included in the Final Reference Pool established by the Regional Board and the Baseline Pool established by SCCWRP and SPAWAR. Each pool selected a subset of stations from 22 candidate reference stations from the Bight'98 regional survey. The Bight'98 stations were located in San Diego Bay and identified using the distance from shore approach (Appendix E1) as containing relatively low levels of contaminants that were typical of baseline conditions in the bay.

Table E3- 1. Station inclusion in the Reference Pool and Baseline Pool.

	Reference Pool		Baseline Pool	
Station	**Included**	**Rationale[1]**	**Included**	**Rationale[2]**
2231	X	Retain based on triad results		Remove based on sample size limit
2233	X	Retain based on triad results		Remove based on sample size limit
2235		Remove based on BRI score of 42.1	X	Retained based on location and sediment type
2238	X	Retain based on triad results		Remove based on location
2240	X	Retain based on triad results		Remove based on sample size limit
2241	X	Retain based on triad results	X	Retained based on location and sediment type
2242	X	Retain based on triad results	X	Retained based on location and sediment type
2243	X	Retain based on triad results	X	Retained based on location and sediment type
2244	X	Retain based on triad results		Remove based on sample size limit
2245		Remove based on BRI score of 42.6		Remove based on sample size limit
2247	X	Retain based on triad results		Remove based on sample size limit
2249		Remove based on BRI score of 45		Remove based on location
2252	X	Retain based on triad results		Remove based on sample size limit
2256	X	Retain based on triad results	X	Retained based on location and sediment type
2257	X	Retain based on triad results	X	Retained based on location and sediment type
2258		Remove based on BRI score of 43	X	Retained based on location and sediment type
2260		Remove based on amphipod survival of 73%	X	Retained based on location and sediment type
2265	X	Retain based on triad results	X	Retained based on location and sediment type
2433	X	Retain based on triad results		Remove based on location
2435	X	Retain based on triad results		Remove based on location
2436	X	Retain based on triad results		Remove based on location
2440	X	Retain based on triad results		Remove based on location

Weight of evidence decision by Regional Board based on best professional judgment evaluation of chemistry, amphipod survival and Benthic Response Index results. Suitable chemistry was defined as within the ranges determined by the distance from shore evaluation, suitable amphipod survival was defined as no less than 80% of control, and suitable BRI score was defined as less than 41.

Weight of evidence decision by SCCWRP and SPAWAR based on chemistry, sediment type, location, and desired number of stations. A maximum of nine stations were selected in order to provide a temporal balance with the nine reference stations selected from other studies. Suitable chemistry was defined as within the ranges determined by the distance from shore evaluation, suitable sediment type defined as within ranges of TOC (0.3-3.5%) and percent fines (24-84%) present at the study sites, and suitable location was defined as within the lower portion of San Diego Bay (i.e., the portion of the bay south of the general vicinity of the Coronado Bridge that is characterized by a relatively large distance between the eastern and western shores).

E4 - USING PERCENT FINES TO DETERMINE TRACE METAL ENRICHMENT IN CHOLLAS AND PALETA SEDIMENTS

Introduction

This document describes the procedure used to help identify concentrations of metals that were enriched in Chollas and Paleta study site sediments. Metal enrichment was determined using %fines:metals relationships based on regression analysis with the Baseline Pool. The procedure was based on the methods reported by Schiff and Weisberg (1997) that used iron as a reference element.

Methods

The first step was to eliminate data from the Baseline Pool that were not normally distributed. To do this, regressions were developed between each metal and %fines in the Baseline Pool (excluding Cr at Bight'98 Station 2265), then normality of the regression residuals was assessed with the Kolmogorov-Smirnov test. If the residuals were not normally distributed, sites with residuals >2 standard deviations were eliminated, and the regression was recalculated. The process of testing for normality and removal of data based on standard deviations was iterated until a normal distribution was achieved.

The second step was to identify background levels for each metal. After the non-normally distributed data were eliminated, the slope and y-intercept of the regression lines were calculated for each metal (Table E4-1, Figure E4-1).

The third step was to identify concentrations of metals in the quarterly field samples that were enriched. This was performed by comparing the metal concentration to a threshold value based in part on the % fines measured at each station. Because the % fines varied by station and sampling event, the threshold used to evaluate metal enrichment was also variable. The threshold value was calculated as the background level + the 95% prediction limit. The 95% prediction limit is derived as:

$$\text{95\% prediction limit} = SE\sqrt{1+\frac{1}{n}+\frac{(X-\overline{X})^2}{(n-1)(SD^2)}} * (t-statistic)$$

The t-statistic for a one-tailed test, n-2, α = 0.05 was used. Measured concentrations of metals that exceeded the threshold value were identified as being enriched (Figure E4-2, Table E4-2).

Results

Arsenic and cadmium were the only elements that had non-normally distributed residuals. Two stations were removed from the Baseline Pool for As. However, none of the residuals for Cd were greater than 2 standard deviations, and therefore none of the data were removed for Cd. All other metals had normally distributed residuals, and thus data from all 18 stations were used (except for Cr, which had data from 17 stations).

Table E4-1. Regression results of fines:metals relationships in the Baseline Pool. Results are for the data pool after removing residuals that exceed 2 standard deviations. All relationships are significant at $p < 0.05$.

Element	Sample size	r^2	Slope	Y-intercept	Range in thresholds	
					9% fines	80% fines
Ag	18	0.289	0.00827	0.1778	0.78	1.37
As	16	0.881	0.0841	2.001	4.15	10.07
Cd	18	0.249	0.0024	0.0519	0.25	0.42
Cr	17	0.728	0.673	7.90	30.61	77.78
Cu	18	0.596	1.44	3.80	65.65	167.18
Hg	18	0.376	0.0047	0.0999	0.39	0.72
Ni	18	0.869	0.215	0.840	6.25	21.41
Pb	18	0.433	0.481	8.25	35.23	69.15
Zn	18	0.721	2.21	28.98	105.68	261.50

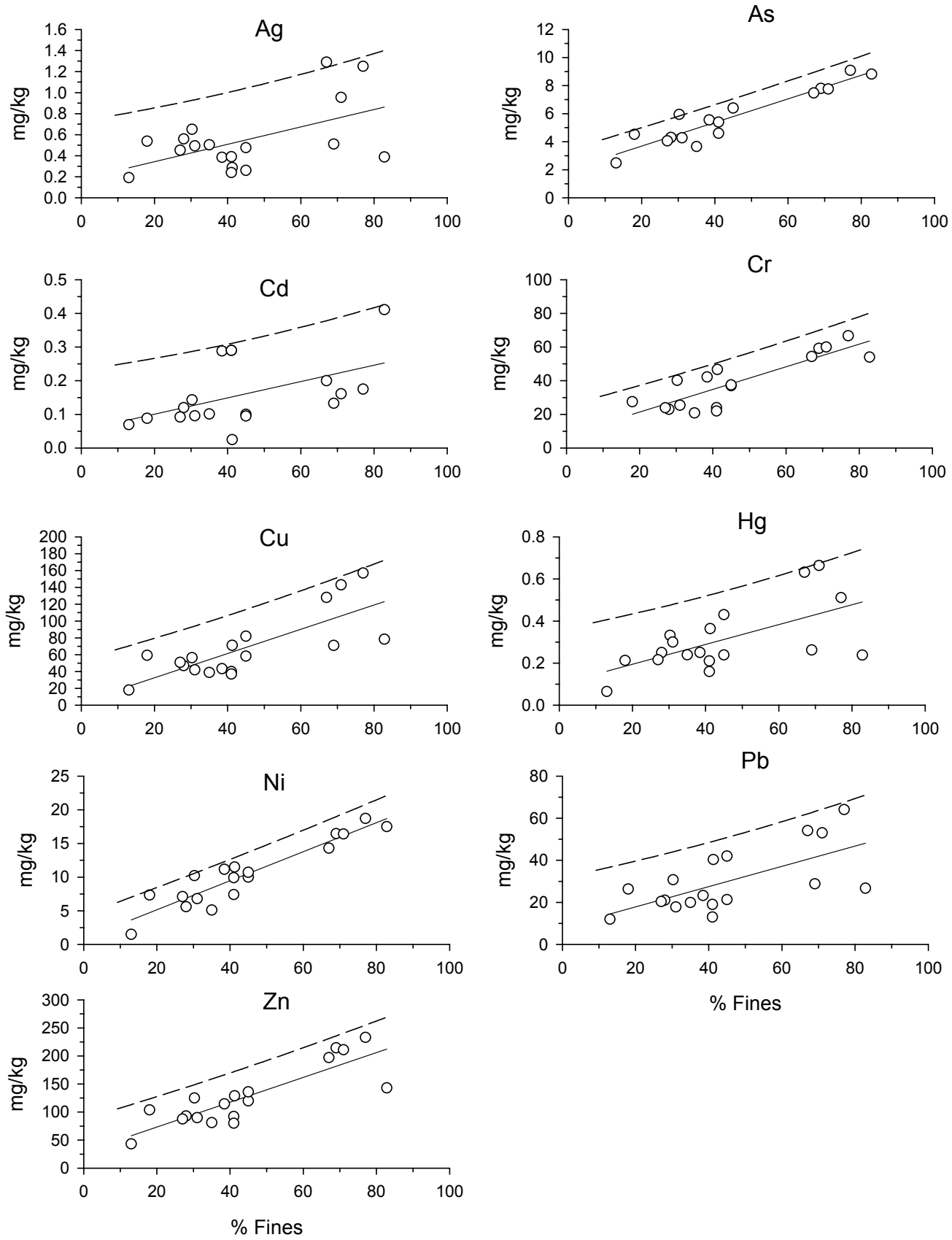


Figure E4-1. % Fines:metals plots from the Baseline Pool. The solid line is the relationship from linear regression. The dashed line is the threshold (predicted value + 95% prediction interval).

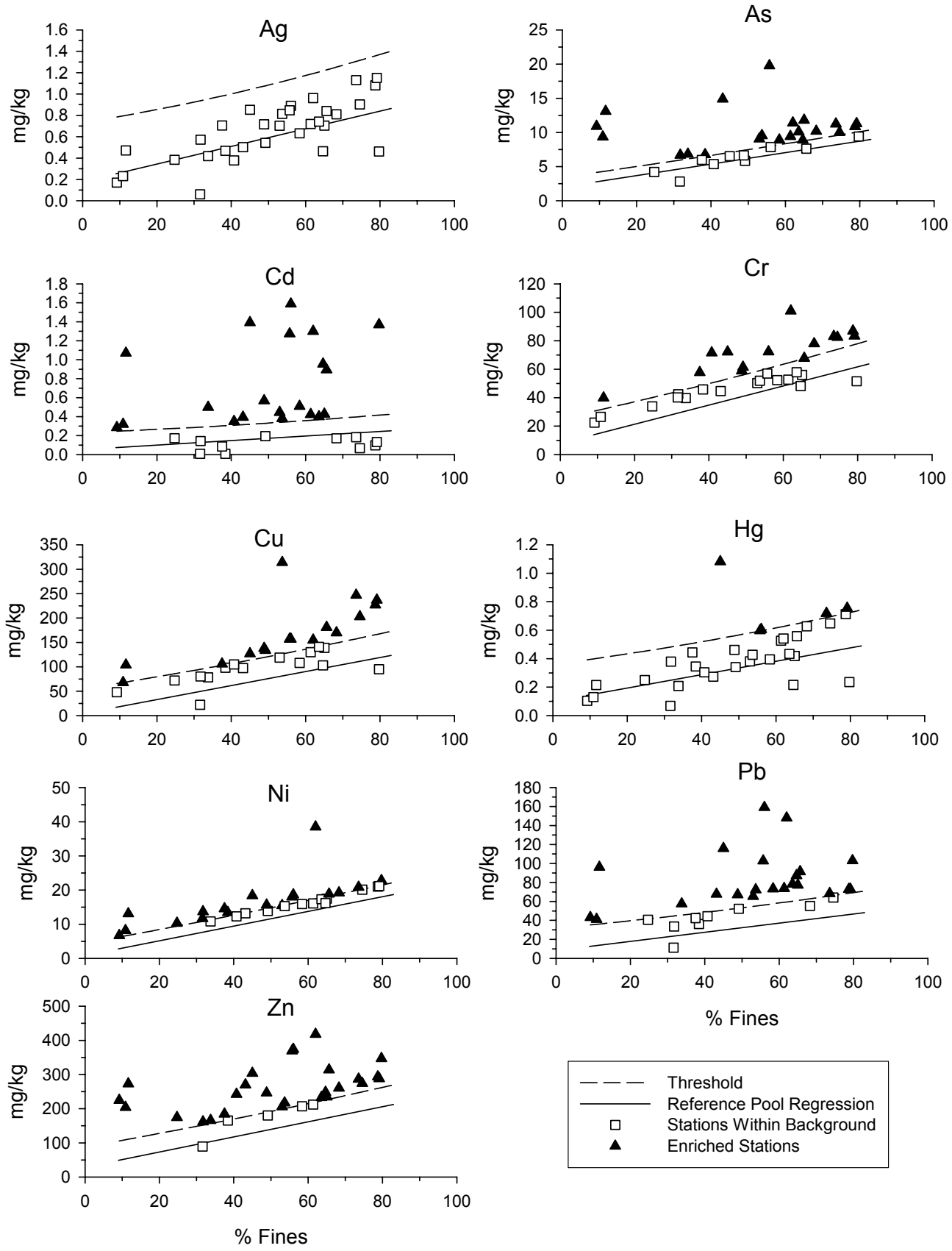


Figure E4-2. %Fines:metals plots from Chollas and Paleta stations overlaid on the threshold and regression lines from the Baseline Pool. Sites which fall below the threshold are considered uncontaminated. Sites which lie above the threshold are considered enriched.

Table E4-2. Identification of Chollas and Paleta sediment metal concentrations (Value) that exceed the threshold values (Thrsh). The threshold values were derived from the Baseline Pool, using the fines:metal regression approach. Boxed measured values are those which exceed the threshold.

Station	% Fines	Ag		As		Cd		Cr		Cu		Hg		Ni		Pb		Zn	
		Value	Thrsh	Value	Thrsh	Value	Thrsh	Value	Thrsh	Value	Thrsh	Value	Thrsh	Value	Thrsh	Value	Thrsh	Value	Thrsh
C01	65	0.70	1.22	11.8	8.77	0.428	0.37	56.0	67.04	139.0	143.68	0.419	0.64	17.5	18.08	77.3	61.00	235.0	226.30
C02	61	0.72	1.19	9.4	8.45	0.424	0.36	52.7	64.43	130.0	138.00	0.526	0.62	16.1	17.26	73.7	59.04	212.0	217.73
C03	62	0.96	1.19	11.4	8.51	1.300	0.36	101.0	64.90	155.0	139.01	0.541	0.63	38.5	17.41	148.0	59.39	418.0	219.26
C04	43	0.50	1.03	14.9	6.90	0.396	0.32	44.6	51.93	97.4	110.94	0.273	0.53	13.2	13.29	67.7	49.90	270.0	176.52
C05	58	0.63	1.16	8.9	8.19	0.510	0.35	52.3	62.33	108.0	133.42	0.395	0.61	15.9	16.60	73.3	57.48	207.0	210.81
C06	64	0.74	1.21	10.1	8.64	0.400	0.37	57.9	66.01	141.0	141.43	0.433	0.63	17.3	17.76	78.4	60.22	233.0	222.91
C07	9	0.17	0.78	10.9	4.15	0.286	0.25	22.5	30.61	47.9	65.65	0.104	0.39	6.7	6.25	43.1	35.23	225.0	105.68
C08	11	0.23	0.79	9.3	4.28	0.321	0.25	26.6	31.60	68.0	67.74	0.130	0.40	8.1	6.58	41.3	35.89	204.0	109.00
C09	53	0.70	1.11	9.1	7.73	0.446	0.34	50.3	58.60	119.0	125.33	0.381	0.58	15.5	15.42	65.4	54.73	206.0	198.53
C10	54	0.81	1.12	9.6	7.79	0.381	0.34	51.9	59.07	314.0	126.36	0.427	0.58	15.3	15.57	72.3	55.08	217.0	200.10
C11	12	0.47	0.80	13.1	4.34	1.070	0.25	39.9	32.05	104.0	68.68	0.215	0.40	13.1	6.73	96.1	36.19	273.0	110.50
C12	34	0.42	0.95	6.8	6.12	0.499	0.29	39.7	45.79	78.5	97.78	0.208	0.49	10.8	11.30	57.6	45.55	166.0	156.20
C13	65	0.46	1.22	8.9	8.74	0.956	0.37	48.2	66.79	103.0	143.13	0.216	0.64	16.2	18.00	87.2	60.81	248.0	225.48
C14	80	0.46	1.37	9.4	10.07	1.370	0.42	51.6	77.78	94.9	167.18	0.235	0.72	22.8	21.41	103.0	69.15	347.0	261.50
P01	32	0.57	0.94	6.7	5.95	0.144	0.29	42.4	44.48	80.2	94.98	0.379	0.48	13.7	10.87	33.7	44.63	161.7	151.85
P02	68	0.81	1.25	10.2	9.06	0.172	0.38	78.0	69.39	170.0	148.81	0.627	0.66	19.2	18.81	55.2	62.76	260.6	234.02
P03	38	0.47	0.99	6.8	6.50	0.009	0.30	45.8	48.79	98.1	104.20	0.345	0.51	13.4	12.27	36.1	47.66	165.2	166.14
P04	75	0.90	1.31	10.0	9.61	0.067	0.40	82.5	73.95	203.0	158.78	0.648	0.69	20.1	20.23	64.1	66.22	274.2	248.96
P05	79	1.08	1.36	10.9	9.98	0.098	0.41	87.0	77.05	227.0	165.57	0.713	0.72	21.0	21.18	72.8	68.58	293.5	259.09
P06	74	1.13	1.30	11.3	9.53	0.184	0.40	83.1	73.25	247.0	157.24	0.719	0.69	20.8	20.01	68.3	65.68	286.5	246.65
P07	79	1.15	1.36	11.3	10.02	0.133	0.41	83.4	77.34	237.0	166.20	0.755	0.72	21.2	21.27	73.0	68.81	288.2	260.04
P08	38	0.71	0.98	6.0	6.43	0.086	0.30	57.7	48.22	106.0	102.98	0.444	0.51	14.6	12.09	42.4	47.26	184.4	164.26
P09	32	0.06	0.94	2.8	5.94	0.009	0.29	40.2	44.40	22.1	94.81	0.068	0.48	11.7	10.84	11.3	44.57	89.3	151.58
P10	41	0.38	1.01	5.4	6.69	0.351	0.31	71.5	50.32	105.0	107.49	0.304	0.52	12.3	12.77	44.4	48.75	242.4	171.21
P11	45	0.85	1.04	6.5	7.05	1.392	0.32	72.2	53.18	127.0	113.63	1.081	0.54	18.4	13.69	116.0	50.80	303.9	180.65
P12	49	0.54	1.08	5.9	7.40	0.195	0.33	61.5	55.96	134.0	119.64	0.341	0.56	13.9	14.58	52.3	52.81	180.1	189.85
P13	25	0.38	0.89	4.2	5.38	0.173	0.28	33.9	40.06	71.9	85.58	0.250	0.45	10.3	9.41	40.7	41.58	174.4	137.18
P14	49	0.72	1.07	6.6	7.38	0.569	0.33	58.9	55.75	138.0	119.17	0.462	0.56	15.6	14.51	67.2	52.65	246.4	189.13
P15	56	0.89	1.14	7.9	7.99	1.589	0.35	72.3	60.69	157.0	129.86	0.606	0.60	18.6	16.08	159.1	56.27	373.6	205.41
P16	66	0.84	1.23	7.6	8.82	0.894	0.37	67.8	67.48	181.0	144.63	0.558	0.65	18.8	18.22	91.4	61.32	313.8	227.74
P17	56	0.85	1.13	19.8	7.96	1.273	0.35	57.0	60.46	157.0	129.36	0.597	0.59	18.0	16.01	102.8	56.10	369.5	204.66

References

Schiff, K. and S.B. Weisberg. 1997. Iron as a reference element for determining trace metal enrichment in California coastal shelf sediments. Pp 68-77 *in*: S.B. Weinberg, C. Francisco and D. Hallock (eds.) Southern California Coastal Water Research Project Annual Report 1996. Westminster, CA.

APPENDIX F: ASSESSMENT OF EFFECTS AND POTENTIAL IMPAIRMENT TO BENEFICIAL USES USING THE REFERENCE POOL

F1 - REFERENCE POOL CHARACTERISTICS

The reference condition was defined as the optimum ambient condition in the bay. This condition was based on a pool of reference stations meeting specific thresholds of acceptability for toxicity and benthic condition (e.g., amphipod survival >85%). Because some reference stations were excluded from the pool on the basis of elevated toxicity and impacted benthos, the Reference Pool is a measure of the best existing conditions in the bay and may not represent the full range of variability in the ambient condition for some parameters. The stations comprising the Reference Pool were specified by the SDRWQCB following discussion with SCCWRP, SPAWAR and stakeholders (Table F-1). The process for selection can be found in Appendix E. The Reference Pool was comprised of data from 22 stations from three studies: two stations came from the Chollas/Paleta study, three stations came from the Phase I Shipyard study, and 17 stations came from the Bight '98 study.

Each parameter was evaluated for normality prior to its statistical evaluation using prediction limits. An exception to this was the fines-normalized metals data that were subject to a normalization process described in Appendix E4. The Normality of each parameter was tested using both the Kolmogorov/Smirnov (KS) and Shapiro-Wilk tests. In the event a distribution was not normally distributed (P<0.1) the data were transformed using ln, square-root, arcsin, or cube transforms. In instances when multiple transforms could satisfy normality, the best transform was chosen based on best professional judgment after review of the resulting p and r statistics and review of a graphical representation of the data. The data transforms used for the Reference Pool are shown in **Error! Reference source not found.**F-2.

Physical Properties

The range of fines content and TOC is shown in (Table F-3). The range of fines in the Reference Pool was slightly narrower (13% to 77%) than that found at the Chollas and Paleta (9.2% to 82.8%) study sites. The full range of TOC represented by stations in the Reference Pool (0.3% to1.6%) is also narrower than the range at Chollas and Paleta stations (0.1to 6.1%).

Metals

Metals characteristics and summary statistics for the Reference Pool are shown in (Table F3). Metal concentrations in the Reference Pool were generally low, and most showed variations on the order of 50% for most metals as measured by RSD from station to station. Among the Reference Pool stations, 2257 had the highest occurrence of maximum metal concentrations. Higher metals levels at this station are consistent with the high fines content (77%) observed at this station. Maximum metal concentrations in the Reference Pool all fell below the ERM. The 95% upper predictive limit for metals in the Reference pool was calculated two ways. One method calculated the 95% upper predictive limit from the normalized data set. The backcalculated values from the transformed data are shown in (Table F-3). A predictive limit was also determined from regression analysis with fines content as was done for the Baseline Pool. The results were therefore specific for the fines content measured at each station. In general, this means that stations with higher fines content will have a higher 95% upper predictive limit. Table F-4 shows the threshold values as a function of fines for each metal.

Organic Contaminants

The concentrations measured for nearly all Bight'98 organic compounds were below their individual method detection limits. For this reason, the organic data from the Bight'98 study were not used in developing the Reference Pool. The organic data forming the Reference Pool are shown in (Table F-5). None of the organic compounds exceeded their associated SQG. Pesticides were not measured in the shipyard study, thus there are only two measurements of TCHLOR and TDDT in this pool. Because there was no way to correctly calculate a predictive limit from this limited data set, the upper predictive limit from the Baseline Pool was used instead.

SQGQ1

The SQGQ1 data for the Reference Pool calculated using the method described in section 11.1.4 are shown in Table F-6. SQGQ1 values were calculated for all stations using ½ method detection limits for all organic data. Values ranged from 0.08 to 0.33. The upper predictive limit of the Reference Pool SQGQ1 was 0.15.

Toxicity

Toxicity results for the Reference Pool are shown in (Table F-7). The amphipod survival data were all above 80%, a criterion used in defining the pool. Because of the limited number of stations available for the urchin interface test, the lower predictive limit calculated for the Baseline Pool was used. These two interface tests were also flagged for possible ammonia interference. Because of the high variance, the urchin pore water test had a negative lower prediction limit.

Benthic Community

The metrics used to measure benthic community are shown in (Table F-8). Abundance measurements in the Reference Pool sediments ranged from 237 to 1543 with a mean of 807. The number of taxa ranged from 28 to 108 with a mean of 48. The Shannon-Wiener diversity index ranged from 1.8 to 3.4 with a mean of 2.6. The Benthic Response Index (BRI) yielded results ranging from -1 to 38 with a mean BRI of 26. All stations were either in response index I or reference.

Bioaccumulation

Statistical analysis for potential impacts to aquatic dependent wildlife and human health from CoPC in the sediment at the study sites necessitated that the Reference Pool contain bioaccumulation data. However, because the Bight '98 study did not collect bioaccumulation data for the San Diego Bay stations, the Reference Pool for bioaccumulation data was limited to only five stations. The requisite calculations to analyze potential risks to wildlife and human health also required a slightly different list of organic chemical constituents than was needed for sediment chemistry analysis. Therefore, upper 95% predictive limits where created for the following organic parameters: naphthalene, benzo-a-pyrene, TPCB, α-chlordane, γ-chlordane, sum of ortho and para DDE, sum of ortho and para DDD, and the sum of ortho and para DDT. Tissue characteristics and metals data, summary statistics, and upper 95% predictive limits for the Reference Pool are shown in Table F-9. Tissue organics data, summary statistics, and upper 95% predictive limits for the Reference Pool are shown in Table F-10. The prediction limits for zinc and naphthalene were calculated using an N of two instead of five because of an apparent bias detected in the three shipyard station's bioaccumulation data. The Reference Pool for the pesticides was restricted to stations only from the Chollas-Paleta study because the

shipyard study did not analyze for pesticides. Therefore, the predictive limits for all pesticides were calculated using an N of two instead of nine.

Table F- 1. Stations making up the reference pool.

Station ID	Station ID
CP 2238	B98 2243
CP 2433	B98 2244
SY 2243	B98 2247
SY 2433	B98 2252
SY 2441	B98 2256
B98 2231	B98 2257
B98 2233	B98 2265
B98 2238	B98 2433
B98 2240	B98 2435
B98 2241	B98 2436
B98 2242	B98 2440

Table F- 2. Data transforms used to produce normally distributed data for use in statistical testing against the Reference Pool.

Parameter	Transform
Metals	
Ag	Square root
As	Natural log
Cd	Square root
Cr	Natural log
Cu	Natural log
Hg	Natural log
Ni	No transformation
Pb	Natural log
Zn	Natural log
Organics	
PPPAH	No transformation
PCBs	No transformation
Chlordane	No transformation
DDTs	No transformation
SQGQ1	Natural log
Toxicity	
Amphipod survival	No transformation
Sea urchin development	No transformation
Sea urchin fertilization	Cube
Benthos	
Abundance	Natural log
Taxa	Natural log
Diversity	No transformation
BRI	Cube

Table F- 3. Individual station characteristics and summary statistics for physical properties (%) and metals (mg/kg) in the Reference Pool.

StationID	%FINES	%TOC	Ag	As	Cd	Cr	Cu	Hg	Ni	Pb	Zn
CP 2238	69.0	1.0	0.510	7.80	0.13	59.2	71.0	0.262	16.5	28.8	214
CP 2433	38.4	0.5	0.385	5.55	0.29	42.2	43.3	0.251	11.2	23.3	115
SY 2243	28.0	0.5	0.560	4.30	0.12	23.0	47.0	0.250	5.6	21.0	93.0
SY 2433	41.0	0.7	0.390	4.60	0.29	24.0	40.0	0.210	7.4	19.0	92.0
SY 2441	41.0	1.1	0.240	5.40	0.29	22.0	37.0	0.160	9.9	13.0	80.0
B98 2231	31.0	0.6	0.300	4.73	0.04	26.7	58.1	0.224	8.0	21.6	92.5
B98 2233	36.0	0.5	0.008	4.26	0.01	28.5	52.0	0.316	7.9	26.8	106
B98 2238	57.0	1.0	0.427	5.88	0.17	33.1	55.1	0.169	12.2	18.1	143
B98 2240	44.0	0.5	0.512	4.33	0.08	29.5	47.4	0.263	8.1	22.5	103
B98 2241	18.0	0.5	0.538	4.53	0.09	27.5	59.2	0.213	7.3	26.3	104
B98 2242	31.0	0.7	0.493	4.27	0.10	25.4	42.0	0.300	6.8	17.8	89.8
B98 2243	35.0	0.5	0.504	3.66	0.10	20.8	38.8	0.239	5.1	19.9	81.2
B98 2244	20.0	0.3	0.390	4.23	0.10	21.2	41.8	0.177	5.7	15.4	82.4
B98 2247	44.0	0.6	0.407	6.16	0.11	28.3	53.4	0.157	8.5	17.4	103
B98 2252	16.0	0.6	0.204	4.34	0.04	14.8	31.1	0.113	4.2	13.8	64.2
B98 2256	67.0	1.3	1.29	7.47	0.20	54.3	128	0.632	14.3	54.1	197
B98 2257	77.0	1.6	1.25	9.08	0.18	66.7	157	0.511	18.7	64.1	233
B98 2265	13.0	0.4	0.192	2.48	0.07	NA	18.0	0.065	1.5	12.0	43.2
B98 2433	71.0	1.2	0.499	8.32	0.25	34.5	71.6	0.263	14.9	21.0	126
B98 2435	49.0	0.5	0.185	5.06	0.14	20.6	28.4	0.123	9.9	7.1	64.4
B98 2436	55.0	1.4	0.616	8.62	0.21	48.4	85.8	0.517	15.3	34.4	145
B98 2440	38.0	0.5	0.008	4.84	0.04	24.3	41.8	0.235	7.2	20.6	81.1
N	22	22	22	22	22	21	22	22	22	22	22
Minimum	13.0	0.3	0.01	2	0.01	14.8	18.0	0.065	1.5	7.1	43.2
Maximum	77.0	1.6	1.29	9.1	0.29	66.7	157	0.632	18.7	64.1	233
Mean	41.8	0.7	0.45	5.45	0.14	32.1	56.7	0.257	9.4	23.5	111
Std Dev	18.3	0.4	0.31	1.75	0.08	14.0	31.9	0.137	4.4	13.1	48.6
RSD	43.7%	48.1%	69.8%	32.2%	61.4%	43.5%	56.3%	53.3%	46.6%	55.4%	43.6%
95% UPL	73.9	1.4	1.13*	9.04*	0.32*	59.2*	116*	0.559*	17.0	48.3*	209*
ERM	NA	NA	3.7	70	9.6	370	270	0.71	51.6	218	410

* Value backcalculated from transformed data.

Table F- 4. Threshold values derived from the fines-metals regression approach, for the Reference Pool. Sediment metal concentrations that exceed these thresholds are considered enriched. Metal concentrations in mg/Kg.

%Fines	Ag	As	Cd	Cr	Cu	Hg	Ni	Pb	Zn
0	0.55	3.58	0.10	22.6	48.0	0.29	3.39	26.3	76.1
5	0.59	3.97	0.11	25.3	53.4	0.30	4.42	28.0	85.8
10	0.63	4.36	0.12	28.0	58.8	0.32	5.47	29.8	95.6
15	0.67	4.76	0.13	30.8	64.4	0.34	6.52	31.6	106
20	0.71	5.15	0.14	33.7	70.1	0.36	7.59	33.5	116
25	0.76	5.56	0.15	36.6	76.0	0.38	8.66	35.4	126
30	0.80	5.97	0.16	39.6	82.0	0.40	9.74	37.4	136
35	0.85	6.38	0.17	42.6	88.1	0.42	10.8	39.4	147
40	0.90	6.80	0.19	45.7	94.3	0.44	11.9	41.5	158
45	0.95	7.22	0.20	48.9	101	0.47	13.1	43.7	169
50	1.00	7.65	0.21	52.1	107	0.49	14.2	46.0	180
55	1.05	8.09	0.22	55.4	114	0.51	15.3	48.3	191
60	1.11	8.52	0.24	58.7	121	0.54	16.4	50.6	202
65	1.16	8.97	0.25	62.1	127	0.56	17.6	53.1	214
70	1.22	9.42	0.26	65.5	134	0.59	18.8	55.6	226
75	1.28	9.87	0.27	69.0	142	0.62	19.9	58.1	238
80	1.34	10.3	0.29	72.6	149	0.64	21.1	60.7	250
85	1.40	10.8	0.30	76.2	156	0.67	22.3	63.3	262
90	1.46	11.3	0.32	79.8	164	0.70	23.5	66.0	274
95	1.52	11.7	0.33	83.5	171	0.73	24.7	68.7	286
100	1.59	12.2	0.34	87.2	179	0.76	25.9	71.5	299

Table F- 5. Individual station characteristics, summary statistics, and 95% upper predictive limits for organic contaminants (μg/kg) in the Reference Pool. Organics data for Bight98 were used only in the calculation of the SQGQ1 using ½ method detection limits. The Baseline Pool predictive limit was used for the pesticide data because of the limited sample size.

Station	PPPAH ng/g	CBPAH ug/gOC	TPCB ng/g	CBPCB ug/gOC	TCHLOR ng/g	TDDT ng/g	TDDT ug/g OC
CP 2238	199	14.8	11	6.8	0.183	1.295	0.13
CP 2433	780	121.6	27	17.0	0.57	2.095	0.40
SY 2243	204	27.2	22	17.6			
SY 2433	486	56.7	21	15.8			
SY 2441	343	25.5	11	8.0			
B98 2231	604	78.6	51	18.6	0.60	1.67	
B98 2233	237	44.7	51	17.6	0.60	1.67	
B98 2238	234	20.7	51	17.6	0.60	1.67	
B98 2240	315	48.5	51	17.6	0.60	1.67	
B98 2241	234	38.3	51	17.6	0.60	1.67	
B98 2242	359	39.4	51	17.6	0.60	3.30	
B98 2243	234	40.7	51	17.6	0.60	1.67	
B98 2244	234	66.7	51	17.6	0.60	1.67	
B98 2247	258	38.2	51	17.6	0.60	2.45	
B98 2252	236	33.8	51	17.6	0.60	1.67	
B98 2256	369	24.9	51	17.6	0.60	1.67	
B98 2257	449	23.6	52	18.8	0.60	1.67	
B98 2265	234	55.9	51	17.6	0.60	1.67	
B98 2433	574	43.1	51	17.6	0.60	1.67	
B98 2435	234	36.1	51	17.6	0.60	1.67	
B98 2436	565	36.0	51	17.6	0.60	1.67	
B98 2440	234	39.9	51	17.6	0.60	1.67	
N	5**		5**		5+	5+	
Minimum	199**		11**		0.18	1.30	
Maximum	780**		52**		0.57	2.10	
Mean	402**		18.5**		0.54+	3.91+	
Std Dev	242**		7.19**		0.34+	3.99+	
RSD	60%**		39%**		63%+	102%+	
95% UPL	966**		35.3**		1.33+	13.2+	
SQG		1800		400	4.8		100

\+ Values come from Baseline Pool.

* Value backcalculated from transformed data.

** Statistics based on CP and SY data only.

Table F- 6. SQGQ1 values calculated for the Reference Pool.

Station	SQGQ1
CP 2238	0.18
CP 2433	0.15
SY 2243	0.15
SY 2433	0.13
SY 2441	0.10
B98 2231	0.13
B98 2233	0.11
B98 2238	0.15
B98 2240	0.14
B98 2241	0.16
B98 2242	0.13
B98 2243	0.13
B98 2244	0.12
B98 2247	0.13
B98 2252	0.09
B98 2256	0.30
B98 2257	0.33
B98 2265	0.08
B98 2433	0.16
B98 2435	0.08
B98 2436	0.20
B98 2440	0.09
N	22
Minimum	0.08
Maximum	0.33
Mean	0.15
Std Dev	0.06
RSD	42%
95% UPL	0.26

Table F- 7. Individual station characteristics, summary statistics, and 95% lower predictive limits (LPL) for control adjusted amphipod survival (%), urchin development (% normal), and urchin fertilization (%) in the Reference Pool. The Baseline Pool predictive limit was used for the Urchin pore water data because of the limited sample size.

StationID	Amphipod	Urchin Interface	Urchin Pore Water
CP 2238	90.4	88.1*	35.7
CP 2433	91.2	115.5*	99.5
SY 2243	91.8		91.9
SY 2433	95.9		79.0
SY 2441	95.0		90.1
B98 2231	93.8		
B98 2233	99.0		
B98 2238	86.7		
B98 2240	88.8		
B98 2241	97.9		
B98 2242	91.8		
B98 2243	95.9		
B98 2244	100.0		
B98 2247	89.8		
B98 2252	104.2		
B98 2256	100.0		
B98 2257	90.8		
B98 2265	84.9		
B98 2433	96.9		
B98 2435	102.1		
B98 2436	100.0		
B98 2440	103.1		
N	22	4+	5
Minimum	84.9	88.1	35.7
Maximum	104.2	115.5	99.5
Mean	95.0	101.8+	79.2
Std Dev	5.4	13.3+	25.4
RSD	5.7%	13.1%+	32.1%
95% LPL	85.5	64.7+	-61.4**

+ Values come from Baseline Pool.
* Values flagged for possible ammonia interference.
** Value backcalculated from transformed data.

Table F- 8. Individual station characteristics, summary statistics, and 95% lower predictive limits for abundance, number of taxa, Shannon-Weiner diversity index and BRI in the Reference Pool.

StationID	Abundance	# Taxa	S-W Diversity	BRI	BRI Level
CP 2238					
CP 2433	421	57	2.82	22.85	reference
SY 2243					
SY 2433	441	77	2.58	16.8	reference
SY 2441	506	108	2.80	19.9	reference
B98 2231	1502	70	2.75	15.97	reference
B98 2233	395	39	2.73	28.81	reference
B98 2238	760	41	2.47	38.48	I
B98 2240	1201	40	2.18	28.83	reference
B98 2241	1526	44	2.31	34.74	I
B98 2242	1117	28	1.80	36.61	I
B98 2243	966	47	2.74	36.36	I
B98 2244	1376	48	2.69	31.23	I
B98 2247	900	33	2.09	34.11	I
B98 2252	327	37	2.81	4.26	reference
B98 2256	237	28	2.66	37.90	I
B98 2257	503	37	2.31	38.10	I
B98 2265	1543	48	2.39	26.68	reference
B98 2433	709	59	3.08	20.99	reference
B98 2435	466	60	3.41	-1.11	reference
B98 2436	599	48	3.06	19.38	reference
B98 2440	651	59	3.16	31.66	I
N	20	20	20	20	
Minimum	237	28	1.8	-1.1	
Maximum	1543	108	3.4	38	
Mean	807	50	2.64	26.13	
Std Dev	431	19	0.39	11.2	
RSD	53%	37%	15%	43%	
95% LPL	260.5*	26.2*	1.9	39.5*	

* Value backcalculated from transformed data.

Table F- 9. Individual station characteristics, summary statistics, and 95% upper predictive limits for tissue solids (%), lipid (%), and metals (mg/kg) in the Reference Pool.

Station ID	Solids	Lipid	Ag	As	Cd	Cr	Cu	Hg	Ni	Pb	Zn
CP 2433	12.1	6.7	0.37	20.7	0.24	24.5	12.1	0.06	16.9	2.6	73.9
CP 2238	11.8	4.8	0.48	19.3	0.22	58.8	12.6	0.05	37.6	1.9	77.5
SY 2441	12.6	3.2	0.51	21.1	0.42	3.2	20.3	0.08	3.9	2.4	*
SY 2433	14.7	3.4	0.29	19.0	0.25	2.4	10.5	0.08	2.9	1.9	*
SY 2243	15.1	2.9	0.26	20.3	0.20	2.0	11.5	0.11	2.4	2.0	*
N	5	5	5	5	5	5	5	5	5	5	2
Min	11.8	2.9	0.26	19.0	0.20	2.0	10.5	0.05	2.4	1.9	73.9
Max	15.1	6.7	0.51	21.1	0.42	58.8	20.3	0.11	37.6	2.6	77.5
Mean	13.3	4.2	0.38	20.1	0.27	18.2	13.4	0.08	12.7	2.2	75.7
Std Dev	1.5	1.6	0.11	0.9	0.09	24.6	3.9	0.03	15.1	0.3	2.5
RSD	12%	37%	29%	4%	34%	135%	29%	33%	119%	15%	3%
Upper 95% PL			0.64	22.2	0.47	75.7	22.6	0.14	48.1	2.9	95.4

*Stations not used due to observed bias between studies

Table F- 10. Individual station characteristics, summary statistics, and 95% upper predictive limits for tissue organic contaminants (μg/kg) in the Reference Pool.

Station ID	Naph	BAP	TPCB	α-Chlor	γ-Chlor	DDE	DDD	DDT
CP 2433	8.2	69	138	0.10	0.62	8.4	2.3	0.44
CP 2238	4.9	6	56	0.42	0.08	6.4	0.6	0.27
SY 2441	*	118	39	**	**	**	**	**
SY 2433	*	63	83	**	**	**	**	**
SY 2243	*	59	80	**	**	**	**	**
N	2	5	5	2	2	2	2	2
Min	4.9	6	39	0.10	0.08	6.4	0.6	0.27
Max	8.2	118	138	0.42	0.62	8.4	2.3	0.44
Mean	6.6	63	79	0.26	0.35	7.4	1.5	0.35
Std Dev	2.3	40	37	0.23	0.38	1.4	1.2	0.12
RSD	36%	63%	47%	88%	109%	19%	83%	35%
Upper 95% PL	24.6	156	167	2.02	3.30	18.2	10.7	1.29

*Stations not used due to observed bias between studies
**Chemical was not analyzed at these stations

F2 - ASSESSMENT OF EFFECTS

Aquatic Life

Sediment Chemistry

Effects on aquatic life were assessed using three lines of evidence (LOE): sediment chemistry, toxicity, and benthic community composition. The relative degree of effect (or likelihood of an impact) was evaluated and used to classify each station as having low, moderate, or high impact for each LOE.

The relative likelihood that bulk sediment CoPCs were a site-specific causative agent for effects was ranked into three general categories of low, moderate, or high. The rankings were based on a comparison to the Reference Pool (95 percentile predictive limit of the reference stations) and gave increasing weight or confidence that an effect to aquatic life will occur given an increasing number and magnitude of chemicals exceeding the SQG thresholds. A schematic of the decision tree used to apply station ranking criteria was shown in Section 11 of the report.

Results of the sediment chemistry LOE for each station in the Chollas and Paleta sites are shown in Table F-11 . The results for the Chollas site showed three inner creek stations (C12, C13, C14) and three outer creek stations (C2, C3, and C5) contain chemical levels that have a high likelihood to cause effects to organisms living or feeding on these sediments. The remaining Chollas stations were categorized as Moderate. At the Paleta site, two stations (P11 and P15) were ranked with a high likelihood of impacts, 11 were ranked as having a moderate likelihood of impact and four stations (P1, P3, P4 and P9) were ranked as having no or low likelihood of impact.

Toxicity

The results from all three toxicity tests were used to classify the relative magnitude of sediment toxicity into three general categories of low, moderate, or high. The rankings were based on a comparison to the controls, MSDs, and the Reference Pool. Increasing weight or confidence that a toxic effect to aquatic life will occur was given when a severe effect on amphipod survival was present or toxicity was observed in multiple tests. A schematic of the decision tree used to apply station ranking criteria was shown in Section 11 of the report.

Results of the toxicity LOE evaluation for each station in the Chollas and Paleta sites are shown Table F-12. Four Chollas stations (C1, C10, C14, C14) received High toxicity classifications, three were ranked as moderate (C4, C6, C9, C12) and the remainder were ranked as having no or low toxicity. Evaluation of toxicity at the Paleta stations indicated lower level of impacts overall. Most of the 17 stations had no or low toxicity. One station (P11) had evidence of moderate toxicity and the three inner creek stations (P15, P16, P17) had high levels of toxicity.

Benthic Community

The results from all the four benthic community parameters (BRI, abundance, number of taxa, Shannon-Weiner diversity index) were used to classify the relative response of the benthic community into three general categories of low, moderate, or high. The rankings were based on a comparison to the Reference Pool for each parameter and, for the BRI, a comparison to five response level thresholds that indicate the degree departure from the reference condition expected in the absence of contamination. Increasing weight or confidence that a benthic community impact was present was given when a severe departure from the BRI reference

condition was present or when effects were observed for multiple parameters. A schematic of the decision tree used to apply station ranking criteria was shown in Section 11 of the report.

Results of the benthic community LOE evaluation for each station in the Chollas and Paleta sites are shown in Table F-13. Six stations in the Chollas site, including the three inner creek stations, were classified as having a High level of impact, with the remainder being classified as having a moderate level of impact. Eight stations in the Paleta site were classified as having a High level of impact, with the remainder being classified as having a moderate level of impact.

Table F- 11. Results of sediment chemistry LOE for each station in the Chollas and Paleta sites. Results are categorized as No/Low (open circle), Moderate (concentric circle), or High (closed circle) according to rules identified in Section 11.

Station	# Chemicals exceeding SQG and UPL	SQGQ1	SQGQ1 Level	SQGQ1 > Reference	Chem Class
C01	1	0.97	II	+	⊙
C02	1	1.10	III	+	●
C03	2	1.39	III	+	●
C04	1	0.76	II	+	⊙
C05	1	1.11	III	+	●
C06	1	0.98	II	+	⊙
C07	0	0.31	II	+	⊙
C08	1	0.37	II	+	⊙
C09	1	0.79	II	+	⊙
C10	2	0.91	II	-	⊙
C11	1	0.56	II	+	⊙
C12	2	1.15	III	+	●
C13	1	2.25	III	+	●
C14	1	2.88	III	+	●
P01	0	0.21	I	+	○
P02	0	0.37	II	+	⊙
P03	0	0.23	I	+	○
P04	0	0.45	II	-	○
P05	1	0.74	II	+	⊙
P06	1	0.49	II	-	⊙
P07	1	0.51	II	+	⊙
P08	0	0.35	II	+	⊙
P09	0	0.08	I	+	○
P10	1	0.37	II	+	⊙
P11	2	1.01	III	+	●
P12	1	0.50	II	-	⊙
P13	0	0.26	II	+	⊙
P14	1	0.73	II	+	⊙
P15	1	1.36	III	+	●
P16	1	0.92	II	-	⊙
P17	1	0.78	II	+	⊙

Table F- 12. Results of toxicity LOE for each station in the Chollas and Paleta sites. Results are categorized as No/Low, Moderate, or High according to the rules described in Section 11.

Station	Amphipod Survival			SWI Sea Urchin Development			PW Sea Urchin Fertilization			Tox Class
	<Control	<Ref	<50%	<Control	<Ref	<50%	<Control	<Ref	<50%	
C01	+	+	+	-	-	-	-	-	-	●
C02	-	+	-	-	-	-	-	-	-	○
C03	-	+	-	-	+	-	-	-	-	○
C04	+	+	-	-	-	-	-	-	-	⊙
C05	-	-	-	-	-	-	-	-	-	○
C06	+	+	-	-	+	-	-	-	-	⊙
C07	-	-	-	-	-	-	-	-	-	○
C08	-	-	-	-	-	-	-	-	-	○
C09	-	+	-	+	+	+	-	-	-	⊙
C10	+	+	+	-	+	-	-	-	-	●
C11	-	-	-	-	-	-	-	-	-	○
C12	-	-	-	+	+	+	+	-	-	⊙
C13	+	+	+	-	-	-	+	-	+	●
C14	+	+	+	+	+	+	-	-	-	●
P01	-	-	-	-	-	-	+	-	-	○
P02	-	-	-	-	-	-	+	-	-	○
P03	-	-	-	-	+	+	-	-	-	○
P04	-	-	-	-	-	-	-	-	-	○
P05	-	+	-	-	-	-	-	-	-	○
P06	-	-	-	-	-	-	-	-	-	○
P07	-	-	-	-	-	-	-	-	-	○
P08	-	-	-	-	-	-	-	-	-	○
P09	-	-	-	-	-	-	-	-	-	○
P10	-	+	-	-	+	+	-	-	-	○
P11	+	+	-	+	+	+	-	-	-	●
P12	-	+	-	-	+	-	-	-	-	○
P13	+	+	-	-	-	-	-	-	-	⊙
P14	-	+	-	-	-	-	-	-	-	○
P15	-	+	-	+	+	+	-	-	-	⊙
P16	-	+	-	+	+	+	-	-	-	⊙
P17	-	-	-	+	+	+	-	-	-	⊙

Table F- 13. Benthic community analysis criteria used to categorize sites for the LOE assessment. Results are categorized as No/Low, Moderate, or High according to the rules described in Section 11.

Station	Abun<Ref	Taxa<Ref	SW<Ref	BRI>Ref	BRI Response Level	BCA Class
C01	-	-	-	+	II	⊙
C02	+	-	-	+	II	⊙
C03	+	+	-	+	III	●
C04	-	-	-	+	III	⊙
C05	+	+	+	+	III	●
C06	-	-	-	+	II	⊙
C07	-	-	-	+	II	⊙
C08	+	+	+	+	III	●
C09	-	-	-	+	III	⊙
C10	-	-	-	+	III	⊙
C11	+	+	+	-	Ref	⊙
C12	+	+	-	+	III	●
C13	+	+	-	+	III	●
C14	-	+	+	+	IV	●
P01	+	-	-	-	I	⊙
P02	+	+	-	+	II	⊙
P03	+	-	-	+	III	●
P04	+	+	-	+	II	⊙
P05	+	+	+	+	II	⊙
P06	+	+	-	+	III	●
P07	+	+	-	+	III	●
P08	-	-	-	+	II	⊙
P09	+	+	-	+	II	⊙
P10	+	+	-	+	III	●
P11	+	+	-	+	III	●
P12	-	-	-	+	II	⊙
P13	-	-	-	+	II	⊙
P14	-	-	-	+	III	⊙
P15	+	+	-	+	III	●
P16	+	+	-	+	III	●
P17	+	+	-	+	III	●

Aquatic Dependent Wildlife

A screening level risk assessment was performed to assess potential impairment to aquatic-dependent wildlife. For this assessment, bioaccumulation of CoPCs in the clam *Macoma nasuta* exposed to site sediments was used to estimate exposure for representative wildlife receptors including surface feeding birds (Least Tern and Brown Pelican), diving birds (Surf Scoter and Western Grebe), and marine mammals (California Sea Lion). For the screening level assessment, conservative exposure assumptions included 100% dietary fraction from the site, 100% area use factor for the site, and the low toxicity reference value.

Control samples were compared to pooled Paleta and Chollas stations using a one-sided t-test to detect statistical differences at $p<0.05$. For the Paleta site, copper, mercury, lead, Benzo[a]pyrene, TPCB, alpha-Chlordane, gamma-Chlordane, DDE and DDD all showed statistically significant bioaccumulation relative to controls (Table F-21). For the Chollas site, copper, lead, Benzo[a]pyrene, TPCB, alpha-Chlordane, gamma-Chlordane, DDE and DDD all showed statistically significant bioaccumulation relative to controls (Table F-22).

The site-maximum for tissue concentrations of clams exposed to study site sediments were compared with the 95% upper predictive interval of tissue concentrations from clams exposed to Reference Pool sediments to determine if the elevated concentrations are above those characteristic of relatively undegraded conditions in the bay. For the Paleta site, arsenic, lead, Benzo[a]pyrene, TPCB, alpha-Chlordane, gamma-Chlordane, DDE, DDD and DDT all had site-maximum tissue concentrations greater than the Reference Pool (Table F-21). For the Chollas site, arsenic, lead, zinc, Benzo[a]pyrene, TPCB, alpha-Chlordane, and gamma-Chlordane all had site-maximum tissue concentrations greater than reference (Table F-22).

The site-maximum of the clam tissue concentrations from each site (Chollas and Paleta) was used to estimate doses to wildlife receptors including surface feeding birds (Least Tern and Brown Pelican), diving birds (Surf Scoter and Western Grebe), and marine mammals (California Sea Lion). Model parameters are summarized in Table F-14. Estimated doses were then compared to the low Biological Technical Assistance Group (BTAG) TRVs (U.S. EPA, 2002) where available, or other published thresholds in the case where BTAG TRVs are not available as shown in Table F-15. Hazard quotients were then calculated as HQ=Dose/TRV. No chemicals at either the Paleta or Chollas site had HQ>1 for any of the wildlife receptors, with the exception of copper at Chollas for the Least Tern (Table F-16 through Table F-20). However, copper in clam tissues at the Chollas site was not elevated relative to the Reference Pool.

Table F-14. Wildlife receptor characteristics.

Receptor	Body Weight (kg)	Food type	Area Use Factor	Fraction Food Contaminated	Assimilation Efficiency	Feeding Rate (kg_{dry}/d)	Average Dry Weight Fraction (kg_{dry}/kg_{wet})	Normalized Feeding Rate ($kg_{wet}/kg_{BW}/d$)
Brown pelican	2.845	Macoma	1	1	1	0.23	0.114	0.71
Least Tern	0.036	Macoma	1	1	1	0.0044	0.114	1.07
Western Grebe	0.808	Macoma	1	1	1	0.046	0.114	0.50
Surf Scoter	0.859	Macoma	1	1	1	0.048	0.114	0.49
Sea Lion	45	Macoma	1	1	1	0.99	0.114	0.19

Table F-15. Avian and mammal TRVs (mg/kg/d).

TRV	Avian TRV_{low}	Mammal TRV_{low}	Toxic Endpoint	Source
Ag	180	0.38	Avian: Reproduction Mammal: Hypoactivity	Rungby and Danscher (1984)
As	5.5	0.32	Avian: Reproduction Mammal: Growth, cancer	U.S. EPA (2002)
Cd	0.08	0.06	Avian: Kidney Mammal: Reproduction	U.S. EPA (2002)
Cr	0.86	3.3	Avian: Survival Mammal: Liver, kidney	Haseltine et al. (1985) MacKenzie et al. (1958)
Cu	2.3	2.7	Avian: Growth Mammal: Immunotixicity	U.S. EPA (2002)
Hg	0.039	0.027	Avian: Reproduction Mammal: Mortality, anorexia, neurological	U.S. EPA (2002)
Ni	1.4	0.13	Avian: Growth Mammal: Reproduction	U.S. EPA (2002)
Pb	3.9	11	Avian: Reproduction Mammal: Reproduction	Pattee (1984) Azar et al. (1973)
Zn	17	9.6	Avian: Growth, reproduction Mammal: Pancreas, adrenal cortex	U.S. EPA (2002)
Naph	2.9	50	Avian: Mortality Mammal: Developmental	Ogden (2004) U.S. EPA (2002)
BAP	2	1.3	Avian: Growth Mammal: Cancer	Ogden (2004) U.S. EPA (2002)
TPCB	0.09	0.36	Avian: Reproduction Mammal: Reproduction	U.S. EPA (2002)
α-Chlor	0.21	4.6	Avian: Reproduction Mammal: Reproduction	Sample et al. (1996)
γ-Chlor	0.21	4.6	Avian: Reproduction Mammal: Reproduction	Sample et al. (1996)
DDE	0.009	0.8	Avian: Reproduction Mammal: Reproduction	U.S. EPA (2002)
DDD	0.009	0.8	Avian: Reproduction Mammal: Reproduction	U.S. EPA (2002)
DDT	0.009	0.8	Avian: Reproduction Mammal: Reproduction	U.S. EPA (2002)

Table F-16. Estimated dose and HQ for the Brown Pelican.

	Paleta			Chollas		
	Tiss. Conc. (mg/kg_{wet})	Dose (mg/kg/d)	HQ	Tiss. Conc. (mg/kg_{wet})	Dose (mg/kg/d)	HQ
Ag	0.051	0.036	0.00020	0.083	0.059	0.00033
As	2.6	1.8	0.34	2.9	2.0	0.37
Cd	0.033	0.023	0.29	0.034	0.024	0.30
Cr	0.62	0.44	0.51	0.49	0.35	0.41
Cu	2.1	1.5	0.64	3.4	2.4	1.1
Hg	0.0080	0.0057	0.15	0.0073	0.0051	0.13
Ni	0.58	0.41	0.30	0.49	0.35	0.25
Pb	1.17	0.83	0.21	1.02	0.72	0.19
Zn	11.0	7.8	0.45	11	7.8	0.45
Naph	0.0013	0.00093	0.00032	0.0018	0.0013	0.00045
BAP	0.071	0.050	0.025	0.096	0.068	0.034
TPCB	0.060	0.043	0.47	0.036	0.026	0.29
α-Chlor	0.0026	0.0019	0.0089	0.0020	0.0014	0.0067
γ-Chlor	0.0032	0.0023	0.011	0.0019	0.0013	0.0063
DDE	0.0043	0.0031	0.34	0.0019	0.0014	0.15
DDD	0.0040	0.0028	0.31	0.0014	0.0010	0.11
DDT	0.00030	0.00021	0.023	0.000150	0.00011	0.012

Table F-17. Estimated dose and HQ for the Least Tern.

	Paleta			Chollas		
	Tiss. Conc. (mg/kg_{wet})	Dose (mg/kg/d)	HQ	Tiss. Conc. (mg/kg_{wet})	Dose (mg/kg/d)	HQ
Ag	0.051	0.055	0.00031	0.083	0.089	0.00050
As	2.6	2.8	0.51	2.9	3.1	0.56
Cd	0.033	0.035	0.44	0.034	0.036	0.45
Cr	0.62	0.67	0.78	0.49	0.53	0.62
Cu	2.1	2.2	0.97	3.4	3.7	1.6
Hg	0.0080	0.0086	0.22	0.0073	0.0078	0.20
Ni	0.58	0.62	0.45	0.49	0.52	0.38
Pb	1.17	1.25	0.32	1.02	1.1	0.28
Zn	11.0	12	0.69	11	12	0.68
Naph	0.0013	0.0014	0.00049	0.0018	0.0019	0.00068
BAP	0.071	0.076	0.038	0.096	0.103	0.052
TPCB	0.060	0.065	0.72	0.036	0.039	0.43
α-Chlor	0.0026	0.0028	0.013	0.0020	0.0021	0.010
γ-Chlor	0.0032	0.0035	0.016	0.0019	0.0020	0.0095
DDE	0.0043	0.0046	0.51	0.0019	0.0021	0.23
DDD	0.0040	0.0042	0.47	0.0014	0.0015	0.17
DDT	0.00030	0.00032	0.035	0.000150	0.00016	0.018

Table F-18. Estimated dose and HQ for the Western Grebe.

	Paleta			Chollas		
	Tiss. Conc. (mg/kg_{wet})	Dose (mg/kg/d)	HQ	Tiss. Conc. (mg/kg_{wet})	Dose (mg/kg/d)	HQ
Ag	0.051	0.026	0.00014	0.083	0.041	0.00023
As	2.6	1.3	0.24	2.9	1.4	0.26
Cd	0.033	0.017	0.21	0.034	0.017	0.21
Cr	0.62	0.31	0.36	0.49	0.25	0.29
Cu	2.1	1.0	0.45	3.4	1.7	0.74
Hg	0.0080	0.0040	0.10	0.0073	0.0036	0.09
Ni	0.58	0.29	0.21	0.49	0.24	0.18
Pb	1.17	0.58	0.15	1.02	0.51	0.13
Zn	11.0	5.5	0.32	11	5.5	0.32
Naph	0.0013	0.00065	0.00023	0.0018	0.00090	0.00032
BAP	0.071	0.035	0.018	0.096	0.048	0.024
TPCB	0.060	0.030	0.33	0.036	0.018	0.20
α-Chlor	0.0026	0.0013	0.0062	0.0020	0.00099	0.0047
γ-Chlor	0.0032	0.0016	0.0076	0.0019	0.00093	0.0044
DDE	0.0043	0.0022	0.24	0.0019	0.00096	0.11
DDD	0.0040	0.0020	0.22	0.0014	0.00070	0.078
DDT	0.00030	0.00015	0.016	0.000150	0.000075	0.0083

Table F-19. Estimated dose and HQ for the Surf Scoter.

	Paleta			Chollas		
	Tiss. Conc. (mg/kg_{wet})	Dose (mg/kg/d)	HQ	Tiss. Conc. (mg/kg_{wet})	Dose (mg/kg/d)	HQ
Ag	0.051	0.025	0.00014	0.083	0.041	0.00023
As	2.6	1.3	0.23	2.9	1.4	0.25
Cd	0.033	0.016	0.20	0.034	0.016	0.21
Cr	0.62	0.31	0.36	0.49	0.24	0.28
Cu	2.1	1.0	0.44	3.4	1.7	0.73
Hg	0.0080	0.0039	0.10	0.0073	0.0036	0.09
Ni	0.58	0.28	0.20	0.49	0.24	0.17
Pb	1.17	0.57	0.15	1.02	0.50	0.13
Zn	11.0	5.4	0.31	11	5.4	0.31
Naph	0.0013	0.00064	0.00022	0.0018	0.00089	0.00031
BAP	0.071	0.035	0.017	0.096	0.047	0.024
TPCB	0.060	0.030	0.33	0.036	0.018	0.20
α-Chlor	0.0026	0.0013	0.0061	0.0020	0.00097	0.0046
γ-Chlor	0.0032	0.0016	0.0075	0.0019	0.00092	0.0043
DDE	0.0043	0.0021	0.23	0.0019	0.00094	0.10
DDD	0.0040	0.0019	0.22	0.0014	0.00069	0.077
DDT	0.00030	0.00015	0.016	0.000150	0.000074	0.0082

Table F-20. Estimated dose and HQ for the Sea Lion.

	Paleta			Chollas		
	Tiss. Conc. (mg/kg_{wet})	Dose (mg/kg/d)	HQ	Tiss. Conc. (mg/kg_{wet})	Dose (mg/kg/d)	HQ
Ag	0.051	0.0099	0.000056	0.083	0.016	0.000090
As	2.6	0.50	0.091	2.9	0.55	0.10
Cd	0.033	0.0064	0.080	0.034	0.0065	0.081
Cr	0.62	0.12	0.14	0.49	0.10	0.11
Cu	2.1	0.40	0.17	3.4	0.66	0.29
Hg	0.0080	0.0016	0.040	0.0073	0.0014	0.036
Ni	0.58	0.11	0.081	0.49	0.094	0.068
Pb	1.17	0.23	0.058	1.02	0.20	0.050
Zn	11.0	2.1	0.12	11	2.1	0.12
Naph	0.0013	0.00025	0.000088	0.0018	0.00035	0.00012
BAP	0.071	0.014	0.0069	0.096	0.019	0.0093
TPCB	0.060	0.012	0.13	0.036	0.0070	0.078
α-Chlor	0.0026	0.00051	0.0024	0.0020	0.00038	0.0018
γ-Chlor	0.0032	0.00062	0.0029	0.0019	0.00036	0.0017
DDE	0.0043	0.00083	0.092	0.0019	0.00037	0.041
DDD	0.0040	0.00076	0.085	0.0014	0.00027	0.030
DDT	0.00030	0.000057	0.0064	0.000150	0.000029	0.0032

Table F-21. Summary of the screening level wildlife risk assessment for the Paleta site.

	>Control	>Reference	Brown Pelican HQ>1	Least Tern HQ>1	Western Grebe HQ>1	Surf Scoter HQ>1	Sea Lion HQ>1
Ag	-	-	-	-	-	-	-
As	-	+	-	-	-	-	-
Cd	-	-	-	-	-	-	-
Cr	-	-	-	-	-	-	-
Cu	+	-	-	-	-	-	-
Hg	+	-	-	-	-	-	-
Ni	-	-	-	-	-	-	-
Pb	+	+	-	-	-	-	-
Zn	-	-	-	-	-	-	-
Naph	-	-	-	-	-	-	-
BAP	+	+	-	-	-	-	-
TPCB	+	+	-	-	-	-	-
α-Chlor	+	+	-	-	-	-	-
γ-Chlor	+	+	-	-	-	-	-
DDE	+	+	-	-	-	-	-
DDD	+	+	-	-	-	-	-
DDT	-	+	-	-	-	-	-

Table F-22. Summary of the screening level wildlife risk assessment for the Chollas site.

	>Control	>Reference	Brown Pelican HQ>1	Least Tern HQ>1	Western Grebe HQ>1	Surf Scoter HQ>1	Sea Lion HQ>1
Ag	-	+	-	-	-	-	-
As	-	+	-	-	-	-	-
Cd	-	-	-	-	-	-	-
Cr	-	-	-	-	-	-	-
Cu	+	+	+	+	-	-	-
Hg	-	-	-	-	-	-	-
Ni	-	-	-	-	-	-	-
Pb	+	+	-	-	-	-	-
Zn	-	-	-	-	-	-	-
Naph	-	-	-	-	-	-	-
BAP	+	+	-	-	-	-	-
TPCB	+	+	-	-	-	-	-
α-Chlor	+	+	-	-	-	-	-
γ-Chlor	+	+	-	-	-	-	-
DDE	+	-	-	-	-	-	-
DDD	+	+	-	-	-	-	-
DDT	-	+	-	-	-	-	-

Human Health

A screening level risk assessment was used to assess potential impairment to human health. For this assessment, bioaccumulation of CoPCs in clams exposed to site sediments was used to estimate exposure. In this case it was assumed that clam tissue is representative of all marine life harvested and consumed by humans from the sites. Conservative assumptions for this assessment included 100% of seafood consumption from site, 100% assumed contaminated at the site-maximum tissue concentration, a conservative consumption rate, and conservative exposure duration.

Control samples were compared to pooled Paleta and Chollas stations using a one-sided t-test to detect statistical differences at $p<0.05$. For the Paleta site, copper, mercury, lead, Benzo[a]pyrene, TPCB, alpha-Chlordane, gamma-Chlordane, DDE and DDD all showed statistically significant bioaccumulation relative to controls (Table F-26). For the Chollas site, copper, lead, Benzo[a]pyrene, TPCB, alpha-Chlordane, gamma-Chlordane, DDE and DDD all showed statistically significant bioaccumulation relative to controls (Table F-26).

The site maximum for tissue concentrations of clams exposed to study site sediments were compared with the 95% upper predictive interval of tissue concentrations from clams exposed to reference sediments to determine if the elevated concentrations are above those characteristic of relatively undegraded conditions in the bay. For the Paleta site, arsenic, lead, Benzo[a]pyrene, TPCB, alpha-Chlordane, gamma-Chlordane, DDE, DDD and DDT all had site-maximum tissue concentrations greater than reference (Table F-26). For the Chollas site, arsenic, lead, zinc, Benzo[a]pyrene, TPCB, alpha-Chlordane, and gamma-Chlordane all had site-maximum tissue concentrations greater than reference (Table F-26).

The site maximum of the clam tissue concentrations from each site (Chollas and Paleta) was compared to tissue screening levels. Model parameters are summarized in Table F-23 and Table F-24. The site maximum for tissue concentrations of clams exposed to study site sediments was then compared to the TSL_{min}. The results of this analysis indicated that tissue concentrations of arsenic, Benzo[a]pyrene, and TPCB in clams exceeded the tissue screening levels (Table F-25).

For those chemicals that exceeded human health screening thresholds and had tissue levels greater than reference and control, a station-by-station assessment was made using the individual station tissue concentration instead of the site-maximum tissue concentration of all stations. These chemicals included Benzo[a]pyrene, and TPCB. Although arsenic exceeded the human health screening level, it did not exceed reference and control at either of the sites. For stations where bioaccumulation was not measured, tissue concentrations of Benzo[a]pyrene, and TPCB were estimated based on site-specific BSAFs calculated from tissue and sediment concentrations at stations where bioaccumulation was measured (Table F-27 and Table F-28). For Benzo[a]pyrene, measured and calculated tissue concentrations exceeded the screening level at all Chollas and Paleta stations by factors ranging from 1.3 to 21.1 at Chollas and 5.6 to15.6 at Paleta. For TPCB, measured and calculated tissue concentrations exceeded the screening level at all Chollas and Paleta stations except C13 and C14. TPCB screening levels were exceeded by factors ranging from 1.1 to 2.7 at Chollas and 1.1 to 3.7 at Paleta.

Table F-23. Human health risk screening parameters.

Parameter	Value	Units
Consumption Rate	0.021	kg/d
Fraction Ingested	1	
Body Weight	70	kg
Target Risk Level	1.0E-05	
Absorbed Fraction	1	

Table F-24. Human health risk tissue screening levels.

	CSF $(mg/kg/day)^{-1}$	RfD mg/kg/day	TSL_c mg/kg	TSL_t mg/kg	TSL_{min} mg/kg	Reference
Ag		5.0E-03		17	17	EPA (2004)
As		3.0E-04		1.0	1.0	EPA (2004)
Cd		5.0E-04		1.7	1.7	EPA (2004)
Cr		3.0E-03		10	10	EPA (2004)
Cu		3.7E-02		123	123	EPA (2004)
Hg		1.0E-04		0.33	0.33	EPA (2004)
Ni		2.0E-02		67	67	EPA (2004)
Pb				1.7	1.7	FDA (1993)
Zn		3.0E-01		1000	1000	EPA (2004)
Naph		2.0E-02		67	67	EPA (2004)
BAP	7.3		0.0046		0.0046	EPA (2004)
TPCB	2.0	2.0E-05	0.017	0.067	0.017	EPA (2004)
α-Chlor	0.35	5.0E-04	0.095	1.7	0.095	EPA (2004)
γ-Chlor	0.35	5.0E-04	0.095	1.7	0.095	EPA (2004)
DDE	0.34		0.098		0.098	EPA (2004)
DDD	0.24		0.14		0.14	EPA (2004)
DDT	0.34	5.0E-04	0.098	1.7	0.098	EPA (2004)

Table F-25. Human health risk site-maximum tissue concentrations for the Chollas and Paleta sites, and corresponding normalized risk levels (tissue concentration/screening level).

	Paleta		Chollas	
	Tiss. Conc. (mg/kg_{wet})	C_{tiss}/TSL	Tiss. Conc. (mg/kg_{wet})	C_{tiss}/TSL
Ag	0.051	0.0031	0.051	0.0050
As	2.6	**2.6**	2.1	**2.9**
Cd	0.033	0.020	0.033	0.020
Cr	0.62	0.062	0.45	0.049
Cu	2.1	0.017	1.4	0.028
Hg	0.0080	0.024	0.0045	0.022
Ni	0.58	0.0086	0.48	0.0073
Pb	1.17	0.69	0.50	0.60
Zn	11.0	0.011	9.6	0.011
Naph	0.0013	0.000020	0.0010	0.000027
BAP	0.071	**16**	0.0060	**21**
TPCB	0.060	**3.6**	0.012	**2.2**
α-Chlor	0.0026	0.028	0.0014	0.021
γ-Chlor	0.0032	0.034	0.0013	0.020
DDE	0.0043	0.044	0.0013	0.020
DDD	0.0040	0.029	0.00022	0.010
DDT	0.00030	0.0030	0.00015	0.0015

Table F-26. Summary of the screening level human health risk assessment for the Chollas and Paleta sites.

	Paleta				Chollas			
	>Control	>Reference	$>TSL_{min}$	Station Analysis	>Control	>Reference	$>TSL_{min}$	Station Analysis
Ag	-	-	-	no	-	+	-	no
As	-	+	+	no	-	+	+	no
Cd	-	-	-	no	-	-	-	no
Cr	-	-	-	no	-	-	-	no
Cu	+	-	-	no	+	+	-	no
Hg	+	-	-	no	-	-	-	no
Ni	-	-	-	no	-	-	-	no
Pb	+	+	-	no	+	+	-	no
Zn	-	-	-	no	-	-	-	no
Naph	-	-	-	no	-	-	-	no
BAP	+	+	+	yes	+	+	+	yes
TPCB	+	+	+	yes	+	+	+	yes
α-Chlor	+	+	-	no	+	+	-	no
γ-Chlor	+	+	-	no	+	+	-	no
DDE	+	+	-	no	+	-	-	no
DDD	+	+	-	no	+	+	-	no
DDT	-	+	-	no	-	+	-	no

Table F-27. Station-by-station assessment for human health risk from Benzo[a]pyrene at the Chollas and Paleta sites.

Site	Station	BAP in Sediment (mg/kg)	BAP in Tissue (mg/kg_{lip})	Tissue Solids (%)	Lipid Content (%)	BAP in Tissue (mg/kg_{wet})	C_{tiss}/TSL_{min}
Paleta	P01	0.043	0.0047	11.4*	6.7*	0.036	**7.9**
	P02	0.040	0.0053	10.9	6.7*	0.038	**8.4**
	P03	0.028	0.0030	11.4*	6.7*	0.023	**5.0**
	P04	0.030	0.0051	11	8	0.045	**9.9**
	P05	0.043	0.0047	11.4*	6.7*	0.036	**8.0**
	P06	0.049	0.0054	11.4*	6.7*	0.042	**9.1**
	P07	0.043	0.0046	11.4*	6.7*	0.036	**7.8**
	P08	0.067	0.0059	11.8	7.2	0.051	**11.1**
	P09	0.031	0.0033	11.4*	6.7*	0.026	**5.6**
	P10	0.033	0.0035	11.4*	6.7*	0.027	**5.9**
	P11	0.065	0.0094	11.9	6.3	0.071	**15.5**
	P12	0.050	0.0055	11.4*	6.7*	0.042	**9.3**
	P13	0.023	0.0070	11.9	7.8	0.064	**14.1**
	P14	0.038	0.0041	11.4*	6.7*	0.032	**6.9**
	P15	0.061	0.0085	11	6.6	0.062	**13.5**
	P16	0.035	0.0038	11.4*	6.7*	0.029	**6.4**
	P17	0.037	0.0085	11.1	7.5	0.071	**15.6**
Chollas	C01	0.028	0.0029	11.4*	6.7*	0.023	**5.0**
	C02	0.034	0.0025	11.3	6.4*	0.018	**4.0**
	C03	0.050	0.0055	11.4*	6.7*	0.042	**9.2**
	C04	0.032	0.0034	11.4*	6.7*	0.026	**5.8**
	C05	0.034	0.0030	11.3	4.7	0.016	**3.5**
	C06	0.030	0.0032	11.4*	6.7*	0.025	**5.4**
	C07	0.059	0.0066	11.4*	6.7*	0.050	**11.1**
	C08	0.043	0.0023	11.6	7.5	0.020	**4.3**
	C09	0.073	0.0081	11.4*	6.7*	0.063	**13.7**
	C10	0.047	0.0052	11.4*	6.7*	0.040	**8.8**
	C11	0.026	0.0032	11.0	6.0	0.021	**4.6**
	C12	0.179	0.0120	11.2	7.2	0.096	**21.1**
	C13	0.032	0.0037	11.4*	6.6	0.027	**6.0**
	C14	0.007	0.0009	11.1	6.4	0.006	**1.3**

*Value shown was estimated from the BSAF at measured stations
**Value shown was taken as the mean value of measured stations

Table F-28. Station-by-station assessment for human health risk from TPCB at the Chollas and Paleta sites.

Site	Station	TPCB in Sediment (mg/kg)	TPCB in Tissue (mg/kg_{lip})	Tissue Solids (%)	Lipid Content (%)	TPCB in Tissue (mg/kg_{wet})	C_{tiss}/TSL_{min}
Paleta	P01	0.010	0.0047	11.4*	6.7*	0.025	**1.5**
	P02	0.006	0.0053	10.9	6.7	0.021	**1.3**
	P03	0.006	0.0030	11.4*	6.7*	0.019	**1.1**
	P04	0.007	0.0051	11	8	0.022	**1.3**
	P05	0.047	0.0047	11.4*	6.7*	0.062	**3.7**
	P06	0.008	0.0054	11.4*	6.7*	0.023	**1.4**
	P07	0.007	0.0046	11.4*	6.7*	0.021	**1.3**
	P08	0.011	0.0059	11.8	7.2	0.029	**1.8**
	P09	0.011	0.0033	11.4*	6.7*	0.027	**1.6**
	P10	0.009	0.0035	11.4*	6.7*	0.024	**1.4**
	P11	0.033	0.0094	11.9	6.3	0.060	**3.6**
	P12	0.010	0.0055	11.4*	6.7*	0.026	**1.6**
	P13	0.009	0.0070	11.9	7.8	0.044	**2.6**
	P14	0.015	0.0041	11.4*	6.7*	0.032	**1.9**
	P15	0.025	0.0085	11	6.6	0.059	**3.5**
	P16	0.009	0.0038	11.4*	6.7*	0.024	**1.5**
	P17	0.009	0.0085	11.1	7.5	0.042	**2.5**
Chollas	C01	0.010	0.0029	11.4*	6.7*	0.026	**1.6**
	C02	0.026	0.0025	11.3	6.4	0.036	**2.2**
	C03	0.018	0.0055	11.4*	6.7*	0.036	**2.2**
	C04	0.012	0.0034	11.4*	6.7*	0.029	**1.7**
	C05	0.017	0.0030	11.3	4.7	0.019	**1.1**
	C06	0.011	0.0032	11.4*	6.7*	0.027	**1.6**
	C07	0.027	0.0066	11.4*	6.7*	0.045	**2.7**
	C08	0.015	0.0023	11.6	7.5	0.020	**1.2**
	C09	0.011	0.0081	11.4*	6.7*	0.028	**1.7**
	C10	0.013	0.0052	11.4*	6.7*	0.030	**1.8**
	C11	0.012	0.0032	11.0	6.0	0.024	**1.4**
	C12	0.014	0.0120	11.2	7.2	0.028	**1.7**
	C13	0.008	0.0037	11.4	6.6	0.014	0.9
	C14	0.003	0.0009	11.1	6.4	0.012	0.7

*Value shown was estimated from the BSAF at measured stations
**Value shown was taken as the mean value of measured stations

F3 - POTENTIAL IMPAIRMENT TO BENEFICIAL USES

The potential for impairment to the three beneficial uses most sensitive to sediment contamination at the Chollas and Paleta study sites was determined using three independent evaluations. A WOE using the three LOE of sediment chemistry, toxicity, and benthic community composition was used to evaluate the potential for impairment to the Aquatic Life Beneficial Use, specifically, the benthic community. A screening level ecological risk assessment was used to evaluate the potential for impairment to the Aquatic-Dependent Wildlife Life Beneficial Use, specifically related to consumption of aquatic organisms by birds and marine mammals. A screening level human health risk assessment was used to evaluate the potential for impairment to the Human Health Beneficial Use, specifically related to consumption of shellfish. The outcome of each of these three evaluations is summarized below.

Aquatic Life

The WOE framework for categorizing stations as “Unlikely”, “Possible” or “Likely” to be impaired by site CoPCs is described in the main document. Each of the three LOE was integrated into these three categories as shown in (Table F-29). All but three Chollas stations were categorized as likely to be impaired. The three stations categorized as possible (C7, C8, C11) were located at the inner/outer creek boundary area where there were relatively low fines and TOC. At the Paleta site five of the inner creek stations (P11, P13, P15, P16, P17) were categorized as likely impaired. Three stations (P1, P3, P9) were categorized as unlikely to be impaired and the remaining nine stations were categorized as possibly impaired.
The WOE based on a comparison to the Reference Pool generally resulted in stations being categorized as the same or at a higher level of impairment than when they were compared to the Baseline Pool. Six Chollas stations were categorized with a higher level of impairment using the Reference Pool, five changing from possible to likely and one changing from unlikely to possible. All six stations had a higher impairment to the benthic community LOE. Two of the stations additionally had a higher toxicity LOE and one station had a higher chemistry LOE designation. Five Paleta stations were categorized with a higher level of impairment using the Reference Pool, four changing from unlikely to possible and one changing from unlikely to likely. Four of the five stations were increased in their categorization based on an increased level of impairment in the benthic community LOE. Station P13 increased from unlikely to likely with increases in each of the LOE from unlikely to possible.

Aquatic Dependent Wildlife

The likelihood of aquatic dependent wildlife impairment at the Chollas and Paleta sites using the Reference Pool was categorized as unlikely for all receptors with respect to all CoPCs (Table F-21 and Table F-22). The only CoPC with HQ>1 was copper at Chollas for the Least Tern. However the tissue levels of copper at the Chollas site did not exceed the predictive limit of the Reference Pool.

Human Health

The likelihood of human health impairment at the Chollas and Paleta sites using the Reference Pool was categorized identically to the likelihood based on the Baseline Pool. Potential for impairment was categorized as unlikely for all CoPCs with the exception of BAP and TPCB.

Table F-30. Results of the weight of evidence analysis applied to Chollas and Paleta sites using the Reference Pool and compared to the Baseline Pool. Bolded WOE designations in the Baseline Pool column are those that differ from the Reference Pool.

Station	Chem Class	Tox Class	BCA Class	Impairment from CoPC?	Overall classification
C01	⊙	●	⊙	Likely	●
C02	●	○	⊙	Likely	●
C03	●	○	●	Likely	●
C04	⊙	⊙	⊙	Likely	●
C05	●	○	●	Likely	●
C06	⊙	⊙	⊙	Likely	●
C07	⊙	○	⊙	Possible	⊙
C08	⊙	○	●	Possible	⊙
C09	⊙	⊙	⊙	Likely	●
C10	⊙	●	⊙	Likely	●
C11	⊙	○	⊙	Possible	⊙
C12	●	⊙	●	Likely	●
C13	●	●	●	Likely	●
C14	●	●	●	Likely	●
P01	○	○	⊙	UnLikely	○
P02	⊙	○	⊙	Possible	⊙
P03	○	○	●	UnLikely	○
P04	⊙	○	⊙	Possible	⊙
P05	⊙	○	⊙	Possible	⊙
P06	⊙	○	●	Possible	⊙
P07	⊙	○	●	Possible	⊙
P08	⊙	○	⊙	Possible	⊙
P09	○	○	⊙	UnLikely	○
P10	⊙	○	●	Possible	⊙
P11	●	●	●	Likely	●
P12	⊙	○	⊙	Possible	⊙
P13	⊙	⊙	⊙	Likely	●
P14	⊙	○	⊙	Possible	⊙
P15	●	⊙	●	Likely	●
P16	⊙	⊙	●	Likely	●
P17	⊙	⊙	●	Likely	●