Appendix I

Supporting Documentation for Sediment Numeric Target Development

San Diego Bay Sediment TMDLs

Appendix I-1:
Methodology for Sediment Numeric Targets Development

I-1.1. Introduction

Numeric targets are specific goals for TMDLs that ensure protection of designated beneficial uses of waterbodies and provide a basis for data analysis and allocations. The contaminants of concern chosen as numeric targets for these TMDLs are total chlordane, priority pollutant PAHs (PPPAHs), and total PCBs.

Monitoring station data from a number of San Diego Bay studies were assessed by Southern California Coastal Water Research Project (SCCWRP) using an approach integrating multiple lines of evidence. These data were later statistically analyzed by the San Francisco Estuary Institute Aquatic Science Center (SFEI) to estimate statistical impact limits for sediment contaminants that could be used for future regulatory actions. Thompson et al. (2009) describes SFEI's methodology and presents the results for these datasets in a report on sediment contamination in San Diego Bay. San Diego Water Board applied this methodology to additional datasets collected as part of the two Phase I sediment assessment studies for Chollas and Paleta creek mouths and B Street/Broadway Piers, Downtown Anchorage, and Switzer Creek Mouth (SCCWRP and SPAWAR 2005; Anderson et al. 2004). The following information describes the methodology and presents the San Diego Water Board's final statistical analyses used to establish the sediment numeric targets for TMDL development.

I-1.2. Station Level Assessment Using Multiple Lines of Evidence Approach

The numeric targets for these TMDLs were developed using data collected in San Diego Bay that were analyzed using the interpretation methods set forth in Benthic Community Protection of the Enclosed Bays and Estuaries Plan, Part 1 Sediment Quality (Enclosed Bays and Estuaries Plan Part 1) (SWRCB 2009). These methods of sediment quality assessment, referred to as the Multiple Lines of Evidence (MLOE) Approach, integrate three lines of evidence: sediment chemistry, sediment toxicity, and benthic community condition (Bay, et al. 2009). The datasets used for the numeric target analysis were collected in San Diego Bay from:

- Sediment Assessment Study for the Mouths of Chollas and Paleta Creeks, San Diego, Phase I Final Report (SCCWRP and SPAWAR 2005);
- Sediment Quality Assessment Study at the B Street/Broadway Piers, Downtown Anchorage, and Switzer Creek, San Diego Bay, Phase I Final Report (Anderson et al. 2004);
- Southern California Bight 1998 Regional Monitoring Program (Bay et al. 2000; Noblet et al. 2003; and Ranasinghe et al. 2003);

- Southern California Bight 2003 Regional Monitoring Program (Bay et al. 2005; Schiff et al. 2006; Ranasinghe et al. 2007);
- NASSCO and Southwest Marine Detailed Sediment Investigation (Shipyard Site) (Exponent 2003); and
- 1999 U.S. EPA Western Coastal Environmental Monitoring and Assessment Program (EMAP) (U.S. EPA 1999)

Data for the five TMDL sites, which were presented in the two Phase I Final Reports listed above, were analyzed by the San Diego Water Board using the MLOE Approach. The results of that analysis can be found in Attachment 1 of Appendix I-1. There were a total of 161 stations, with 190 samples collected from 1998 through 2003. For the SFEI report and analysis, there were a total of 137 stations with 161 samples. Some reference stations and two stations each at Chollas and Paleta Creek mouths were sampled more than once over time.

Data were transcribed into the Data Integration Tool v5.4, which was developed for the State Water Board to assist with conducting the MLOE Approach. The tool is a Microsoft Excel workbook that contains formulas for calculating the individual LOEs from data entered into the workbook spreadsheets. Once all of the individual LOEs are completed, the tool then calculates the station level assessment results. The *Sediment Quality Assessment Draft Technical Support Manual* provides all of the instructions for measuring sediment quality parameters, data calculation and integration, and interpretation of results for what is referred to in this report as the MLOE Approach (Bay et al. 2009).

Sediment Chemistry LOE

The sediment chemistry LOE category is determined from two indices: the Logistic Regression Model calibrated to California data (CA LRM) (Bay et al. 2008); and the Chemical Score Index (CSI), (Ritter et al. 2008). Sixteen contaminants are included in the analysis including five heavy metals, HMW PAHs, LMW PAHs, alpha and gamma chlordane, dieldrin, trans nonachlor, four forms of DDT, and total PCBs.

Values for each of these sixteen contaminants are entered into the Data Integration Tool for analysis to determine the Sediment Chemistry LOE category for each data point.

Sediment Toxicity LOE

The sediment toxicity LOE is calculated from one or more toxicity test results. Two types of toxicity tests are recommended: acute and chronic tests (Bay, et al. 2009). For acute toxicity, the *Eohaustorius estuarius* 10-day test for survival was always used. In many cases chronic toxicity was also tested. For chronic toxicity, the mussel (*Mytilus galloprovincialis)* 2-day sub-lethal test for normal embryo development was used. Both tests are recommended for California marine habitats and can be found in U.S. EPA methods for assessing or estimating toxicity (U.S. EPA, 1994; U.S. EPA 1995).

Toxicity test results and control results (reported as percentage of survival or successful larval development) are entered into the Data Integration Tool for analysis to determine the Toxicity LOE category.

Benthic Community LOE

The Benthic Community LOE is calculated using four benthic metrics: the Index of Biotic Integrity (IBI), the Benthic Response Index (BRI), the Relative Benthic Index (RBI), and the River Invertebrate Prediction and Classification System (RIVPACS) (Bay, et al., 2009). The analyses of the data for the five TMDL sites did include the RIVPACS benthic community analysis. The Benthic Community LOE category results for the Shipyards stations, the Bight stations, and the Western Coastal EMAP stations are not available in this report because those results were obtained from others who had already run the analysis. These LOE category results did not include the RIVPACS analysis in the benthic macrofauna LOE. The RIVPACS analysis is extremely time consuming, but is a valuable piece of information for determining the benthic macrofauna LOE for the MLOE Approach. When RIVPACS results are unavailable, the benthic macrofauna LOE is calculated with only three benthic metrics instead of four.

One other difference among the five TMDL datasets is found in the data. The sediment sample for the benthic community LOE for the Chollas and Paleta Creek mouth stations was completely processed, and all of the organisms found in the sample were counted. Therefore, only one data set per station was reported. For Downtown Anchorage, B Street/ Broadway Piers, and Switzer Creek mouth stations, the benthic community sediment sample had three sub-samples collected. Therefore, three data sets per station were reported. To account for this difference, three full station level assessments were recorded in the Data Integration Tool spreadsheets, which contained the same sediment chemistry and sediment toxicity, but different benthic community data results; therefore, the station level assessment category results differed because of the differences in the benthic community LOE results.

The agreeing two or three categories set the station level assessment category ranking. If there were three different category rankings, then an average score was calculated and the MLOE rules for scoring were followed.

For the benthic community metrics, each taxon name and abundance is entered for each station into the Data Integration Tool for analysis. Taxon names must be spelled exactly as they are spelled in the Data Integration Tool's reference list, or they will not be recognized by the Tool.

RIVPACS

For the RIVPACS analysis, data were transcribed into a TAB-delimited text file using Microsoft Excel. There are total of five files that must be entered into the RIVPACS model. Two files must be prepared with station-specific (test site) data to be submitted to the model for the analysis. Three files were prepared for the MLOE Approach station level assessment are included required as input files, and contain reference site

information. The RIVPACS analysis was run using the RIVPACS model at the Utah State University's Center of Monitoring and Assessment website.

MLOE Approach Station Level Assessment

The MLOE Approach Station Level Assessment produces six possible station condition categories. These categories are the result 64 possible combinations of the LOE category results for sediment chemistry, toxicity, and benthic community condition. The six condition categories are: (1) Unimpacted, (2) Likely Unimpacted, (3) Possibly Impacted, (4) Likely Impacted, (5) Clearly Impacted, and (6) Inconclusive (Bay et al. 2009). The numeric target analysis used data from stations that fell into the categories that represent minimal impact, the (1) Unimpacted and (2) Likely Unimpacted categories.

I-1.3. Numeric Target Calculation using 95 Percent Upper Confidence Limits

This present numeric target development follows part of the analytical design described in the SFEI report of sediment contamination in San Diego Bay (Thompson, et al. 2009). The SFEI report also used the same data used in the present analysis, with the exception of the data collected for the Switzer Creek Mouth, B Street/ Broadway Piers, and Downtown Anchorage TMDL projects and those sites' associated reference stations.

As discussed above, the data were analyzed for the "unimpacted" data (categories "1" and "2"), although the impacted data (categories "3", "4", and "5") were considered for comparison purposes as well.

The U.S. EPA's ProUCL statistical program was used to determine the UCL. The data were not normally distributed. However, considering the robustness of the Student's t-test, it is still appropriate to use the Student's t-test to develop the 95% UCLs after the data were transformed (a log transformation made the data less skewed, and is widely used to transform environmental data). Before the UCLs were run, statistical outliers were removed from the dataset. There was one statistical outlier for each of the three contaminants within the "unimpacted" grouping (categories 1 & 2), as well as within the "impacted" grouping (categories 3, 4, & 5). Tables 1 and 2 provide the results of statistical analyses for SQO Categories 1 & 2 for total PCBs, total Chlordane and PPPAHs. As with the SFEI Report and Analysis (Thompson et al. 2009), the 80%, 90% and 95% UCLs were calculated using the Student's t-test. Results from 95% Modified Student's t-test were also given, as well as the 95% lower confidence limit of the mean (LCL), to provide a perspective of the range. Note that the statistical program did not have a function for calculating the LCL, so the LCL was calculated by averaging the data of interest and subtracting by the confidence interval of that data.

Some have suggested that a 95% LCL for the "impacted" grouping (categories 3, 4, & 5) should be used (see Table 3). Caution is suggested when using the Possibly Impacted station category (category 3) for interpreting results; this is the least certain of all the categories (Bay et al. 2009). In addition, the 95% LCL of the mean of the "impacted"

categories ranged above the 50th percentile of that data (see Table 4). One could surmise that values above the median of the "impacted" category are probably at a threshold of causing an impact.

The San Diego Water Board supports using a conservative approach by choosing the unimpacted categories, with the less conservative higher 95% UCL for the numeric targets. These values fall within only the higher ranges of the "unimpacted" category, between the 80th to 85th percentiles, without getting into the extreme ranges (95th to 99th percentiles) where much higher values are seen. (Compare the 95% UCL in Table 1 with the percentile data in Table 2.)

Table 1. Confidence Limits (CL) for MLOE Categories 1 & 2 for Organics (µg/kg) in San Diego Bay Sediments.

Organic	95% St-t LCL	Mean	80% St-t UCL	90% St-t UCL	95% St-t UCL	95% Mod-t UCL
tPCBs	59.3	109.1	139.2	155.1	168.3	171.4
tChlordane	0.49	1.61	1.86	1.99	2.10	2.11
PPPAHs	1715	2340	2658	2825	2965	2980

Table 2. Percentiles of MLOE Approach Categories 1 & 2 for Organics

Variable	Number Observed	10%ile	20%ile	25%ile	50%ile	75%ile	80%ile	90%ile	95%ile	99%ile
tPCBs	75	0.1	3.1	3.1	9.6	21.7	29.4	397	559	1300
tChlordane	60	0.2	0.2	0.6	0.6	0.6	1.7	5.7	5.7	7.4
PPPAHs	75	394	468	470	780	2698	3400	6954	11396	12752

Table 3. Confidence Limits (CL) for MLOE Categories 3, 4, & 5 for Organics (µg/kg) in San Diego Bay Sediments.

Organic	95% St-t LCL	Mean	80% St-t UCL	90% St-t UCL	95% St-t UCL	95% Mod-t UCL
tPCB	119.7	149.3	164.0	171.7	178.1	178.7
tChlordane	7.15	9.68	10.99	11.68	12.25	12.32
PPPAHs	4243	5284	5814	6093	6325	6363

Table 4. Percentiles of MLOE Approach Categories 3, 4, and 5 for Organics										
Variable	Number Observed	10%ile	20%ile	25%ile	50%ile	75%ile	80%ile	90%ile	95%ile	99%ile
tPCBs	113	3.1	9.6	9.6	90.3	196	216	369	509	960
tChlordane	95	0.2	0.2	0.6	5.0	13.0	17.1	29.0	36.3	66.4
PPPAHs	113	543	802	1165	4016	6738	7392	9140	16160	34572

Note on the CA LRM Approach

The first attempt to develop a numeric target for this TMDL involved using the Sediment Chemistry line of evidence (LOE) of the CA SQO in 2007, when very little information on the CA LRM approach and its development were available. (A public meeting was held in 2008 in which the development of this numeric target was disclosed.) Within the sediment chemistry LOE are two chemical contamination indices based on two types of Sediment Quality Guidelines: the CA Logistic regression model (CA LRM) and the Chemical Score Index. The first numeric target was calculated using the CA LRM. The threshold value of T20 was chosen because it was the same threshold used in the national LRM, where there are significantly more data points used to generate the model results. The San Diego Water Board did not have access much information used to develop the predictive equation in 2007, as most of the reports were still being written on the Aquatic Life SQO. San Diego Water Board was informed in 2011 that the data set used to develop the model did not show mortality at or above 20% at the LRM threshold value. Mortality begins to occur around T25 (one point), with the next two occurrences at T33; however, it is understood that predictions of the Pmax, and with fewer data points for the calculation of the prediction, an outcome with predictions higher than the original data distribution are easily possible.

In October of 2011, San Diego Water Board staff began working on the current CA SQO Approach using the 95% UCL for numeric targets.

I-1.4. References

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Appendix I-1, Attachment 1

MLOE Approach Station Level Assessment Results

Table of Contents

All Information was taken directly from CA SQO Tool spreadsheets.

SQO Output Page 1 of 2 **Chollas Creek Mouth 1-10**

Chemistry						
Station ID	C01	C02	C03	C04	C05	C06
CA LRM value	0.8	0.83	0.85	0.69	0.88	0.8
CA LRM category	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure
CSI value	3.14	3.28	3.28	2.94	3.13	3.14
CSI category	High Exposure	High Exposure	High Exposure	Moderate Exposure	High Exposure	High Exposure
Integrated Chemistry Indicator	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure
Toxicity						
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity
Test Method 2						
Toxicity Category						
Test Method 3						
Toxicity Category						
Test Method 4						
Toxicity Category						
Integrated Toxicity Indicator	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity
Benthos						
BRI Score	48.87	49.62	57.35	57.80	49.10	47.67
BRI Category	Low Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Low Disturbance	Low Disturbance
IBI Score	1	1	1	1	1	1
IBI Category	Low Disturbance	Low Disturbance	Low Disturbance	Low Disturbance	Low Disturbance	Low Disturbance
RBI Score	0.13	0.13	0.07	0.07	0.06	0.12
RBI Category	Moderate Disturbance	Moderate Disturbance	High Disturbance	High Disturbance	High Disturbance	Moderate Disturbance
RIVPACS Score	0.556	0.556	0.493	0.557	0.405	0.761
RIVPACS Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Low Disturbance
Integrated Benthic Indicator	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Low Disturbance
Station Assessment	Clearly impacted	Clearly impacted	Clearly impacted	Clearly impacted	Clearly impacted	Likely impacted

DATA INPUT 1 PAGE 1 of 2 **Chollas Creek Mouth 1-10**

Station Data		1	2	3	4	5	6
Sample#	C01	C02	C03	C04	C05	C06	
Station ID	C	C	C	C	C	C	
Benthic Assemblage							
Chemistry Data (Dry Weight)		0.428	0.424	1.3	0.396	0.51	0.4
Cadmium (mg/kg)		139	130	155	97.4	108	141
Copper (mg/kg)		77.3	73.7	148	67.7	73.3	78.4
Lead (mg/kg)		0.419	0.526	0.541	0.273	0.395	0.433
Mercury (mg/kg)		235	212	418	270	207	233
Zinc (mg/kg)		2184	2050	2660	1787	1913	2306
HPAH (ug/kg)		326	341	623	266	298	367
LPAH (ug/kg)		12	13	14	8.9	16	12
Alpha Chlordane (ug/kg)		17	18	23	12	20	17
Gamma Chlordane (ug/kg)	x	x	x	x	x	x	
Dieldrin (ug/kg)	x	x	x	x	x	x	
Trans Nonachlor (ug/kg)		8	10.8	11.7	6.5	10.7	9
DDDs, total (ug/kg)		15	16	18	11	17	15
DDEs, total (ug/kg)		28.8	44.39	38.995	21.98	33.505	30.315
DDTs, total (ug/kg)		3.2	14	6.9	2.7	3.1	3.6
4,4'-DDT (ug/kg)		189.73	421.58	319.86	144.66	233.55	189.76
PCBs, total (ug/kg)							

DATA INPUT 2 PAGE 1 of 2 **Chollas Creek Mouth 1-10**

Toxicity Data	C01	C02	C03	C04	C05	C06
Station ID	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Test Method 1	99	99	99	99	99	99
Test 1 Raw Control Result	58	71	75	70	79	61
Test 1 Raw Station Result	Yes	Yes	Yes	Yes	Yes	Yes
Significantly Different from Control	58.58585859	71.71717172	75.75757576	70.70707071	79.7979798	61.61616162
Percent Control						
Toxicity Test Method 2						
Test 2 Raw Control Result						
Test 2 Raw Station Result						
Significantly Different from Control	x	x	x	x	x	x
Percent Control						

Benthic Data	C01	C02	C03	C04	C05	C06
Station ID						
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.						
RIVPACS	0.556	0.556	0.493	0.557	0.405	0.761

All Information was taken directly from CA SQO Tool spreadsheets.

SQO Output Page 2 of 2 **Chollas Creek Mouth 1-10**

Chemistry				
Station ID	C07	C08	C09	C10
CA LRM value	0.64	0.61	0.67	0.7
CA LRM category	Moderate Exposure	Moderate Exposure	High Exposure	High Exposure
CSI value	2.3	2.47	2.96	2.95
CSI category	Low Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
Integrated Chemistry Indicator	Moderate Exposure	Moderate Exposure	High Exposure	High Exposure
Toxicity				
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Nontoxic	Nontoxic	Moderate Toxicity	Moderate Toxicity
Test Method 2				
Toxicity Category				
Test Method 3				
Toxicity Category				
Test Method 4				
Toxicity Category				
Integrated Toxicity Indicator	Nontoxic	Nontoxic	Moderate Toxicity	Moderate Toxicity
Benthos				
BRI Score	46.70	50.11	47.86	48.73
BRI Category	Low Disturbance	Moderate Disturbance	Low Disturbance	Low Disturbance
IBI Score	1	3	1	2
IBI Category	Low Disturbance	High Disturbance	Low Disturbance	Moderate Disturbance
RBI Score	0.06	0.01	0.14	0.11
RBI Category	High Disturbance	High Disturbance	Moderate Disturbance	Moderate Disturbance
RIVPACS Score	0.644	0.142	0.609	0.608
RIVPACS Category	Moderate Disturbance	High Disturbance	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	Moderate Disturbance	High Disturbance	Moderate Disturbance	Moderate Disturbance
Station Assessment	Possibly impacted	Possibly impacted	Clearly impacted	Clearly impacted

DATA INPUT 1 PAGE 2 of 2 **Chollas Creek Mouth 1-10**

Station Data		7	8	9	10
Sample#	C07	C08	C09	C10	
Station ID	C	C	C	C	
Benthic Assemblage					
Chemistry Data (Dry Weight)		0.286	0.428	0.424	1.3
Cadmium (mg/kg)		47.9	68	119	314
Copper (mg/kg)		43.1	41.25	65.4	72.3
Lead (mg/kg)		0.104	0.13	0.381	0.427
Mercury (mg/kg)		225	204	206	217
Zinc (mg/kg)		772	775	6020	2560
HPAH (ug/kg)		130	116	3048	332
LPAH (ug/kg)		1.8	3.4	8.3	8.7
Alpha Chlordane (ug/kg)		2.8	4.5	12	13
Gamma Chlordane (ug/kg)	x	x	x	x	
Dieldrin (ug/kg)	x	x	x	x	
Trans Nonachlor (ug/kg)		1.75	2.5	7.7	8.1
DDDs, total (ug/kg)		2.2	3.4	11	12
DDEs, total (ug/kg)		5.05	7.93	22.785	24.49
DDTs, total (ug/kg)		0.52	1.1	2.3	2.1
4,4'-DDT (ug/kg)		59.56	52.852	154.42	202.34
PCBs, total (ug/kg)					

DATA INPUT 2 PAGE 2 of 2 **Chollas Creek Mouth 1-10**

Toxicity Data	C07	C08	C09	C10
Station ID	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Test Method 1	99	99	99	99
Test 1 Raw Control Result	93	95	79	68
Test 1 Raw Station Result	Yes	Yes	Yes	Yes
Significantly Different from Control	93.93939394	95.95959596	79.7979798	68.68686869
Percent Control				
Toxicity Test Method 2				
Test 2 Raw Control Result				
Test 2 Raw Station Result				
Significantly Different from Control	x	x	x	x
Percent Control				

Benthic Data	C07	C08	C09	C10
Station ID				
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.				
RIVPACS	0.644	0.142	0.609	0.608

Benthic Data Input Page

Station #1	C01
TaxonName	Abundance
Amphideutopus oculatus	2
Cirratulidae	1
Cossura candida	23
Crucibulum spinosum	1
Diplocirrus sp SD1	4
Dorvillea (Schistomeringos) sp	5
Edwardsia californica	8
Euchone limnicola	3
Euphilomedes carcharodonta	5
Eupolymnia heterobranchia	1
Exogone lourei	4
Harmothoe imbricata Cmplx	1
Heterophoxus oculatus	2
Laevicardium substriatum	1
Leitoscoloplos pugettensis	57
Lumbrineridae	3
Lyonsia californica	1
Mediomastus sp	14
Musculista senhousia	40
Nassarius tiarula	1
Oligochaeta	3
Pista sp	7
Polycirrus sp	1
Prionospio (Prionospio) heterobranchia	56
Pseudopolydora paucibranchiata	4
Pteropurpura festiva	1
Pyromaia tuberculata	2
Rudilemboides sp	1
Scolanthus sp A	6
Scolelepis sp	1

Station #7	C07
TaxonName	Abundance
Amphiuridae	1
Capitella capitata Cmplx	3
Caprella californica	1
Chaetozone corona	2
Cirratulidae	1
Cossura candida	10
Diopatra ornata	1
Diplocirrus sp SD1	1
Dorvillea (Schistomeringos) sp	20
Edwardsia californica	18
Eteone sp	1
Euchone limnicola	1
Euphilomedes carcharodonta	7
Exogone lourei	2
Glycera americana	1
Leitoscoloplos pugettensis	40
Leptosynapta sp	6
Lumbrineridae	1
Lumbrineris erecta	2
Lumbrineris japonica	1
Mediomastus sp	78
Microspio pigmentata	1
Musculista senhousia	1
Natantia	1
Neanthes acuminata Cmplx	4
Notomastus sp	1
Oligochaeta	9
Paranemertes californica	3
Pista sp	6
Prionospio (Prionospio) heterobranchia	36

Scoletoma sp C	97
Syllis (Typosyllis) nipponica	1

Station #2	C02
TaxonName	Abundance
Americhelidium sp	1
Amphideutopus oculatus	1
Nemertea	1
Ceriantharia	1
Corymorpha sp	1
Cossura candida	7
Diplocirrus sp SD1	1
Dorvillea (Schistomeringos) sp	1
Edwardsia californica	4
Euphilomedes carcharodonta	8
Exogone lourei	1
Glycera americana	1
Hippolytidae	1
Leitoscoloplos pugettensis	21
Lineidae	1
Lophopanopeus bellus	2
Lumbrineris erecta	1
Lyonsia californica	1
Mediomastus sp	10
Musculista senhousia	7
Mysidopsis californica	2
Nassarius tiarula	2
Paraprionospio pinnata	1
Pseudopolydora paucibranchiata	9
Scolelepis sp	2
Scoletoma sp	3
Scoletoma sp A	4
Scoletoma sp C	146
Tagelus subteres	2
Theora lubrica	2
Tubulanus sp	3

Station #8	C08
TaxonName	Abundance
Cossura candida	1
Edwardsia californica	3
Glycera americana	1
Leitoscoloplos pugettensis	1
Pherusa capulata	1
Scoletoma sp C	13

Station #9	C09
TaxonName	Abundance
Acteocina inculta	1
Americhelidium sp	1
Ampelisca lobata	1
Amphiodia sp	3
Brania sp	1
Nemertea	1
Cossura candida	15
Diplocirrus sp SD1	5

Pista sp	2
Prionospio (Prionospio) heterobranchia	1
Pseudopolydora paucibranchiata	10
Pyromaia tuberculata	2
Scolanthus sp A	1
Scoletoma sp	1
Scoletoma sp C	56
Theora lubrica	3

Station #3	C03
TaxonName	Abundance
Amphideutopus oculatus	1
Diplocirrus sp SD1	2
Dorvillea (Schistomeringos) sp	4
Edwardsia californica	1
Euchone limnicola	6
Euphilomedes carcharodonta	2
Exogone lourei	1
Leitoscoloplos pugettensis	68
Lumbrineris erecta	4
Mediomastus sp	1
Musculista senhousia	4
Natantia	2
Paranemertes californica	1
Phyllodoce hartmanae	1
Pista sp	3
Pista sp	1
Prionospio (Prionospio) heterobranchia	2
Pseudopolydora paucibranchiata	21
Scolanthus sp A	4
Scoletoma sp C	29
Theora lubrica	4
Dorvillea (Schistomeringos) sp	7
Drilonereis mexicana	1
Edwardsia californica	2
Euchone limnicola	8
Euphilomedes carcharodonta	4
Eupolymnia heterobranchia	3
Exogone lourei	47
Harmothoe imbricata Cmplx	5
Heterophoxus oculatus	2
Heteroserolis carinata	1
Laevicardium substriatum	1
Leitoscoloplos pugettensis	97
Leptosynapta sp	9
Lineidae	1
Lumbrineridae	5
Lumbrineris limicola	5
Macoma indentata	1
Mediomastus sp	35
Musculista senhousia	106
Nassarius tiarula	2
Neanthes acuminata Cmplx	1
Nephtys caecoides	1
Odontosyllis phosphorea	1
Oligochaeta	2
Phoronida	1
Pista sp	35
Prionospio (Prionospio) heterobranchia	35
Pseudopolydora paucibranchiata	22
Scolanthus sp A	20
Scoletoma sp	7
Scoletoma sp A	14
Scoletoma sp C	128
Theora lubrica	2
Tubulanus sp	1

Tubulanus sp	1

Station #4	C04
TaxonName	Abundance
Acteocina inculta	1
Aphelochaeta sp	1
Cossura candida	33
Diplocirrus sp SD1	3
Dorvillea (Schistomeringos) sp	1
Eteone sp	1
Euchone limnicola	7
Exogone lourei	14
Glycera americana	1
Harmothoe imbricata Cmplx	4
Leitoscoloplos pugettensis	68
Lumbrineridae	1
Lumbrineris erecta	10
Lyonsia californica	1
Mediomastus sp	18
Musculista senhousia	83
Nassarius tiarula	2
Neanthes acuminata Cmplx	1
Neosabellaria cementarium	1
Oligochaeta	5
Paranemertes californica	1
Pista sp	71
Prionospio (Minuspio) lighti	1
Prionospio (Prionospio) heterobranchia	35
Pseudopolydora paucibranchiata	7
Scolanthus sp A	4
Scoletoma sp	3
Scoletoma sp C	82
Theora lubrica	11

Station #10	C10
TaxonName	Abundance
Amphideutopus oculatus	3
Armandia brevis	2
Calocarides sp	3
Cossura candida	7
Diplocirrus sp SD1	7
Dorvillea (Schistomeringos) sp	3
Drilonereis mexicana	1
Edwardsia californica	3
Euchone limnicola	2
Euphilomedes carcharodonta	7
Exogone lourei	14
Fabricinuda limnicola	4
Glycera americana	1
Harmothoe imbricata Cmplx	4
Heterophoxus oculatus	1
Leitoscoloplos pugettensis	69
Lumbrineridae	1
Mediomastus sp	19
Musculista senhousia	45
Nemertea	1
Nephtys cornuta	1
Notomastus sp	1
Odontosyllis phosphorea	2
Pista sp	12
Prionospio (Prionospio) heterobranchia	18
Pseudopolydora paucibranchiata	4
Pyromaia tuberculata	1
Rudilemboides sp	1
Scolanthus sp A	4
Scoletoma sp C	73

Station #5	C05
TaxonName	Abundance
Cossura candida	14
Diplocirrus sp SD1	1
Dorvillea (Schistomeringos) sp	1
Drilonereis mexicana	1
Edwardsia californica	3
Exogone lourei	1
Gammaridea	1
Leitoscoloplos pugettensis	52
Lumbrineris erecta	1
Mediomastus sp	6
Nassarius tiarula	2
Prionospio (Prionospio) heterobranchia	8
Pseudopolydora paucibranchiata	2
Rudilemboides sp	1
Scolanthus sp A	12
Scoletoma sp A	8
Scoletoma sp C	86
Theora lubrica	3
Tubulanus sp	2

Station #6	C06
TaxonName	Abundance
Amphideutopus oculatus	12
Armandia brevis	1
Chione sp	1
Cirratulidae	1
Cossura candida	7
Diplocirrus sp SD1	11
Dorvillea (Schistomeringos) sp	5
Euchone limnicola	4
Euphilomedes carcharodonta	1

Exogone lourei	15
Fabricinuda limnicola	1
Glycera americana	2
Hartmanodes hartmanae	1
Leitoscoloplos pugettensis	79
Lumbrineris erecta	1
Lyonsia californica	2
Mayerella banksia	1
Mediomastus sp	12
Musculista senhousia	17
Nephtys cornuta	2
Odontosyllis phosphorea	1
Paranemertes californica	1
Pista sp	14
Prionospio (Prionospio) heterobranchia	17
Pseudopolydora paucibranchiata	14
Pyromaia tuberculata	1
Rudilemboides sp	4
Scolanthus sp A	6
Scolelepis sp	1
Scoletoma sp C	51
Spiophanes duplex	1
Theora lubrica	14

All Information taken directly from CA SQO Tool spreadsheets

SQO Output Page 1 of 2 Chollas Creek Mouth 11-14 and Reference Sites for Chollas and Paleta

Chemistry							
Station ID	C11	C12	C13	C14	2231	2243	2433
CA LRM value	0.71	0.77	0.98	0.99	0.49	0.49	0.46
CA LRM category	High Exposure	High Exposure	High Exposure	High Exposure	Low Exposure	Low Exposure	Low Exposure
CSI value	2.91	2.6	3.17	3	2.03	1.73	1.61
CSI category	Moderate Exposure	Moderate Exposure	High Exposure	High Exposure	Low Exposure	Low Exposure	Minimal Exposure
Integrated Chemistry Indicator	High Exposure	High Exposure	High Exposure	High Exposure	Low Exposure	Low Exposure	Low Exposure
Toxicity							
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Nontoxic	Nontoxic	Moderate Toxicity	High Toxicity	Low Toxicity	Nontoxic	Low Toxicity
Test Method 2							
Toxicity Category							
Test Method 3							
Toxicity Category							
Test Method 4							
Toxicity Category							
Integrated Toxicity Indicator	Nontoxic	Nontoxic	Moderate Toxicity	High Toxicity	Low Toxicity	Nontoxic	Low Toxicity
Benthos							
BRI Score	38.02	51.57	59.27	80.46	28.90	47.34	27.65
BRI Category	Reference	Moderate Disturbance	Moderate Disturbance	High Disturbance	Reference	Low Disturbance	Reference
IBI Score	3	1	1	2	1	1	0
IBI Category	High Disturbance	Low Disturbance	Low Disturbance	Moderate Disturbance	Low Disturbance	Low Disturbance	Reference
RBI Score	0.02	0.04	0.10	x	0.54	0.16	0.47
RBI Category	High Disturbance	High Disturbance	Moderate Disturbance	#VALUE!	Reference	Moderate Disturbance	Reference
RIVPACS Score	0.142	0.291	0.339	0.482	0.552	0.675	0.56
RIVPACS Category	High Disturbance	High Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	High Disturbance	High Disturbance	Moderate Disturbance	#VALUE!	Low Disturbance	Moderate Disturbance	Reference
Station Assessment	Likely impacted	Likely impacted	Clearly impacted	#VALUE!	Likely unimpacted	Likely unimpacted	Unimpacted

DATA INPUT 1 PAGE 1 of 2 Chollas Creek Mouth 11-14 and Reference Sites for Chollas and Paleta

Station Data							
Sample#		1	2	3	4	5	6	7
Station ID	C11	C12	C13	C14		2231	2243	2433
Benthic Assemblage	C	C	C	C	C	C	C	
Chemistry Data (Dry Weight)								
Cadmium (mg/kg)		0.396	0.51	0.4	0.286	0.025	0.143	0.288
Copper (mg/kg)		104	78.5	103	94.9	71.1	56.4	43.3
Lead (mg/kg)		96.1	57.6	87.2	103	40.3	30.7	23.25
Mercury (mg/kg)		0.215	0.208	0.216	0.235	0.364	0.332	0.2505
Zinc (mg/kg)		273	166	248	347	129	125	114.5
HPAH (ug/kg)		1013	36060	11600	5194	536	118	415
LPAH (ug/kg)		120	7475	2007	1212	86	20	56
Alpha Chlordane (ug/kg)		4.2	11	39	54	0.27	0.095	0.18
Gamma Chlordane (ug/kg)		6.2	19	50	65	0.64	0.11	0.39
Dieldrin (ug/kg)	x	x	x	x	x	x	x	
Trans Nonachlor (ug/kg)	x	x	x	x	x	x	x	
DDDs, total (ug/kg)		3.7	13.6	23.1	34.8	1.9	0.48	0.56
DDEs, total (ug/kg)		4.7	13	38	51	1.71	0.79	1.39
DDTs, total (ug/kg)		9.64	33.395	78.39	122.8	10.93	1.65	2.24
4,4'-DDT (ug/kg)		0.52	5.3	11	20	6.7	0.18	0.11
PCBs, total (ug/kg)		74.245	166.57	255.07	212.12	43.426	21.06	27.37

DATA INPUT 2 PAGE 1 of 2 Chollas Creek Mouth 11-14 and Reference Sites for Chollas and Paleta

Toxicity Data							
Station ID	C11	C12	C13	C14	2231	2243	2433
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	99	99	99	99	99	99	99
Test 1 Raw Station Result	90	91	78	53	75	83	83
Significantly Different from Con	Yes	No	Yes	Yes	No	No	Yes
Percent Control	90.90909091	91.91919192	78.78787879	53.53535354	75.75757576	83.83838384	83.83838384
Toxicity Test Method 2							
Test 2 Raw Control Result							
Test 2 Raw Station Result							
Significantly Different from Control							
Percent Control	x	x	x	x	x	x	x

Benthic Data							
Station ID	C11	C12	C13	C14	2231	2243	2433
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.							
RIVPACS	0.142	0.291	0.339	0.482	0.552	0.675	0.56

All Information taken directly from CA SQO Tool spreadsheets

SQO Output Page 2 of 2 Chollas Creek Mouth 11-14 and Reference Sites

Chemistry		
Station ID	2441	2238
CA LRM value	0.52	0.62
CA LRM category	Moderate Exposure	Moderate Exposure
CSI value	2.03	1.77
CSI category	Low Exposure	Low Exposure
Integrated Chemistry Indicator	Moderate Exposure	Moderate Exposure
Toxicity		
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Low Toxicity	High Toxicity
Test Method 2		
Toxicity Category		
Test Method 3		
Toxicity Category		
Test Method 4		
Toxicity Category		
Integrated Toxicity Indicator	Low Toxicity	High Toxicity
Benthos		
BRI Score	27.72	45.55
BRI Category	Reference	Low Disturbance
IBI Score	0	1
IBI Category	Reference	Low Disturbance
RBI Score	0.22	0.15
RBI Category	Low Disturbance	Moderate Disturbance
RIVPACS Score	0.606	0.43
RIVPACS Category	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	Low Disturbance	Moderate Disturbance
Station Assessment	Possibly impacted	Likely impacted

DATA INPUT 1 PAGE 2 of 2 Chollas Creek Mouth 11-14 and Reference Sites

Station Data				
Sample#		9		10
Station ID		2441		2238
Benthic Assemblage	C		C	
Chemistry Data (Dry Weight)				
Cadmium (mg/kg)		0.411		0.1328
Copper (mg/kg)		78.4		71
Lead (mg/kg)		26.7		28.79
Mercury (mg/kg)		0.238		0.262
Zinc (mg/kg)		143		214.3
HPAH (ug/kg)		1210		103
LPAH (ug/kg)		236		17
Alpha Chlordane (ug/kg)		0.11		0.043
Gamma Chlordane (ug/kg)		0.72		0.14
Dieldrin (ug/kg)	x		x	
Trans Nonachlor (ug/kg)	x		x	
DDDs, total (ug/kg)		0.75		0.241
DDEs, total (ug/kg)		2.31		0.8
DDTs, total (ug/kg)		3.99		1.345
4,4'-DDT (ug/kg)		0.21		0.23
PCBs, total (ug/kg)		33.943		11.69

DATA INPUT 2 PAGE 2 of 2 Chollas Creek Mouth 11-14 and Reference Sites

Toxicity Data			
Station ID		2441	2238
Toxicity Test Method 1	Eohaustorius 10-day		Eohaustorius 10-day
Test 1 Raw Control Result		99	99
Test 1 Raw Station Result		81	
Significantly Different from Con	Yes		
Percent Control		81.81818182	0
Toxicity Test Method 2			
Test 2 Raw Control Result			
Test 2 Raw Station Result			
Significantly Different from Control			
Percent Control	x		x

Benthic Data		
Station ID	2441	2238
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.		
RIVPACS	0.606	0.43

Benthic Data Input Page

Chollas Creek Mouth 11-14 and Reference Sites for Chollas and Paleta

Station #1	C11
TaxonName	Abundance
Nemertea	1
Euphilomedes carcharodonta	1
Lumbrineris latreilli	1
Notomastus sp	1
Odontosyllis phosphorea	1
Prionospio (Prionospio) heterobranchia	1
Pseudopolydora paucibranchiata	1

Station #2	C12
TaxonName	Abundance
Chaetozone corona	1
Cossura candida	1
Diplocirrus sp SD1	2
Euphilomedes carcharodonta	3
Leitoscoloplos pugettensis	10
Leptosynapta sp	2
Lyonsia californica	1
Musculista senhousia	4
Neanthes acuminata Cmplx	1
Nemertea	1
Pista sp	1
Scoletoma sp C	5
Timarete sp	1

Station #3	C13
TaxonName	Abundance
Acteocina inculta	4
Aoroides sp	1

Station #7	2433
TaxonName	Abundance
Acteocina culcitella	1
Aglaja ocelligera	1
Amaeana occidentalis	2
Amphicteis scaphobranchiata	1
Amphideutopus oculatus	2
Amphiodia sp	1
Amphiodia sp	1
Asteropella slatteryi	1
Asthenothaerus diegensis	1
Chaetozone corona	13
Cossura candida	2
Cryptomya californica	4
Diplocirrus sp SD1	81
Euchone limnicola	1
Euclymeninae	4
Euclymeninae sp A	8
Glycera americana	2
Nemertea	1
Laevicardium substriatum	1
Leitoscoloplos pugettensis	57
Leptosynapta sp	1
Lucinisca nuttalli	1
Lumbrineris erecta	1
Lyonsia californica	1
Macoma yoldiformis	2
Malacoplax californiensis	2
Mediomastus sp	28
Mysidopsis californica	1
Neastacilla californica	2
Neotrypaea sp	4

Station #4	C14
TaxonName	Abundance
Bemlos sp	1
Bulla gouldiana	4
Capitella capitata Cmplx	75
Cossura candida	1
Dorvillea (Schistomeringos) sp	38
Euphilomedes carcharodonta	3
Exogone lourei	2
Grandidierella japonica	2
Hemigrapsus oregonensis	1
Leitoscoloplos pugettensis	1
Leptochelia dubia	1
Leptosynapta sp	2
Lineidae	1
Lumbrineris erecta	1
Macoma indentata	1
Macoma nasuta	1
Musculista senhousia	11
Neanthes acuminata Cmplx	13
Odontosyllis phosphorea	1
Oxyurostylis pacifica	2
Pista sp	1
Prionospio (Prionospio) heterobranchia	12
Scoletoma sp C	3
Streblospio benedicti	7
Neotrypaea sp	7
Nephtys cornuta	2
Notomastus sp	2
Oxyurostylis pacifica	1
Paranemertes californica	1
Paraprionospio pinnata	1
Phyllodoce hartmanae	1
Pista sp	5
Pista sp	1
Praxillella pacifica	1
Rochefortia coani	2
Rudilemboides sp	1
Scleroplax granulata	29
Scoletoma sp	23
Scoletoma sp A	8
Scoletoma sp B	2
Scoletoma sp C	80
Spiophanes duplex	2
Syllis (Typosyllis) nipponica	9
Tagelus subteres	4
Tellina carpenteri	1
Terebellidae	1
Theora lubrica	5
Thracia sp	1
Tubulanus sp	1
Nemertea	1

Bemlos sp	1
Bulla gouldiana	3
Capitella capitata Cmplx	501
Dorvillea (Schistomeringos) sp	27
Grandidierella japonica	2
Harmothoe imbricata Cmplx	1
Nassarius tiarula	1
Neanthes acuminata Cmplx	14
Oligochaeta	2
Streblospio benedicti	1

Station #5	2231
TaxonName	Abundance
Acidostoma hancocki	1
Acteocina inculta	1
Ampelisca lobata	4
Amphideutopus oculatus	1
Amphipholis squamata	5
Nemertea	5
Amphiuridae	1
Anthozoa	1
Anthuridae	1
Bathyleberis sp	1
Bemlos sp	9

Station #8	2440
TaxonName	Abundance
Americhelidium sp	4
Amphideutopus oculatus	17
Amphiuridae	1
Apoprionospio pygmaea	2
Armandia brevis	1
Asteropella slatteryi	8
Atylus tridens	2
Campylaspis rubromaculata	2
Capitella capitata Cmplx	2
Carazziella sp	1
Chaetozone corona	3
Cooperella subdiaphana	1
Cossura candida	1
Diopatra ornata	1
Diplocirrus sp SD1	123
Dorvillea (Schistomeringos) sp	15
Eteone sp	1
Euchone limnicola	21
Euphilomedes carcharodonta	16
Exogone lourei	28
Fabricinuda limnicola	2
Goniada littorea	1
Halosydna latior	1

Boccardia sp	1
Brania sp	1
Calocarides sp	3
Ceratonereis mirabilis	1
Chone minuta	1
Cryptomya californica	1
Diopatra ornata	1
Dorvillea (Schistomeringos) sp	6
Drilonereis mexicana	1
Ericthonius brasiliensis	4
Eteone sp	1
Euchone limnicola	1
Eumida longicornuta	5
Eupolymnia heterobranchia	3
Exogone lourei	238
Fabricinuda limnicola	1
Gammaropsis thompsoni	2
Glycera americana	1
Harmothoe imbricata Cmplx	31
Hemipodia borealis	15
Heteromysis odontops	6
Heterophoxus oculatus	23
Hiatella arctica	6
Nemertea	6
Joeropsis dubia	6
Kalliapseudes crassus	5128
Laevicardium substriatum	1
Laonice cirrata	1
Leitoscoloplos pugettensis	2
Leptochelia dubia	114
Leptopecten latiauratus	2
Leucothoe alata	7
Lophopanopeus bellus	23
Lumbrineridae	10
Lumbrineris erecta	12
Lumbrineris limicola	20
Maera similis	5
Heterophoxus oculatus	5
Heteroserolis carinata	7
Laevicardium substriatum	1
Leitoscoloplos pugettensis	117
Listriella melanica	2
Lyonsia californica	4
Mediomastus sp	117
Melanochlamys diomedea	1
Melinna sp	2
Micropodarke dubia	1
Musculista senhousia	4
Nassarius tiarula	1
Neotrypaea sp	1
Nephtys caecoides	1
Nephtys cornuta	3
Nereis procera	3
Odontosyllis phosphorea	1
Oligochaeta	2
Paraprionospio pinnata	1
Pista sp	136
Pista sp	3
Pista sp	2
Prionospio (Minuspio) lighti	1
Prionospio (Prionospio) heterobranchia	63
Pseudopolydora paucibranchiata	2
Pyromaia tuberculata	2
Rochefortia grippi	1
Rudilemboides sp	7
Scleroplax granulata	1
Scolanthus sp A	3
Scolelepis sp	2
Scoletoma sp	15
Scoletoma sp A	4
Scoletoma sp C	94
Serpulidae	4
Solen rostriformis	2
Spiophanes duplex	8

Marphysa sp	31
Mediomastus sp	78
Melinna sp	1
Monocorophium acherusicum	1
Musculista senhousia	8
Neanthes acuminata Cmplx	1
Nereididae	1
Nicolea sp	158
Notomastus sp	1
Odontosyllis phosphorea	10
Oligochaeta	1
Ophiodromus pugettensis	1
Paracerceis sculpta	1
Paranemertes californica	6
Paranthura elegans	2
Peramphithoe sp	1
Pherusa capulata	8
Pista sp	77
Podocerus brasiliensis	2
Podocerus fulanus	1
Polycirrus sp	4
Turbellaria	1
Polydora sp	1
Prionospio (Prionospio) heterobranchia	29
Protothaca sp	3
Pseudopolydora paucibranchiata	6
Pyromaia tuberculata	27
Sabellaria gracilis	1
Scoletoma sp C	52
Scyphoproctus oculatus	57
Spiophanes duplex	1
Styelidae	3
Syllidae	2
Syllis (Syllis) gracilis	10
Syllis (Typosyllis) nipponica	22
Tagelus affinis	1
Terebellidae	2
Syllis (Typosyllis) nipponica	2
Tagelus subteres	10
Tanaidacea	8
Theora lubrica	18
Tubulanus sp	1

Station #9	2441
TaxonName	Abundance
Amaeana occidentalis	4
Ampharete labrops	3
Amphicteis scaphobranchiata	2
Amphiodia sp	11
Anoplodactylus erectus	1
Aphelochaeta monilaris	1
Aphelochaeta petersenae	1
Nemertea	1
Chaetozone corona	11
Cossura candida	12
Cryptomya californica	1
Diopatra ornata	2
Diplocirrus sp SD1	8
Dorvillea (Schistomeringos) sp	3
Edwardsia californica	2
Edwardsia sp G	1
Edwardsiidae	4
Euclymeninae sp A	4
Glycera americana	2
Glycera nana	1
Heteroserolis carinata	2
Leitoscoloplos pugettensis	86
Leptopecten latiauratus	1
Leptosynapta sp	11
Lineidae	3
Listriella eriopisa	2
Listriella goleta	1
Macoma nasuta	1

Nemertea	2
Theora lubrica	2
Turbonilla sp	7

Station #6	2243
TaxonName	Abundance
Amphideutopus oculatus	3
Atylus tridens	1
Barleeia sp	1
Caprella equilibra	8
Ceriantharia	2
Dorvillea (Schistomeringos) sp	2
Edwardsia californica	31
Edwardsiidae	2
Euchone limnicola	1
Exogone lourei	70
Fabricinuda limnicola	3
Glycera americana	1
Harmothoe imbricata Cmplx	2
Hartmanodes hartmanae	1
Heterophoxus oculatus	1
Leitoscoloplos pugettensis	10
Leptopecten latiauratus	1
Lineidae	1
Lumbrineridae	3
Lumbrineris erecta	8
Macoma nasuta	6
Mediomastus sp	50
Musculista senhousia	50
Nassarius tiarula	7
Neanthes acuminata Cmplx	12
Oligochaeta	1
Oxyurostylis pacifica	1
Paracerceis sculpta	7
Paranemertes californica	1
Macoma yoldiformis	5
Malmgreniella sp	6
Mediomastus sp	16
Melinna sp	3
Metasychis disparidentatus	1
Microspio pigmentata	1
Musculista senhousia	1
Nephtys cornuta	1
Nereididae	1
Nereis procera	3
Notomastus sp	1
Nuculana taphria	1
Oligochaeta	2
Cnidaria	1
Paraprionospio pinnata	2
Parvilucina tenuisculpta	1
Pectinaria californiensis	2
Philine sp	1
Pista sp	7
Pista sp	7
Turbellaria	1
Prionospio (Minuspio) lighti	2
Prionospio (Prionospio) heterobranchia	17
Rochefortia compressa	1
Rochefortia tumida	1
Scolanthus sp A	3
Scoletoma sp	29
Scoletoma sp A	9
Scoletoma sp B	4
Scoletoma sp C	140
Spiophanes duplex	4
Tagelus subteres	7
Tellina modesta	5
Theora lubrica	3
Tubulanus sp	4

Phoronida	6
Pista sp	11
Podocerus brasiliensis	7
Poecilochaetus johnsoni	1
Prionospio (Prionospio) heterobranchia	7
Pseudopolydora paucibranchiata	7
Scolanthus sp A	3
Scoletoma sp C	240
Scyphoproctus oculatus	119
Theora lubrica	1

Station #10	2238
TaxonName	Abundance
Alpheus sp	2
Amphipholis squamata	5
Anthozoa	1
Armandia brevis	5
Atylus tridens	1
Bemlos macromanus	10
Deltamysis sp A	1
Diplocirrus sp SD1	2
Edwardsia californica	5
Eteone sp	1
Exogone lourei	2
Harmothoe imbricata Cmplx	5
Heterophoxus oculatus	3
Heteroserolis carinata	1
Kalliapseudes crassus	7
Leitoscoloplos pugettensis	35
Macoma indentata	2
Mediomastus sp	35
Musculista senhousia	70
Neanthes acuminata Cmplx	30
Paracerceis sculpta	65
Paranemertes californica	1
Pherusa capulata	6
Pista sp	11
Podocerus brasiliensis	4
Prionospio (Prionospio) heterobranchia	5
Pseudopolydora paucibranchiata	1
Schmittius politus	1
Scoletoma sp C	82
Scyphoproctus oculatus	16
Syllis (Syllis) gracilis	2
Theora lubrica	2

All Information taken directly from CA SQO Tool spreadsheets

SQO Output Page 1 of 2 Paleta Creek Mouth 1-10

Chemistry						
Station ID	P01	P02	P03	P04	P05	P06
CA LRM value	0.55	0.67	0.56	0.68	0.7	0.69
CA LRM category	Moderate Exposure	High Exposure	Moderate Exposure	High Exposure	High Exposure	High Exposure
CSI value	1.93	2.53	2.19	2.77	3.09	2.91
CSI category	Low Exposure	Moderate Exposure	Low Exposure	Moderate Exposure	High Exposure	Moderate Exposure
Integrated Chemistry Indicator	Moderate Exposure	High Exposure	Moderate Exposure	High Exposure	High Exposure	High Exposure
Toxicity						
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Nontoxic	Low Toxicity	Nontoxic	Low Toxicity	Nontoxic	Nontoxic
Test Method 2						
Toxicity Category						
Test Method 3						
Toxicity Category						
Test Method 4						
Toxicity Category						
Integrated Toxicity Indicator	Nontoxic	Low Toxicity	Nontoxic	Low Toxicity	Nontoxic	Nontoxic
Benthos						
BRI Score	46.34	45.86	51.38	51.67	58.25	57.79
BRI Category	Low Disturbance	Low Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
IBI Score	1	1	1	1	1	2
IBI Category	Low Disturbance	Low Disturbance	Low Disturbance	Low Disturbance	Low Disturbance	Moderate Disturbance
RBI Score	0.16	0.10	0.11	0.08	0.07	0.05
RBI Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	High Disturbance	High Disturbance	High Disturbance
RIVPACS Score	0.602	0.452	0.502	0.553	0.405	0.503
RIVPACS Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Station Assessment	Possibly impacted	Likely impacted	Possibly impacted	Likely impacted	Likely impacted	Likely impacted

DATA INPUT 1 PAGE 1 of 2 Paleta Creek Mouth 1-10

Station Data							
Sample#		1	2	3	4	5	6
Station ID	P01	P02	P03	P04	P05	P06	
Benthic Assemblage	C	C	C	C	C	C	
Chemistry Data (Dry Weight)							
Cadmium (mg/kg)		0.144	0.172	0.00875	0.0672	0.0981	0.184
Copper (mg/kg)		80.2	170	98.1	203	227	247
Lead (mg/kg)		33.7	55.2	36.1	64.1	72.8	68.3
Mercury (mg/kg)		0.379	0.63	0.35	0.65	0.71	0.72
Zinc (mg/kg)		162	261	165	274	294	287
HPAH (ug/kg)		432	1504	808	1329	2170	2110
LPAH (ug/kg)		108	258	177	311	464	428
Alpha Chlordane (ug/kg)		0.17	0.62	0.42	1.2	1.4	1
Gamma Chlordane (ug/kg)		0.45	1.2	0.75	2.5	2.5	1.8
Dieldrin (ug/kg)	x	x	x	x	x	x	
Trans Nonachlor (ug/kg)	x	x	x	x	x	x	
DDDs, total (ug/kg)		0.66	1.42	1.06	2.3	5.1	3.1
DDEs, total (ug/kg)		0.96	2.8	2	3.9	6.3	4.8
DDTs, total (ug/kg)		4.899	4.78	3.326	7.26	25.51	9.955
4,4'-DDT (ug/kg)		3.2	0.43	0.18	0.95	14	1.3
PCBs, total (ug/kg)		40.097	78.612	50.74	101.38	751.27	121.77

DATA INPUT 2 PAGE 1 of 2 Paleta Creek Mouth 1-10

Toxicity Data						
Station ID	P01	P02	P03	P04	P05	P06
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	99	99	99	99	99	99
Test 1 Raw Station Result	90	82	92	83	88	88
Significantly Different from Cont	No	Yes	No	Yes	No	No
Percent Control	90.90909091	82.82828283	92.92929293	83.83838384	88.88888889	88.88888889
Toxicity Test Method 2						
Test 2 Raw Control Result						
Test 2 Raw Station Result						
Significantly Different from Control						
Percent Control	x	x	x	x	x	x

Benthic Data						
Station ID	P01	P02	P03	P04	P05	P06
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.						
RIVPACS	0.602	0.452	0.502	0.553	0.405	0.503

All Information taken directly from CA SQO Tool spreadsheets

SQO Output Page 2 of 2 Paleta Creek Mouth 1-10

Chemistry				
Station ID	P07	P08	P09	P10
CA LRM value	0.69	0.59	0.4	0.65
CA LRM category	High Exposure	Moderate Exposure	Low Exposure	Moderate Exposure
CSI value	3	2.49	1.05	2.79
CSI category	High Exposure	Moderate Exposure	Minimal Exposure	Moderate Exposure
Integrated Chemistry Indicator	High Exposure	Moderate Exposure	Low Exposure	Moderate Exposure
Toxicity				
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Nontoxic	Low Toxicity	Nontoxic	Low Toxicity
Test Method 2				
Toxicity Category				
Test Method 3				
Toxicity Category				
Test Method 4				
Toxicity Category				
Integrated Toxicity Indicator	Nontoxic	Low Toxicity	Nontoxic	Low Toxicity
Benthos				
BRI Score	54.34	49.67	53.54	53.85
BRI Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
IBI Score	1	0	1	1
IBI Category	Low Disturbance	Reference	Low Disturbance	Low Disturbance
RBI Score	0.06	0.10	0.09	0.11
RBI Category	High Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
RIVPACS Score	0.59	0.676	0.434	0.531
RIVPACS Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Station Assessment	Likely impacted	Likely impacted	Likely unimpacted	Likely impacted

DATA INPUT 1 PAGE 2 of 2 Paleta Creek Mouth 1-10

Station Data					
Sample#		7	8	9	10
Station ID	P07	P08	P09	P10	
Benthic Assemblage	C	C	C	C	
Chemistry Data (Dry Weight)					
Cadmium (mg/kg)		0.133	0.0857	0.00875	0.351
Copper (mg/kg)		237	106	22.1	105
Lead (mg/kg)		73	42.4	11.3	44.37
Mercury (mg/kg)		0.76	0.44	0.068	0.304
Zinc (mg/kg)		288	184	89	242.4
HPAH (ug/kg)		1870	2870	108	1326
LPAH (ug/kg)		401	342	24	196
Alpha Chlordane (ug/kg)		1.5	0.94	0.1	2.2
Gamma Chlordane (ug/kg)		2.7	2.3	0.16	3.6
Dieldrin (ug/kg)	x	x	x	x	
Trans Nonachlor (ug/kg)	x	x	x	x	
DDDs, total (ug/kg)		3	3.4	0.27	3.3
DDEs, total (ug/kg)		5.1	3.8	0.39	4.5
DDTs, total (ug/kg)		12.32	8.05	1.9665	8.706
4,4'-DDT (ug/kg)		4.1	0.74	1.2	0.83
PCBs, total (ug/kg)		113.79	80.297	9.993	71.729

DATA INPUT 2 PAGE 2 of 2 Paleta Creek Mouth 1-10

Toxicity Data				
Station ID	P07	P08	P09	P10
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	99	99	99	99
Test 1 Raw Station Result	91	82	92	84
Significantly Different from Control		Yes	No	Yes
Percent Control	91.91919192	82.82828283	92.92929293	84.84848485
Toxicity Test Method 2				
Test 2 Raw Control Result				
Test 2 Raw Station Result				
Significantly Different from Control				
Percent Control	x	x	x	x

Benthic Data				
Station ID	P07	P08	P09	P10
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.				
RIVPACS	0.59	0.676	0.434	0.531

Benthic Data Input Page

Station #1	P01
TaxonName	Abundance
Amphideutopus oculatus	6
Amphipholis squamata	1
Chione californiensis	1
Crucibulum spinosum	4
Diopatra ornata	2
Diplocirrus sp SD1	4
Drilonereis mexicana	1
Euphilomedes carcharodonta	1
Glycera americana	1
Heterophoxus oculatus	1
Heteroserolis carinata	1
Laevicardium substriatum	3
Leitoscoloplos pugettensis	9
Lyonsia californica	5
Mediomastus sp	11
Musculista senhousia	3
Nassarius tiarula	4
Odontosyllis phosphorea	1
Ostrea sp	1
Paranemertes californica	2
Piromis sp	1
Pista sp	9
Polydora sp	1
Prionospio (Prionospio) heterobranchia	4
Pseudopolydora paucibranchiata	7
Scolanthus sp A	6
Scoletoma sp C	31
Tagelus affinis	1
Theora lubrica	31
Thracia sp	1

Station #7	P07
TaxonName	Abundance
Amphideutopus oculatus	3
Calocarides sp	1
Diplocirrus sp SD1	1
Dorvillea (Schistomeringos) sp	1
Euphilomedes carcharodonta	3
Exogone lourei	3
Heterophoxus oculatus	1
Leitoscoloplos pugettensis	34
Mediomastus sp	33
Musculista senhousia	11
Oligochaeta	3
Paranemertes californica	1
Paraprionospio pinnata	1
Pista sp	6
Prionospio (Prionospio) heterobranchia	9
Pseudopolydora paucibranchiata	6
Scolanthus sp A	2
Scolelepis sp	14
Scoletoma sp C	58
Theora lubrica	3
Tubulanus sp	2

Station #8	P08
TaxonName	Abundance
Alpheus sp	1
Amphideutopus oculatus	16
Bemlos sp	1
Ceriantharia	1
Crucibulum spinosum	3

Station #2	P02
TaxonName	Abundance
Amphideutopus oculatus	5
Ceriantharia	1
Chione californiensis	1
Diplocirrus sp SD1	12
Exogone lourei	1
Glycera americana	1
Heteroserolis carinata	2
Laevicardium substriatum	1
Leitoscoloplos pugettensis	21
Mediomastus sp	19
Musculista senhousia	8
Nassarius tiarula	2
Odontosyllis phosphorea	1
Pista sp	3
Poecilochaetus sp A	1
Prionospio (Prionospio) heterobranchia	4
Pseudopolydora paucibranchiata	
Rudilemboides sp	2
Scolanthus sp A	2
Scoletoma sp C	27
Theora lubrica	7

Station #3	P03
TaxonName	Abundance
Ambidexter panamensis	3
Amphideutopus oculatus	1
Amphipoda	1
Bemlos sp	1
Ceriantharia	1
Diplocirrus sp SD1	1
Dorvillea (Schistomeringos) sp	5
Edwardsia californica	1
Euphilomedes carcharodonta	3
Exogone lourei	74
Glycera americana	1
Harmothoe imbricata Cmplx	4
Heteroserolis carinata	1
Leitoscoloplos pugettensis	61
Leptochelia dubia	1
Lumbrineris erecta	13
Lyonsia californica	5
Malacoplax californiensis	1
Mediomastus sp	263
Musculista senhousia	103
Odontosyllis phosphorea	1
Oligochaeta	3
Paranemertes californica	2
Phoronida	1
Pista sp	44
Prionospio (Prionospio) heterobranchia	19
Pseudopolydora paucibranchiata	29
Rudilemboides sp	3
Scolanthus sp A	3
Scoletoma sp A	2
Scoletoma sp C	103
Nemertea	2

Station #9	P09
TaxonName	Abundance
Calocarides sp	2
Caulleriella pacifica	1
Chione californiensis	1

Chione californiensis	1
Diplocirrus sp SD1	1
Dorvillea (Schistomeringos) sp	1
Euchone limnicola	2
Exogone lourei	7
Heterophoxus oculatus	3
Leitoscoloplos pugettensis	24
Lineidae	2
Lumbrineris erecta	3
Mediomastus sp	55
Microspio pigmentata	1
Musculista senhousia	43
Nassarius tiarula	9
Nereididae	1
Nicolea sp	1
Paracerceis sculpta	2
Paranemertes californica	1
Pista sp	11
Podocerus brasiliensis	2
Prionospio (Prionospio) heterobranchia	5
Protocirrineris sp A	1
Pseudopolydora paucibranchiata	6
Scolanthus sp A	3
Scoletoma sp C	57
Scyphoproctus oculatus	4

Station #4	P04
TaxonName	Abundance
Alpheus sp	1
Amphideutopus oculatus	8
Bemlos sp	2
Euchone limnicola	1
Euphilomedes carcharodonta	3
Exogone lourei	6
Crucibulum spinosum	1
Euphilomedes carcharodonta	1
Heteromysis odontops	2
Leitoscoloplos pugettensis	3
Lumbrineris erecta	4
Lyonsia californica	3
Mediomastus sp	1
Musculista senhousia	1
Paranemertes californica	1
Pista sp	1
Prionospio (Prionospio) heterobranchia	4
Pseudopolydora paucibranchiata	3
Rudilemboides sp	2
Scoletoma sp A	1
Scoletoma sp C	7

Station #10	P10
TaxonName	Abundance
Amphideutopus oculatus	17
Armandia brevis	1
Bemlos macromanus	1
Calocarides sp	1
Diplocirrus sp SD1	1
Dorvillea (Schistomeringos) sp	1
Euphilomedes carcharodonta	5
Exogone lourei	7
Harmothoe imbricata Cmplx	1
Leitoscoloplos pugettensis	49
Lumbrineris erecta	10
Mediomastus sp	51
Musculista senhousia	29
Nassarius tiarula	4
Odontosyllis phosphorea	1
Paranemertes californica	6

Heterophoxus oculatus	1
Leitoscoloplos pugettensis	52
Lumbrineris erecta	1
Mediomastus sp	27
Musculista senhousia	5
Odontosyllis phosphorea	1
Paranemertes californica	4
Pista sp	3
Poecilochaetus sp A	1
Prionospio (Prionospio) heterobranchia	6
Pseudopolydora paucibranchiata	23
Pyromaia tuberculata	1
Scolanthus sp A	5
Scoletoma sp	1
Scoletoma sp C	53
Spiophanes duplex	1
Theora lubrica	3
Tubulanus sp	1

Station #5	P05
TaxonName	Abundance
Amphideutopus oculatus	1
Aphelochaeta sp	1
Cossura candida	1
Decapoda	1
Euphilomedes carcharodonta	1
Exogone lourei	1
Glycera americana	1
Leitoscoloplos pugettensis	17
Mediomastus sp	23
Musculista senhousia	17
Nassarius tiarula	2
Pista sp	5
Pseudopolydora paucibranchiata	2
Phoronida	1
Pista sp	11
Prionospio (Prionospio) heterobranchia	7
Pseudopolydora paucibranchiata	5
Pyromaia tuberculata	1
Scolanthus sp A	1
Scoletoma sp C	27
Theora lubrica	15

Rudilemboides sp	1
Scoletoma sp C	52
Theora lubrica	1

Station #6	P06
TaxonName	Abundance
Ambidexter panamensis	3
Amphideutopus oculatus	1
Diplocirrus sp SD1	1
Euchone limnicola	1
Exogone lourei	2
Glycera americana	1
Leitoscoloplos pugettensis	21
Mediomastus sp	10
Musculista senhousia	9
Paranemertes californica	1
Pista sp	2
Prionospio (Prionospio) heterobranchia	1
Scolanthus sp A	1
Scoletoma sp	2
Scoletoma sp C	14

All Information taken directly from CA SQO Tool spreadsheets

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Chemistry						
Station ID	P11	P12	P13	P14	P15	P16
CA LRM value	0.76	0.58	0.57	0.66	0.82	0.71
CA LRM category	High Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	High Exposure	High Exposure
CSI value	3.09	2.64	2.22	3	3.34	3
CSI category	High Exposure	Moderate Exposure	Low Exposure	High Exposure	High Exposure	High Exposure
Integrated Chemistry Indicator	High Exposure	Moderate Exposure	Moderate Exposure	High Exposure	High Exposure	High Exposure
Toxicity						
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	High Toxicity	Nontoxic	Moderate Toxicity	Nontoxic	Moderate Toxicity	Moderate Toxicity
Test Method 2						
Toxicity Category						
Test Method 3						
Toxicity Category						
Test Method 4						
Toxicity Category						
Integrated Toxicity Indicator	High Toxicity	Nontoxic	Moderate Toxicity	Nontoxic	Moderate Toxicity	Moderate Toxicity
Benthos						
BRI Score	54.54	46.50	50.21	54.18	58.80	67.64
BRI Category	Moderate Disturbance	Low Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
IBI Score	1	0	1	1	1	1
IBI Category	Low Disturbance	Reference	Low Disturbance	Low Disturbance	Low Disturbance	Low Disturbance
RBI Score	0.11	0.17	0.13	0.18	0.07	0.07
RBI Category	Moderate Disturbance	Low Disturbance	Moderate Disturbance	Low Disturbance	High Disturbance	High Disturbance
RIVPACS Score	0.482	0.675	0.58	0.643	0.338	0.355
RIVPACS Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	Moderate Disturbance	Low Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Station Assessment	Clearly impacted	Unimpacted	Likely impacted	Likely impacted	Clearly impacted	Clearly impacted

DATA INPUT 1 PAGE 1 of 2 Paleta Creek Mouth 11-17

Station Data							
Sample#		1	2	3	4	5	6
Station ID	P11	P12	P13	P14	P15	P16	
Benthic Assemblage	C	C	C	C	C	C	
Chemistry Data (Dry Weight)							
Cadmium (mg/kg)		1.39	0.195	0.173	0.569	1.59	0.894
Copper (mg/kg)		127	134	71.9	138	157	181
Lead (mg/kg)		115.95	52.26	40.68	67.21	159.1	91.42
Mercury (mg/kg)		1.08	0.34	0.25	0.46	0.61	0.56
Zinc (mg/kg)		303.9	180.1	174.4	246.4	373.6	313.8
HPAH (ug/kg)		5540	3470	645	2810	5440	3940
LPAH (ug/kg)		417	444	99	514	400	539
Alpha Chlordane (ug/kg)		7.5	3.6	1.1	5.6	11	9.1
Gamma Chlordane (ug/kg)		14	6.2	2.1	11	23	13
Dieldrin (ug/kg)	x	x	x	x	x	x	
Trans Nonachlor (ug/kg)	x	x	x	x	x	x	
DDDs, total (ug/kg)		16.7	7.2	2.36	9.8	21.8	17.2
DDEs, total (ug/kg)		27	9.2	3.1	14	28	21
DDTs, total (ug/kg)		54.344	17.91	6.3445	28.585	51.21	45.796
4,4'-DDT (ug/kg)		0.7	1.4	0.6	4.7	15	12
PCBs, total (ug/kg)		368.75	128.84	52.773	195.71	374.29	192.27

DATA INPUT 2 PAGE 1 of 2 Paleta Creek Mouth 11-17

Toxicity Data						
Station ID	P11	P12	P13	P14	P15	P16
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	99	99	99	99	99	99
Test 1 Raw Station Result	47	88	79	86	80	79
Significantly Different from Control	Yes	No	Yes	No	Yes	Yes
Percent Control	47.47474747	88.88888889	79.7979798	86.86868687	80.80808081	79.7979798
Toxicity Test Method 2						
Test 2 Raw Control Result						
Test 2 Raw Station Result						
Significantly Different from Control						
Percent Control	x	x	x	x	x	x

Benthic Data						
Station ID	P11	P12	P13	P14	P15	P16
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.						
RIVPACS	0.482	0.675	0.58	0.643	0.338	0.355

All Information taken directly from CA SQO Tool spreadsheets

SQO Output Page 2 of 2 Paleta Creek Mouth 11-17

Chemistry	
Station ID	P17
CA LRM value	0.75
CA LRM category	High Exposure
CSI value	3
CSI category	High Exposure
Integrated Chemistry Indicator	High Exposure
Toxicity	
Test Method 1	Eohaustorius 10-day
Toxicity Category	Low Toxicity
Test Method 2	
Toxicity Category	
Test Method 3	
Toxicity Category	
Test Method 4	
Toxicity Category	
Integrated Toxicity Indicator	Low Toxicity
Benthos	
BRI Score	65.52
BRI Category	Moderate Disturbance
IBI Score	1
IBI Category	Low Disturbance
RBI Score	0.09
RBI Category	Moderate Disturbance
RIVPACS Score	0.378
RIVPACS Category	Moderate Disturbance
Integrated Benthic Indicator	Moderate Disturbance
Station Assessment	Likely impacted

DATA INPUT 1 PAGE 2 of 2 Paleta Creek Mouth 11-17

Station Data		
Sample#		7
Station ID	P17	
Benthic Assemblage	C	
Chemistry Data (Dry Weight)		
Cadmium (mg/kg)		1.27
Copper (mg/kg)		157
Lead (mg/kg)		102.8
Mercury (mg/kg)		0.6
Zinc (mg/kg)		369.5
HPAH (ug/kg)		4440
LPAH (ug/kg)		556
Alpha Chlordane (ug/kg)		7.8
Gamma Chlordane (ug/kg)		6.4
Dieldrin (ug/kg)	x	
Trans Nonachlor (ug/kg)	x	
DDDs, total (ug/kg)		16.8
DDEs, total (ug/kg)		17
DDTs, total (ug/kg)		63.894
4,4'-DDT (ug/kg)		12
PCBs, total (ug/kg)		188.98

DATA INPUT 2 PAGE 2 of 2 Paleta Creek Mouth 11-17

Toxicity Data		
Station ID	P17	
Toxicity Test Method 1	Eohaustorius 10-day	
Test 1 Raw Control Result		99
Test 1 Raw Station Result		84
Significantly Different from Contro	Yes	
Percent Control		84.84848485
Toxicity Test Method 2		
Test 2 Raw Control Result		
Test 2 Raw Station Result		
Significantly Different from Control		
Percent Control	x	

Benthic Data		
Station ID	P17	
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.		
RIVPACS		0.378

Benthic Data Input Page Paleta Creek Mouth 11-17

Station #1	P11
TaxonName	Abundance
Ambidexter panamensis	1
Bulla gouldiana	3
Cryptomya californica	1
Diplocirrus sp SD1	1
Dorvillea (Schistomeringos) sp	1
Euphilomedes carcharodonta	6
Leitoscoloplos pugettensis	12
Lumbrineris erecta	5
Lyonsia californica	4
Mediomastus sp	10
Musculista senhousia	3
Nassarius tiarula	1
Odontosyllis phosphorea	1
Nemertea	1
Paranemertes californica	2
Pista sp	5
Prionospio (Prionospio) heterobranchia	6
Pseudopolydora paucibranchiata	1
Pyromaia tuberculata	1
Scoletoma sp	4
Scoletoma sp C	10
Nemertea	1
Theora lubrica	7
Nemertea	1

Station #2	P12
TaxonName	Abundance
Amphideutopus oculatus	35
Bulla gouldiana	2
Crucibulum spinosum	2

Station #5	P15
TaxonName	Abundance
Ambidexter panamensis	1
Amphideutopus oculatus	2
Aphelochaeta sp	8
Bulla gouldiana	1
Corymorphidae	1
Diplocirrus sp SD1	1
Drilonereis sp	1
Exogone lourei	1
Heteroserolis carinata	1
Leitoscoloplos pugettensis	17
Lumbrineris erecta	6
Macoma nasuta	1
Mediomastus sp	14
Nassarius tiarula	1
Pista sp	1
Prionospio (Prionospio) heterobranchia	3
Scolanthus sp A	1
Scoletoma sp	7
Scoletoma sp A	6
Scoletoma sp C	39

Station #6	P16
TaxonName	Abundance
Ambidexter panamensis	1
Aphelochaeta sp	25
Calocarides sp	1
Euchone limnicola	1
Glycera americana	1
Harmothoe imbricata Cmplx	1
Leitoscoloplos pugettensis	35

Diplocirrus sp SD1	1
Dorvillea (Schistomeringos) sp	6
Drilonereis mexicana	1
Edwardsia californica	2
Eumida longicornuta	1
Euphilomedes carcharodonta	40
Exogone lourei	1
Glycera americana	1
Heteroserolis carinata	2
Kalliapseudes crassus	4
Laevicardium substriatum	1
Leitoscoloplos pugettensis	14
Leptochelia dubia	1
Lumbrineris erecta	2
Lyonsia californica	2
Mediomastus sp	68
Musculista senhousia	7
Nassarius tiarula	2
Neanthes acuminata Cmplx	1
Odontosyllis phosphorea	1
Paranemertes californica	1
Phoronida	4
Pista sp	15
Prionospio (Prionospio) heterobranchia	7
Pseudopolydora paucibranchiata	15
Pyromaia tuberculata	2
Rudilemboides sp	4
Scolanthus sp A	1
Scoletoma sp	4
Scoletoma sp A	7
Scoletoma sp C	40
Theora lubrica	6

Station #3	P13
TaxonName	Abundance
Lumbrineris erecta	5
Mediomastus sp	2
Musculista senhousia	3
Pista sp	23
Prionospio (Prionospio) heterobranchia	5
Schmittius politus	1
Scolanthus sp A	3
Scoletoma sp	2
Scoletoma sp A	1
Scoletoma sp C	41
Theora lubrica	1

Station #7	P17
TaxonName	Abundance
Acteocina inculta	4
Ambidexter panamensis	1
Aphelochaeta sp	10
Bulla gouldiana	11
Caulleriella pacifica	2
Euphilomedes carcharodonta	21
Leitoscoloplos pugettensis	13
Lumbrineris erecta	3
Macoma indentata	1
Mediomastus sp	9
Musculista senhousia	21
Nassarius tiarula	2
Natantia	1
Pista sp	8
Prionospio (Prionospio) heterobranchia	8
Pseudopolydora paucibranchiata	2
Scoletoma sp	4
Scoletoma sp A	1
Scoletoma sp C	16
Theora lubrica	13

Alpheus bellimanus	2
Ambidexter panamensis	2
Amphideutopus oculatus	50
Aphelochaeta sp	4
Bulla gouldiana	1
Chione undatella	1
Crucibulum spinosum	2
Dorvillea (Schistomeringos) sp	8
Edwardsia californica	1
Eteone sp	1
Euphilomedes carcharodonta	4
Exogone lourei	3
Glycera americana	1
Harmothoe imbricata Cmplx	3
Heteroserolis carinata	1
Leitoscoloplos pugettensis	70
Lineidae	1
Lumbrineris erecta	34
Lyonsia californica	2
Mediomastus sp	60
Musculista senhousia	147
Mysidopsis sp	1
Nereis procera	1
Odontosyllis phosphorea	5
Oligochaeta	2
Paranemertes californica	3
Pista sp	178
Prionospio (Prionospio) heterobranchia	38
Protocirrineris sp A	1
Pseudopolydora paucibranchiata	4
Rudilemboides sp	10
Scolanthus sp A	5
Scoletoma sp C	115
Theora lubrica	6

Station #4	P14
TaxonName	Abundance
Acteocina inculta	1
Alpheus bellimanus	3
Ambidexter panamensis	5
Amphideutopus oculatus	21
Aphelochaeta sp	4
Crepidula norrisianum	1
Crucibulum spinosum	1
Diplocirrus sp SD1	1
Edwardsia californica	1
Euphilomedes carcharodonta	1
Exogone lourei	5
Harmothoe imbricata Cmplx	1
Heterophoxus oculatus	1
Heteroserolis carinata	1
Leitoscoloplos pugettensis	64
Lumbrineris erecta	19
Lyonsia californica	1
Macoma nasuta	1
Mayerella banksia	1
Mediomastus sp	58
Musculista senhousia	79
Nassarius tiarula	1
Odontosyllis phosphorea	1
Oligochaeta	1
Paranemertes californica	2
Pista sp	67
Prionospio (Prionospio) heterobranchia	13
Protocirrineris sp A	2
Pseudopolydora paucibranchiata	3
Rudilemboides sp	6
Schmittius politus	1
Scolanthus sp A	3
Scoletoma sp C	104

Scoletoma tetraura Cmplx	2
Theora lubrica	10
Tubulanus sp	1

All Information taken directly from CA SQO Tool spreadsheets

SQO Output Page 1 of 3 Reference Sites for Downtown Anch, Switzer and B St.

Chemistry						
Station ID	2229a	2229b	2229c	2229avg	2238a	2238b
CA LRM value	0.43	0.43	0.43	0.43	0.63	0.63
CA LRM category	Low Exposure	Low Exposure	Low Exposure	Low Exposure	Moderate Exposure	Moderate Exposure
CSI value	1.1	1.1	1.1	1.1	1.55	1.55
CSI category	Minimal Exposure	Minimal Exposure	Minimal Exposure	Minimal Exposure	Minimal Exposure	Minimal Exposure
Integrated Chemistry Indicator	Low Exposure	Low Exposure	Low Exposure	Low Exposure	Low Exposure	Low Exposure
Toxicity						
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Test Method 3						
Toxicity Category						
Test Method 4						
Toxicity Category						
Integrated Toxicity Indicator	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Benthos						
BRI Score	35.26	43.97	39.67	38.98	44.58	46.76
BRI Category	Reference	Low Disturbance	Reference	Reference	Low Disturbance	Low Disturbance
IBI Score	0	0	0	0	1	1
IBI Category	Reference	Reference	Reference	Reference	Low Disturbance	Low Disturbance
RBI Score	0.49	0.31	0.36	0.55	0.12	0.13
RBI Category	Reference	Reference	Reference	Reference	Moderate Disturbance	Moderate Disturbance
RIVPACS Score	0.365	0.365	0.411	0.351	0.351	251
RIVPACS Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	Reference	Low Disturbance	Reference	Reference	Moderate Disturbance	Moderate Disturbance
Station Assessment	Unimpacted	Unimpacted	Unimpacted	Unimpacted	Likely unimpacted	Likely unimpacted

DATA INPUT 1 PAGE 1 of 3 Reference Sites for Downtown Anch, Switzer and B St.

Station Data						
Sample#		1	2	3	4	5	6
Station ID	2229a	2229b	2229c	2229avg	2238a	2238b	
Benthic Assemblage	C	C	C	C	C	C	
Chemistry Data (Dry Weight)							
Cadmium (mg/kg)		0.11	0.11	0.11	0.11	0.23	0.23
Copper (mg/kg)		42	42	42	42	74	74
Lead (mg/kg)		23.9	23.9	23.9	23.9	22.9	22.9
Mercury (mg/kg)		0.32	0.32	0.32	0.32	0.35	0.35
Zinc (mg/kg)		103	103	103	103	222	222
HPAH (ug/kg)		1353.22	1353.22	1353.22	1353.22	138.86	138.86
LPAH (ug/kg)		19.35	19.35	19.35	19.35	15.55	15.55
Alpha Chlordane (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Gamma Chlordane (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Dieldrin (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Trans Nonachlor (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
DDDs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
DDEs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
DDTs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
4,4'-DDT (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
PCBs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1

DATA INPUT 2 PAGE 1 of 3 Reference Sites for Downtown Anch, Switzer and B St.

Toxicity Data						
Station ID	2229a	2229b	2229c	2229avg	2238a	2238b
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	98	98	98	98	98	98
Test 1 Raw Station Result	99	99	99	99	87	87
Significantly Different from Control	no	no	no	no	No	No
Percent Control	101.0204082	101.0204082	101.0204082	101.0204082	88.7755102	88.7755102
Toxicity Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Test 2 Raw Control Result	85	85	85	85	82	82
Test 2 Raw Station Result	89	89	89	89	86	86
Significantly Different from Control	No	No	No	No	No	No
Percent Control	104.7058824	104.7058824	104.7058824	104.7058824	104.8780488	104.8780488

Benthic Data						
Station ID	2229a	2229b	2229c	2229avg	2238a	2238b
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.						
RIVPACS	0.365	0.365	0.411	0.351	0.351	251

SQO Output Page 2 of 3 Reference Sites for Downtown Anch, Switzer and B St.

Chemistry						
Station ID	2243a	2243b	2243c	2433a	2433b	2433c
CA LRM value	0.46	0.46	0.46	0.45	0.45	0.45
CA LRM category	Low Exposure	Low Exposure	Low Exposure	Low Exposure	Low Exposure	Low Exposure
CSI value	1.08	1.08	1.08	1.08	1.08	1.08
CSI category	Minimal Exposure	Minimal Exposure	Minimal Exposure	Minimal Exposure	Minimal Exposure	Minimal Exposure
Integrated Chemistry Indicator	Low Exposure	Low Exposure	Low Exposure	Low Exposure	Low Exposure	Low Exposure
Toxicity						
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Low Toxicity	Low Toxicity	Low Toxicity
Test Method 3						
Toxicity Category						
Test Method 4						
Toxicity Category						
Integrated Toxicity Indicator	Nontoxic	Nontoxic	Nontoxic	Low Toxicity	Low Toxicity	Low Toxicity
Benthos						
BRI Score	43.91	42.42	48.30	38.91	39.29	40.37
BRI Category	Low Disturbance	Low Disturbance	Low Disturbance	Reference	Reference	Low Disturbance
IBI Score	0	1	0	0	0	0
IBI Category	Reference	Low Disturbance	Reference	Reference	Reference	Reference
RBI Score	0.13	0.12	0.11	0.13	0.29	0.29
RBI Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Reference	Reference
RIVPACS Score	0.43	0.43	0.531	0.531	0.386	0.386
RIVPACS Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Low Disturbance	Reference	Low Disturbance
Station Assessment	Likely unimpacted	Likely unimpacted	Likely unimpacted	Likely unimpacted	Unimpacted	Likely unimpacted

DATA INPUT 1 PAGE 2 of 3 Reference Sites for Downtown Anch, Switzer and B St.

Station Data						
Sample#		8	9	10	1	2	3
Station ID	2243a	2243b	2243c	2433a	2433b	2433c	
Benthic Assemblage	C	C	C	C	C	C	
Chemistry Data (Dry Weight)							
Cadmium (mg/kg)		0.09	0.09	0.09	0.21	0.21	0.21
Copper (mg/kg)		50.7	50.7	50.7	46.5	46.5	46.5
Lead (mg/kg)		19.2	19.2	19.2	17.1	17.1	17.1
Mercury (mg/kg)		0.28	0.28	0.28	0.26	0.26	0.26
Zinc (mg/kg)		112	112	112	111	111	111
HPAH (ug/kg)		323.92	323.92	323.92	1052.51	1052.51	1052.51
LPAH (ug/kg)		13.44	13.44	13.44	28.42	28.42	28.42
Alpha Chlordane (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Gamma Chlordane (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Dieldrin (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Trans Nonachlor (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
DDDs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
DDEs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
DDTs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
4,4'-DDT (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
PCBs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1

DATA INPUT 2 PAGE 2 of 3

Toxicity Data						
Station ID	2243a	2243b	2243c	2433a	2433b	2433c
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	98	98	98	98	98	98
Test 1 Raw Station Result	94	94	94	93	93	93
Significantly Different from Control	No	No	No	Yes	Yes	Yes
Percent Control	95.91836735	95.91836735	95.91836735	94.89795918	94.89795918	94.89795918
Toxicity Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Test 2 Raw Control Result	82	82	82	82	82	82
Test 2 Raw Station Result	78	78	78	65	65	65
Significantly Different from Control	No	No	No	Yes	Yes	Yes
Percent Control	95.12195122	95.12195122	95.12195122	79.26829268	79.26829268	79.26829268

Benthic Data						
Station ID	2243a	2243b	2243c	2433a	2433b	2433c
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.						
RIVPACS	0.43	0.43	0.531	0.531	0.386	0.386

SQO Output Page 3 of 3 Reference Sites for Downtown Anch, Switzer and B St.

Chemistry					
Station ID	2435b	2435c	2441a	2441b	2441c
CA LRM value	0.26	0.26	0.53	0.53	0.53
CA LRM category	Minimal Exposure	Minimal Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
CSI value	1.08	1.08	1.41	1.41	1.41
CSI category	Minimal Exposure	Minimal Exposure	Minimal Exposure	Minimal Exposure	Minimal Exposure
Integrated Chemistry Indicator	Minimal Exposure	Minimal Exposure	Low Exposure	Low Exposure	Low Exposure
Toxicity					
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Toxicity Category	Moderate Toxicity	Moderate Toxicity	Nontoxic	Nontoxic	Nontoxic
Test Method 3					
Toxicity Category					
Test Method 4					
Toxicity Category					
Integrated Toxicity Indicator	Low Toxicity	Low Toxicity	Nontoxic	Nontoxic	Nontoxic
Benthos					
BRI Score	25.75	29.38	25.62	29.41	30.65
BRI Category	Reference	Reference	Reference	Reference	Reference
IBI Score	0	0	0	0	1
IBI Category	Reference	Reference	Reference	Reference	Low Disturbance
RBI Score	0.15	0.15	0.14	0.14	0.08
RBI Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	High Disturbance
RIVPACS Score	0.362	0.498	0.542	0.493	0.296
RIVPACS Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	High Disturbance
Integrated Benthic Indicator	Low Disturbance	Low Disturbance	Low Disturbance	Low Disturbance	Moderate Disturbance
Station Assessment	Likely unimpacted	Likely unimpacted	Unimpacted	Unimpacted	Likely unimpacted

DATA INPUT 1 PAGE 3 of 3 Reference Sites for Downtown Anch, Switzer and B St.

Station Data						
Sample#		5	6	7	8	9
Station ID	2435b	2435c	2441a	2441b	2441c	
Benthic Assemblage	C	C	C	C	C	
Chemistry Data (Dry Weight)						
Cadmium (mg/kg)		0.09	0.09	0.31	0.31	0.31
Copper (mg/kg)		19.8	19.8	80.9	80.9	80.9
Lead (mg/kg)		7.93	7.93	22	22	22
Mercury (mg/kg)		0.16	0.16	0.31	0.31	0.31
Zinc (mg/kg)		49.3	49.3	149	149	149
HPAH (ug/kg)		320.52	320.52	1311.52	1311.52	1311.52
LPAH (ug/kg)		9.45	9.45	60.41	60.41	60.41
Alpha Chlordane (ug/kg)		0.1	0.1	0.1	0.1	0.1
Gamma Chlordane (ug/kg)		0.1	0.1	0.1	0.1	0.1
Dieldrin (ug/kg)		0.1	0.1	0.1	0.1	0.1
Trans Nonachlor (ug/kg)		0.1	0.1	0.1	0.1	0.1
DDDs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1
DDEs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1
DDTs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1
4,4'-DDT (ug/kg)		0.1	0.1	0.1	0.1	0.1
PCBs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1

DATA INPUT 2 PAGE 3 of 3 Reference Sites for Downtown Anch, Switzer and B St.

Toxicity Data					
Station ID	2435b	2435c	2441a	2441b	2441c
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	98	98	98	98	98
Test 1 Raw Station Result	95	95	96	96	96
Significantly Different from Control	No	No	No	No	No
Percent Control	96.93877551	96.93877551	97.95918367	97.95918367	97.95918367
Toxicity Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Test 2 Raw Control Result	82	82	82	82	82
Test 2 Raw Station Result	55	55	68	68	68
Significantly Different from Control	Yes	Yes	No	No	No
Percent Control	67.07317073	67.07317073	82.92682927	82.92682927	82.92682927

Benthic Data					
Station ID	2435b	2435c	2441a	2441b	2441c
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.					
RIVPACS	0.362	0.498	0.542	0.493	0.296

Benthic Data Input Page Reference Sites for Downtown Anch, Switzer and B St. BDS REF 1 of 9 Pages

Station #1	2229a
TaxonName	Abundance
Actiniaria	1
Americhelidium sp	2
Amphideutopus oculatus	1
Apoprionospio pygmaea	2
Asthenothaerus diegensis	1
Diplocirrus sp SD1	2
Exogone lourei	3
Fabricinuda limnicola	3
Goniada littorea	1
Leitoscoloplos pugettensis	9
Mediomastus sp	7
Microspio oculata	1
Pennatulacea	1
Pinnixa sp	1
Pista sp	1
Prionospio (Prionospio) heterobranchia	3
Pseudopolydora paucibranchiata	1
Pyromaia tuberculata	1
Rudilemboides sp	5
Scoletoma sp A	10
Scoletoma sp C	5
Spionidae	1
Spiophanes duplex	8
Theora lubrica	1

Station #1	2433a
TaxonName	Abundance
Ampelisca agassizi	1
Ampelisca cristata	1
Amphideutopus oculatus	5
Asteropella slatteryi	1
Chaetozone corona	4
Diplocirrus sp SD1	12
Dorvillea (Dorvillea) sp	1
Euchone limnicola	1
Euphilomedes carcharodonta	1
Exogone lourei	1
Heteroserolis carinata	1
Leitoscoloplos pugettensis	6
Lyonsia californica	2
Macoma carlottensis	1
Mediomastus sp	24
Monticellina cryptica	4
Musculista senhousia	2
Nephtys cornuta	1
Pista sp	2
Prionospio (Prionospio) heterobranchia	1
Pseudopolydora paucibranchiata	2
Rudilemboides sp	1
Scoletoma sp A	7
Scoletoma sp C	10
Spiophanes duplex	5
Theora lubrica	4
Syllis (Typosyllis) nipponica	2

Station #2	2229b
TaxonName	Abundance
Amphideutopus oculatus	6
Apoprionospio pygmaea	1
Aruga sp	1
Asthenothaerus diegensis	2
Cirratulidae	1
Diplocirrus sp SD1	1
Edwardsiidae	1
Fabricinuda limnicola	1
Glycera americana	1
Heterophoxus affinis	2
Leitoscoloplos pugettensis	3
Lyonsia californica	1
Mediomastus sp	8
Pista sp	3
Prionospio (Prionospio) heterobranchia	12
Pseudopolydora paucibranchiata	3
Rudilemboides sp	2
Scoletoma sp	6
Scoletoma sp A	2
Scoletoma sp C	5
Spiophanes duplex	2
Theora lubrica	2

Station #2	2433b
TaxonName	Abundance
Ampelisca agassizi	4
Apoprionospio pygmaea	3
Asthenothaerus diegensis	1
Chaetozone corona	3
Cossura sp A	1
Diplocirrus sp SD1	17
Edwardsiidae	1
Euchone limnicola	3
Euclymeninae	2
Euphilomedes carcharodonta	1
Exogone lourei	1
Heteroserolis carinata	1
Leitoscoloplos pugettensis	4
Lyonsia californica	1
Mediomastus sp	10
Monticellina cryptica	6
Monticellina siblina	1
Musculista senhousia	2
Nemertea	3
Nephtys caecoides	1
Notomastus sp	1
Pista sp	1
Scolelepis sp	2
Scoletoma sp A	10
Scoletoma sp C	23
Spiophanes duplex	9
Theora lubrica	2

BDS REF 2 of 9 Pages

Station #3	2229c
TaxonName	Abundance
Actiniaria	1
Amphideutopus oculatus	1

Station #3	2433c
TaxonName	Abundance
Amphideutopus oculatus	7
Diplocirrus sp SD1	10

Apoprionospio pygmaea	1
Aruga sp	3
Asteropella slatteryi	1
Asthenothaerus diegensis	2
Brania sp	3
Cryptomya californica	1
Cylindroleberididae	1
Diplocirrus sp SD1	2
Edwardsiidae	1
Euchone limnicola	3
Euclymeninae	1
Exogone lourei	3
Hartmanodes hartmanae	1
Leitoscoloplos pugettensis	7
Listriella melanica	1
Lyonsia californica	1
Mediomastus sp	11
Microspio oculata	1
Nephtys cornuta	2
phoronida	3
Pinnixa sp	7
Pista sp	2
Prionospio (Prionospio) heterobranchia	7
Pseudopolydora paucibranchiata	1
Rudilemboides sp	1
Scoletoma sp	3
Scoletoma sp A	8
Scoletoma sp C	8
Spiophanes duplex	12
Theora lubrica	3

Station # 4 deleted on purpose. OK.

Station #5	2238a
TaxonName	Abundance
Amphideutopus oculatus	1
Euchone limnicola	2
Exogone lourei	3
Goniada littorea	1
Heterophoxus affinis	1
Leitoscoloplos pugettensis	12
Lyonsia californica	1
Mediomastus sp	5
Microspio oculata	1
Monticellina cryptica	6
Nemertea	2
Nephtys cornuta	1
Pista sp	1
Prionospio (Prionospio) heterobranchia	1
Pseudopolydora paucibranchiata	1
Rudilemboides sp	6
Scoletoma sp	1
Scoletoma sp A	14
Scoletoma sp C	9
Theora lubrica	3
Syllis (Typosyllis) nipponica	2

Station #4	2435a
TaxonName	Abundance
Americhelidium sp	1

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Armandia brevis	1
Cumella vulgaris	1
Cylindroleberididae	1
Euchone limnicola	1
Exogone lourei	17
Fabricinuda limnicola	1
Heterophoxus affinis	2
Leitoscoloplos pugettensis	3
Macoma nasuta	1
Mayerella banksia	2
Mediomastus sp	35
Megalomma pigmentum	1
Musculista senhousia	9
Neanthes acuminata Cmplx	2
phoronida	1
Prionospio (Prionospio) heterobranchia	7
Rudilemboides sp	8
Rutiderma judayi	3
Scoletoma sp	3
Scoletoma sp C	4
Scyphoproctus oculatus	3
Solen rostriformis	2
Theora lubrica	2

Station #6	2238b
TaxonName	Abundance
Actiniaria	1
Americhelidium sp	1
Ampelisca agassizi	2
Ampelisca cristata	14
Ampelisca milleri	1
Amphideutopus oculatus	4
Amphipholis squamata	1
Apoprionospio pygmaea	1
Armandia brevis	3
Asteropella slatteryi	1
Asthenothaerus diegensis	1
Chaetozone sp	1
Chone sp	1
Euchone limnicola	1
Euclymeninae	3
Exogone lourei	7
Leitoscoloplos pugettensis	4
Listriella melanica	1
Lyonsia californica	1
Mediomastus sp	20
Monticellina cryptica	2
Monticellina siblina	1
Nemertea	2
Pista sp	1
Prionospio (Prionospio) heterobranchia	4
Pyromaia tuberculata	1
Rudilemboides sp	4
Scoletoma sp A	20
Scoletoma sp C	16
Spiophanes bombyx	1
Spiophanes duplex	8

Station #5	2435b
TaxonName	Abundance
Americhelidium sp	1
Ampelisca agassizi	6

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Amphideutopus oculatus	1
Amphipholis squamata	3
Anoplodactylus erectus	1
Armandia brevis	2
Brania sp	1
Cumella vulgaris	1
Cylindroleberididae	6
Edwardsiidae	1
Euchone limnicola	1
Exogone lourei	6
Heterophoxus affinis	1
Leitoscoloplos pugettensis	2
Lyonsia californica	2
Macoma nasuta	3
Mayerella banksia	1
Mediomastus sp	56
Musculista senhousia	2
Neanthes acuminata Cmplx	3
Neanthes sp	2
Paracerceis sp	2
phoronida	1
Pista sp	3
Podocerus cristatus	1
Prionospio (Prionospio) heterobranchia	7
Rudilemboides sp	9
Rutiderma judayi	2
Scoletoma sp	1
Scoletoma sp C	7

Ampelisca cristata	9
Ampelisca milleri	1
Amphideutopus oculatus	6
Aphelochaeta sp	1
Armandia brevis	4
Asteropella slatteryi	1
Diplocirrus sp SD1	1
Euchone limnicola	1
Exogone lourei	7
Leitoscoloplos pugettensis	5
Leptochelia dubia	8
Listriella melanica	1
Mediomastus sp	19
Monticellina cryptica	3
Nemertea	2
Notomastus sp	1
Odostomia sp	1
Phyllodoce hartmanae	1
Prionospio (Prionospio) heterobranchia	5
Rochefortia tumida	1
Rudilemboides sp	13
Rutiderma rostratum	4
Scoletoma sp A	18
Scoletoma sp C	13
Spiophanes duplex	9
Syllis (Typosyllis) nipponica	1
Vargula tsujii	1

Station #7	2238c
TaxonName	Abundance
Amphideutopus oculatus	2
Cylindroleberididae	1
Exogone lourei	19
Fabricinuda limnicola	1
Heterophoxus affinis	1
Leitoscoloplos pugettensis	1
Macoma nasuta	2
Mediomastus sp	62
Musculista senhousia	20
Neanthes acuminata Cmplx	5
Neanthes sp	4
Odontosyllis phosphorea	2
Oligochaeta	5
phoronida	1
Pista sp	5
Prionospio (Prionospio) heterobranchia	4
Rutiderma judayi	3
Scolelepis sp	1
Scoletoma sp	2
Scoletoma sp A	1
Scoletoma sp C	11
Scyphoproctus oculatus	9
Solen rostriformis	1

Station #6	2435c
TaxonName	Abundance
Ampelisca agassizi	2
Ampelisca cristata	2
Ampelisca milleri	1
Ampharetidae	1
Amphicteis scaphobranchiata	1
Amphideutopus oculatus	2
Amphipholis squamata	1
Aphelochaeta sp	1
Apoprionospio pygmaea	2
Armandia brevis	6
Brania sp	1
Dorvillea (Dorvillea) sp	1
Euchone limnicola	1
Euclymeninae	3
Euphilomedes carcharodonta	1
Exogone lourei	26
Glycera americana	1
Heterophoxus affinis	1
Heteroserolis carinata	1
Leptochelia dubia	2
Listriella melanica	2
Macoma carlottensis	1
Mediomastus sp	9
Monticellina siblina	1
Nemertea	1
Pista sp	1
Polydora cornuta	1
Prionospio (Prionospio) heterobranchia	7
Proceraea sp	1
Rudilemboides sp	11
Scoletoma sp	2
Scoletoma sp A	5
Scoletoma sp C	6

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Station #8	2243a
TaxonName	Abundance
Acteocina inculta	3
Actiniaria	1
Amphideutopus oculatus	2
Amphipholis squamata	2
Anoplodactylus erectus	3
Armandia brevis	1
Cylindroleberididae	1
Diastylis sp	1
Dorvillea (Dorvillea) sp	1
Edwardsiidae	3
Euchone limnicola	1
Exogone lourei	14
Fabricinuda limnicola	2
Glycera americana	1
Leitoscoloplos pugettensis	5
Glycera americana	1
Leitoscoloplos pugettensis	5
Lyonsia californica	1
Macoma carlottensis	1
Mayerella banksia	5
Mediomastus sp	7
Melphidippa sp	4
Musculista senhousia	2
Nemertea	2
Odontosyllis phosphorea	4
Pista sp	2
Prionospio (Prionospio) heterobranchia	16
Pseudopolydora paucibranchiata	13
Rudilemboides sp	5
Spiophanes duplex	8
Tagelus subteres	1

Station #7	2441a
TaxonName	Abundance
Ampelisca agassizi	54
Ampelisca cristata	3
Amphideutopus oculatus	31
Anoplodactylus erectus	1
Armandia brevis	14
Asteropella slatteryi	1
Chaetozone corona	1
Cossura pygodactylata	1
Cossura sp A	8
Cylindroleberididae	3
Dorvillea (Dorvillea) sp	5
Edwardsiidae	27
Euchone limnicola	2
Euclymeninae	2
Exogone lourei	3
Glycera americana	1
Laonice cirrata	1
Leitoscoloplos pugettensis	37
Leptochelia dubia	2
Mediomastus sp	19
Monticellina cryptica	1
Neastacilla californica	1
Photis brevipes	1
Turbellaria	1
Prionospio (Prionospio) heterobranchia	5
Pseudopolydora paucibranchiata	1
Rochefortia tumida	3
Rudilemboides sp	25
Scoletoma sp A	9

Scoletoma sp A	3
Scoletoma sp C	6
Solen rostriformis	1
Spiophanes duplex	1
Vargula tsujii	4

Station #9	2243b
TaxonName	Abundance
Americhelidium sp	1
Ampelisca agassizi	1
Amphipholis squamata	1
Cylindroleberididae	1
Exogone lourei	5
Fabricinuda limnicola	1
Glycera americana	1
Leitoscoloplos pugettensis	1
Leptochelia dubia	2
Macoma carlottensis	2
Mayerella banksia	3
Mediomastus sp	1
Melphidippa sp	4
Musculista senhousia	4
Nemertea	0
Odontosyllis phosphorea	1
phoronida	0
Pista sp	4
Prionospio (Prionospio) heterobranchia	4
Pseudopolydora paucibranchiata	8
Rudilemboides sp	1
Scoletoma sp A	1
Scoletoma sp C	4
Scyphoproctus oculatus	4
Solen rostriformis	2

Scoletoma sp C	12
Spiophanes duplex	13
Theora lubrica	3

Station #8	2441b
TaxonName	Abundance
Actiniaria	1
Alcyonaria	1
Ampelisca agassizi	21
Ampelisca cristata	1
Amphideutopus oculatus	12
Amphipholis squamata	1
Armandia brevis	15
Chone sp	1
Cossura sp A	7
Dorvillea (Dorvillea) sp	1
Edwardsiidae	37
Euchone limnicola	3
Euphilomedes carcharodonta	2
Exogone lourei	8
Leitoscoloplos pugettensis	26
Leptochelia dubia	1
Listriella melanica	3
Mediomastus sp	13
Nemertea	3
Nemertea	2
Nephtys cornuta	2
oligochaeta	1
Phyllodoce longipes	1
Prionospio (Prionospio) heterobranchia	2
Prionospio (Minuspio) lighti	1

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Spiophanes duplex	1
Theora lubrica	1

Station #10	2243c
TaxonName	Abundance
Acteocina inculta	5
Amphipholis squamata	3
Anoplodactylus erectus	2
Cylindroleberididae	1
Edwardsiidae	4
Exogone lourei	22
Leitoscoloplos pugettensis	3
Leptochelia dubia	2
Lyonsia californica	1
Macoma carlottensis	2
Mayerella banksia	2
Mediomastus sp	5
Megalomma pigmentum	1
Musculista senhousia	6
Nemertea	1
Odontosyllis phosphorea	2
phoronida	2
Pista sp	1
Prionospio (Prionospio) heterobranchia	1
Pseudopolydora paucibranchiata	12
Rudilemboides sp	21
Rutiderma judayi	1
Scoletoma sp	1
Scoletoma sp A	1
Scoletoma sp C	3
Solen rostriformis	1
Pseudopolydora paucibranchiata	1
Pterocirrus californiensis	1
Pyromaia tuberculata	1
Rochefortia tumida	1
Rudilemboides sp	63
Scoletoma sp A	6
Scoletoma sp C	16
Spiophanes duplex	16
Tellina modesta	2
Theora lubrica	2
Thracia sp	1

Station #9	2441c
TaxonName	Abundance
Ampelisca agassizi	51
Ampelisca cristata	1
Amphideutopus oculatus	5
Armandia brevis	1
Cossura pygodactylata	1
Cylindroleberididae	1
Dorvillea (Dorvillea) sp	2
Edwardsiidae	42
Euchone limnicola	2
Leitoscoloplos pugettensis	15
Mediomastus sp	36
Musculista senhousia	1
Notomastus sp	1
Photis brevipes	2
Prionospio (Prionospio) heterobranchia	3
Prionospio (Minuspio) lighti	1
Rudilemboides sp	15
Scoletoma sp A	10
Scoletoma sp C	14
Spiophanes duplex	5

All Information taken directly from CA SQO Tool spreadsheets

SQO Output Page 1 of 3 Switzer Creek Mouth

Chemistry						
Station ID	SWZ01a	SWZ01b	SWZ01c	SWZ02a	SWZ02b	SWZ02c
CA LRM value	0.84	0.84	0.84	0.7	0.7	0.7
CA LRM category	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure
CSI value	3.3	3.3	3.3	2.4	2.4	2.4
CSI category	High Exposure	High Exposure	High Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
Integrated Chemistry Indicator	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure
Toxicity						
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity
Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Integrated Toxicity Indicator	Low Toxicity	Low Toxicity	Low Toxicity	Low Toxicity	Low Toxicity	Low Toxicity
Benthos						
BRI Score	130.84	71.40	69.39	61.11	64.04	105.98
BRI Category	High Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	High Disturbance
IBI Score	3	3	3	2	3	3
IBI Category	High Disturbance	High Disturbance	High Disturbance	Moderate Disturbance	High Disturbance	High Disturbance
RBI Score	-0.03	x	0.00	x	0.00	0.00
RBI Category	High Disturbance	#VALUE!	High Disturbance	#VALUE!	High Disturbance	High Disturbance
RIVPACS Score	0	0.095	0.095	0.097	0.194	0
RIVPACS Category	High Disturbance	High Disturbance	High Disturbance	High Disturbance	High Disturbance	High Disturbance
Integrated Benthic Indicator	High Disturbance	#VALUE!	High Disturbance	#VALUE!	High Disturbance	High Disturbance
Station Assessment	Likely impacted	#VALUE!	Likely impacted	#VALUE!	Likely impacted	Likely impacted

DATA INPUT 1 PAGE 1 of 3 Switzer Creek Mouth

Station Data						
Sample#	1	2	3	4	5	6
Station ID	SWZ01a	SWZ01b	SWZ01c	SWZ02a	SWZ02b	SWZ02c
Benthic Assemblage	C	C	C	C	C	C
Chemistry Data (Dry Weight)						
Cadmium (mg/kg)	0.89	0.89	0.89	0.5	0.5	0.5
Copper (mg/kg)	236	236	236	86.7	86.7	86.7
Lead (mg/kg)	178.9	178.9	178.9	79.7	79.7	79.7
Mercury (mg/kg)	1.04	1.04	1.04	0.4	0.4	0.4
Zinc (mg/kg)	645	645	645	290	290	290
HPAH (ug/kg)	7910.7	7910.7	7910.7	4351.6	4351.6	4351.6
LPAH (ug/kg)	128.4	128.4	128.4	146.3	146.3	146.3
Alpha Chlordane (ug/kg)	3.4	3.4	3.4	0.1	0.1	0.1
Gamma Chlordane (ug/kg)	3	3	3	0.1	0.1	0.1
Dieldrin (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Trans Nonachlor (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
DDDs, total (ug/kg)	7.6	7.6	7.6	10.3	10.3	10.3
DDEs, total (ug/kg)	23.5	23.5	23.5	17.6	17.6	17.6
DDTs, total (ug/kg)	7.2	7.2	7.2	15.1	15.1	15.1
4,4'-DDT (ug/kg)	3.4	3.4	3.4	10.7	10.7	10.7
PCBs, total (ug/kg)	53.8	53.8	53.8	80.1	80.1	80.1

DATA INPUT 2 PAGE 1 of 3 Switzer Creek Mouth

Toxicity Data						
Station ID	SWZ01a	SWZ01b	SWZ01c	SWZ02a	SWZ02b	SWZ02c
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	98	98	98	98	98	98
Test 1 Raw Station Result	73	73	73	76	76	76
Significantly Different from Contro	Yes	Yes	Yes	Yes	Yes	Yes
Percent Control	74.48979592	74.48979592	74.48979592	77.55102041	77.55102041	77.55102041
Toxicity Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Test 2 Raw Control Result	85	85	85	85	85	85
Test 2 Raw Station Result	74	74	74	66	66	66
Significantly Different from Contro	No	No	No	No	No	No
Percent Control	87.05882353	87.05882353	87.05882353	77.64705882	77.64705882	77.64705882

Benthic Data						
Station ID	SWZ01a	SWZ01b	SWZ01c	SWZ02a	SWZ02b	SWZ02c
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.						
RIVPACS	0	0.095	0.095	0.097	0.194	0

All Information taken directly from CA SQO Tool spreadsheets

SQO Output Page 2 of 3 Switzer Creek Mouth

Chemistry						
Station ID	SWZ03a	SWZ03b	SWZ03c	SWZ04a	SWZ04b	SWZ04c
CA LRM value	0.7	0.7	0.7	0.73	0.73	0.73
CA LRM category	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure
CSI value	2.73	2.73	2.73	2.64	2.64	2.64
CSI category	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
Integrated Chemistry Indicator	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure
Toxicity						
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Low Toxicity	Low Toxicity	Low Toxicity	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity
Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Integrated Toxicity Indicator	Low Toxicity	Low Toxicity	Low Toxicity	Low Toxicity	Low Toxicity	Low Toxicity
Benthos						
BRI Score	54.70	51.10	54.21	66.10	71.11	51.74
BRI Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
IBI Score	1	1	1	2	2	1
IBI Category	Low Disturbance	Low Disturbance	Low Disturbance	Moderate Disturbance	Moderate Disturbance	Low Disturbance
RBI Score	0.07	0.27	0.08	0.00	x	0.31
RBI Category	High Disturbance	Low Disturbance	High Disturbance	High Disturbance	#VALUE!	Reference
RIVPACS Score	0.608	0.405	0.507	0.145	0.097	0.436
RIVPACS Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	High Disturbance	High Disturbance	Moderate Disturbance
Integrated Benthic Indicator	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	High Disturbance	#VALUE!	Moderate Disturbance
Station Assessment	Likely impacted	Likely impacted	Likely impacted	Likely impacted	#VALUE!	Likely impacted

DATA INPUT 1 PAGE 2 of 3 Switzer Creek Mouth Switzer Creek Mouth

Station Data						
Sample#	7	8	9	1	2	3
Station ID	SWZ03a	SWZ03b	SWZ03c	SWZ04a	SWZ04b	SWZ04c
Benthic Assemblage	C	C	C	C	C	C
Chemistry Data (Dry Weight)						
Cadmium (mg/kg)	0.56	0.56	0.56	1.07	1.07	1.07
Copper (mg/kg)	106	106	106	144	144	144
Lead (mg/kg)	92	92	92	94.6	94.6	94.6
Mercury (mg/kg)	0.63	0.63	0.63	0.72	0.72	0.72
Zinc (mg/kg)	228	228	228	346	346	346
HPAH (ug/kg)	12192	12192	12192	15071.7	15071.7	15071.7
LPAH (ug/kg)	304.3	304.3	304.3	256.5	256.5	256.5
Alpha Chlordane (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Gamma Chlordane (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Dieldrin (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Trans Nonachlor (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
DDDs, total (ug/kg)	11.4	11.4	11.4	7.7	7.7	7.7
DDEs, total (ug/kg)	24.8	24.8	24.8	20.6	20.6	20.6
DDTs, total (ug/kg)	6.3	6.3	6.3	4.5	4.5	4.5
4,4'-DDT (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
PCBs, total (ug/kg)	579.3	579.3	579.3	168	168	168

DATA INPUT 2 PAGE 2 of 3 Switzer Creek Mouth Switzer Creek Mouth

Toxicity Data						
Station ID	SWZ03a	SWZ03b	SWZ03c	SWZ04a	SWZ04b	SWZ04c
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	98	98	98	98	98	98
Test 1 Raw Station Result	84	84	84	69	69	69
Significantly Different from Contro	Yes	Yes	Yes	Yes	Yes	Yes
Percent Control	85.71428571	85.71428571	85.71428571	70.40816327	70.40816327	70.40816327
Toxicity Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Test 2 Raw Control Result	85	85	85	85	85	85
Test 2 Raw Station Result	86	86	86	67	67	67
Significantly Different from Contro	No	No	No	No	No	No
Percent Control	101.1764706	101.1764706	101.1764706	78.82352941	78.82352941	78.82352941

Benthic Data						
Station ID	SWZ03a	SWZ03b	SWZ03c	SWZ04a	SWZ04b	SWZ04c
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.						
RIVPACS	0.608	0.405	0.507	0.145	0.097	0.436

SQO Output Page 3 of 3 Switzer Creek Mouth

Chemistry						
Station ID	SWZ05a	SWZ05b	SWZ05c	SWZ06a	SWZ06b	SWZ06c
CA LRM value	0.7	0.7	0.7	0.67	0.67	0.67
CA LRM category	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure
CSI value	2.96	2.96	2.96	2.86	2.86	2.86
CSI category	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
Integrated Chemistry Indicator	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure
Toxicity						
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity
Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Integrated Toxicity Indicator	Low Toxicity	Low Toxicity	Low Toxicity	Low Toxicity	Low Toxicity	Low Toxicity
Benthos						
BRI Score	65.89	45.74	59.38	51.15	73.08	53.01
BRI Category	Moderate Disturbance	Low Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
IBI Score	3	3	3	0	3	1
IBI Category	High Disturbance	High Disturbance	High Disturbance	Reference	High Disturbance	Low Disturbance
RBI Score	x	0.04	0.02	0.26	0.00	0.34
RBI Category	#VALUE!	High Disturbance	High Disturbance	Low Disturbance	High Disturbance	Reference
RIVPACS Score	0.145	0.387	0.29	0.608	0.304	0.507
RIVPACS Category	High Disturbance	Moderate Disturbance	High Disturbance	Moderate Disturbance	High Disturbance	Moderate Disturbance
Integrated Benthic Indicator	#VALUE!	High Disturbance	High Disturbance	Moderate Disturbance	High Disturbance	Moderate Disturbance
Station Assessment	#VALUE!	Likely impacted	Likely impacted	Likely impacted	Likely impacted	Likely impacted

DATA INPUT 1 PAGE 3 of 3

Station Data						
Sample#	4	5	6	7	8	9
Station ID	SWZ05a	SWZ05b	SWZ05c	SWZ06a	SWZ06b	SWZ06c
Benthic Assemblage	C	C	C	C	C	C
Chemistry Data (Dry Weight)						
Cadmium (mg/kg)	0.54	0.54	0.54	0.46	0.46	0.46
Copper (mg/kg)	102	102	102	103	103	103
Lead (mg/kg)	79.2	79.2	79.2	78.7	78.7	78.7
Mercury (mg/kg)	0.46	0.46	0.46	0.45	0.45	0.45
Zinc (mg/kg)	295	295	295	257	257	257
HPAH (ug/kg)	5968	5968	5968	8346.1	8346.1	8346.1
LPAH (ug/kg)	165	165	165	285	285	285
Alpha Chlordane (ug/kg)	3.2	3.2	3.2	4.1	4.1	4.1
Gamma Chlordane (ug/kg)	10.4	10.4	10.4	8.3	8.3	8.3
Dieldrin (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Trans Nonachlor (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
DDDs, total (ug/kg)	5.5	5.5	5.5	1.9	1.9	1.9
DDEs, total (ug/kg)	7.3	7.3	7.3	18.7	18.7	18.7
DDTs, total (ug/kg)	1.1	1.1	1.1	8.3	8.3	8.3
4,4'-DDT (ug/kg)	0.1	0.1	0.1	3.5	3.5	3.5
PCBs, total (ug/kg)	98	98	98	142.3	142.3	142.3

DATA INPUT 2 PAGE 3 of 3

Toxicity Data						
Station ID	SWZ05a	SWZ05b	SWZ05c	SWZ06a	SWZ06b	SWZ06c
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	98	98	98	98	98	98
Test 1 Raw Station Result	73	73	73	70	70	70
Significantly Different from Control	Yes	Yes	Yes	Yes	Yes	Yes
Percent Control	74.48979592	74.48979592	74.48979592	71.42857143	71.42857143	71.42857143
Toxicity Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Test 2 Raw Control Result	85	85	85	85	85	85
Test 2 Raw Station Result	82	82	82	80	80	80
Significantly Different from Control	No	No	No	No	No	No
Percent Control	96.47058824	96.47058824	96.47058824	94.11764706	94.11764706	94.11764706

Benthic Data						
Station ID	SWZ05a	SWZ05b	SWZ05c	SWZ06a	SWZ06b	SWZ06c
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.						
RIVPACS	0.145	0.387	0.29	0.608	0.304	0.507

Benthic Data Input Page

Switzer Creek Mouth Stations

Station #1	SWZ01a
TaxonName	Abundance
Capitella capitata Cmplx	1

Station #2	SWZ01b
TaxonName	Abundance
Ampithoe lacertosa	1
Capitella capitata Cmplx	2
Cossura sp A	1
Deximinidae	2
Dorvillea (Dorvillea) sp	1
Isopoda	1
Musculista senhousia	8
Nebalia sp	1
Oligochaeta	1
Paracerceis cordata	1
Pista sp	1
Prionospio (Prionospio) heterobranchia	3

Station #3	SWZ01c
TaxonName	Abundance
Capitella capitata Cmplx	2

Station #1	SWZ04a
TaxonName	Abundance
Capitella capitata Cmplx	1
Cossura sp A	1
Musculista senhousia	1
Nemertea	2
Pista sp	1
Prionospio (Prionospio) heterobranchia	1
Scoletoma sp C	1
Theora lubrica	2

Station #2	SWZ04b
TaxonName	Abundance
Capitella capitata Cmplx	7
Dorvillea (Dorvillea) sp	2
Musculista senhousia	5
Neanthes sp	1
Nebalia sp	4
Oligochaeta	1
Ophiuroidea	1
Pista sp	1
Podocerus fulanus	1
Prionospio (Prionospio) heterobranchia	1
Theora lubrica	4

Station #3	SWZ04c
TaxonName	Abundance
Actiniaria	1

Cossura sp A	1
Dorvillea (Dorvillea) sp	17
Grandidierella japonica	2
Hemigrapsus oregonensis	1
Nebalia sp	5
Prionospio (Prionospio) heterobranchia	1
Prionospio (Minuspio) lighti	1
Scoletoma sp C	2

Americhelidium sp	3
Asthenothaerus diegensis	1
Cirratulidae	1
Cossura sp A	5
Cylindroleberididae	4
Dorvillea (Dorvillea) sp	18
Euchone limnicola	4
Eupolymnia heterobranchia	2
Exogone lourei	4
Grandidierella japonica	5
Harmothoe imbricata Cmplx	3
Hartmanodes hartmanae	1
Heteroserolis carinata	3
Leitoscoloplos pugettensis	10
Mayerella banksia	1
Mediomastus sp	2
Monticellina sp	1
Musculista senhousia	12
Neanthes sp	2
Oligochaeta	2
Paracerceis cordata	3
Paranthura elegans	1
Phtisica marina	1
Pista sp	16
Platynereis bicanaliculata	1
Prionospio (Prionospio) heterobranchia	12
Protothaca sp	1
Pseudopolydora paucibranchiata	3
Scoletoma sp A	1
Scoletoma sp C	5
Sinelobus stanfordi	3
Spiophanes duplex	2
Theora lubrica	11
Syllis (Typosyllis) nipponica	4

Station #4	SWZ02a
TaxonName	Abundance
Capitella capitata Cmplx	1
Dorvillea (Dorvillea) sp	3
Heteroserolis carinata	1
Prionospio (Prionospio) heterobranchia	1
Theora lubrica	2

Station #5	SWZ02b
TaxonName	Abundance
Capitella capitata Cmplx	1
Cossura pygodactylata	3
Cossura sp A	2
Exogone lourei	3
Glycera americana	1
Grandidierella japonica	1
Heterophoxus affinis	1
Neotrypaea sp	1
Oligochaeta	10
Scoletoma sp C	2
Theora lubrica	1

Station #6	SWZ02c
TaxonName	Abundance
Grandidierella japonica	1

Station #4	SWZ05a
TaxonName	Abundance
Bivalvia	1
Capitella capitata Cmplx	5
Cossura pygodactylata	1
Dorvillea (Dorvillea) sp	2
Eteone sp	2
Leitoscoloplos pugettensis	3
Neanthes sp	1
Pista sp	4
Polydora cornuta	1
Prionospio (Prionospio) heterobranchia	11
Theora lubrica	5

Station #5	SWZ05b
TaxonName	Abundance
Exogone lourei	1
Glycera americana	1
Heteroserolis carinata	2
Mediomastus sp	1
Monticellina cryptica	1
Monticellina sp	1
Pista sp	2
Prionospio (Prionospio) heterobranchia	4
Pseudopolydora paucibranchiata	1
Rudilemboides sp	1
Scoletoma sp C	2
Theora lubrica	4

Station #6	SWZ05c
TaxonName	Abundance
Dorvillea (Dorvillea) sp	9

Station #7	SWZ03a
TaxonName	Abundance
Americhelidium sp	1
Campylaspis rubromaculata	2
Cirriformia sp	1
Cossura sp A	1
Cylindroleberididae	1
Diplocirrus sp SD1	1
Dorvillea (Dorvillea) sp	5
Euchone limnicola	6
Exogone lourei	1
Exogone sp	1
Glycera americana	1
Leitoscoloplos pugettensis	14
Lumbrineridae	1
Mediomastus sp	5
Musculista senhousia	2
Phtisica marina	1
Pista sp	6
Prionospio (Prionospio) heterobranchia	8
Pseudopolydora paucibranchiata	4
Rudilemboides sp	1
Scoletoma sp	1
Exogone lourei	1
Glycera americana	1
Neanthes sp	2
Pista sp	2
Prionospio (Prionospio) heterobranchia	3
Pseudopolydora paucibranchiata	1
Scoletoma sp	1
Scoletoma sp C	4
Theora lubrica	1

Station #7	SWZ06a
TaxonName	Abundance
Asthenothaerus diegensis	1
Cirratulidae	1
Cossura pygodactylata	5
Cylindroleberididae	1
Diplocirrus sp SD1	9
Dorvillea (Dorvillea) sp	9
Euchone limnicola	4
Euphilomedes carcharodonta	1
Exogone lourei	2
Glycera americana	1
Heteroserolis carinata	1
Heterophoxus affinis	1
Leitoscoloplos pugettensis	11
Leptochelia dubia	1
Mediomastus sp	3
Microspio pigmentata	1
Musculista senhousia	4
Oligochaeta	1
Pista sp	12
Prionospio (Prionospio) heterobranchia	8
Pseudopolydora paucibranchiata	9

Scoletoma sp C	5
Chaetopteridae	1
Spiophanes duplex	3
Theora lubrica	12

Station #8	SWZ03b
TaxonName	Abundance
Amphideutopus oculatus	1
Asthenothaerus diegensis	1
Cossura pygodactylata	1
Cossura sp A	4
Diplocirrus sp SD1	2
Dorvillea (Dorvillea) sp	5
Euchone limnicola	2
Exogone lourei	3
Heterophoxus affinis	1
Leitoscoloplos pugettensis	7
Mactromeris sp	1
Mediomastus sp	3
Musculista senhousia	1
Pista sp	6
Prionospio (Prionospio) heterobranchia	5
Pseudopolydora paucibranchiata	7
Pyromaia tuberculata	1
Scyphoproctus oculatus	1
Theora lubrica	11

Station #9	SWZ03c
TaxonName	Abundance
Americhelidium sp	1
Cossura sp A	2
Scoletoma sp	1
Scoletoma sp C	5
Scyphoproctus oculatus	1
Spiophanes duplex	2
Theora lubrica	1

Station #8	SWZ06b
TaxonName	Abundance
Capitella capitata Cmplx	1
Cirriformia sp	1
Cylindroleberididae	1
Diplocirrus sp SD1	2
Dorvillea (Dorvillea) sp	3
Leitoscoloplos pugettensis	1
Monticellina sp	1
Musculista senhousia	1
Pista sp	5
Prionospio (Prionospio) heterobranchia	1
Pseudopolydora paucibranchiata	2
Scoletoma sp	1
Scoletoma sp C	3
Spiophanes duplex	1

Station #9	SWZ06c
TaxonName	Abundance
Americhelidium sp	1
Asthenothaerus diegensis	3

Diplocirrus sp SD1	1
Dorvillea (Dorvillea) sp	19
Euchone limnicola	2
Exogone lourei	2
Harmothoe imbricata Cmplx	1
Heteroserolis carinata	2
Heterophoxus affinis	1
Leitoscoloplos pugettensis	11
Mayerella banksia	1
Mediomastus sp	5
Musculista senhousia	3
Nemertea	2
Gastropoda	1
Pista sp	10
Prionospio (Prionospio) heterobranchia	11
Pseudopolydora paucibranchiata	3
Scoletoma sp	1
Scoletoma sp C	2
Spiophanes duplex	2
Theora lubrica	7

Campylaspis rubromaculata	1
Cirriformia sp	1
Cossura sp A	2
Cylindroleberididae	2
Diplocirrus sp SD1	3
Dorvillea (Dorvillea) sp	5
Euchone limnicola	3
Euphilomedes carcharodonta	1
Exogone lourei	5
Heteroserolis carinata	1
Heterophoxus affinis	1
Leitoscoloplos pugettensis	17
Mediomastus sp	5
Musculista senhousia	2
Nemertea	1
Oligochaeta	1
Pista sp	3
Prionospio (Prionospio) heterobranchia	9
Pseudopolydora paucibranchiata	11
Scoletoma sp A	1
Scoletoma sp C	5
Sinelobus stanfordi	1
Spiophanes duplex	2
Theora lubrica	4
Syllis (Typosyllis) nipponica	1

All Information taken directly from CA SQO Tool spreadsheets

SQO Output Page 1 of 5 Downtown Anchorage

Chemistry						
Station ID	DAC01a	DAC01b	DAC01c	DAC02a	DAC02b	DAC02c
CA LRM value	0.71	0.71	0.71	0.7	0.7	0.7
CA LRM category	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure
CSI value	2.43	2.43	2.43	2.55	2.55	2.55
CSI category	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
Integrated Chemistry Indicator	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure	High Exposure
Toxicity						
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Low Toxicity	Low Toxicity	Low Toxicity	Nontoxic	Nontoxic	Nontoxic
Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Test Method 3						
Toxicity Category						
Test Method 4						
Toxicity Category						
Integrated Toxicity Indicator	Low Toxicity	Low Toxicity	Low Toxicity	Nontoxic	Nontoxic	Nontoxic
Benthos						
BRI Score	49.84	55.15	52.30	51.63	50.13	50.03
BRI Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
IBI Score	1	2	2	0	0	3
IBI Category	Low Disturbance	Moderate Disturbance	Moderate Disturbance	Reference	Reference	High Disturbance
RBI Score	0.08	0.04	0.05	0.08	0.08	0.03
RBI Category	High Disturbance	High Disturbance	High Disturbance	High Disturbance	High Disturbance	High Disturbance
RIVPACS Score	0.39	0.29	0.34	0.49	0.44	0.34
RIVPACS Category	Moderate Disturbance	High Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	Moderate Disturbance	High Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	High Disturbance
Station Assessment	Likely impacted	Likely impacted	Likely impacted	Likely impacted	Likely impacted	Likely impacted

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Station Data						
Sample#		1	2	3	4	5	6
Station ID	DAC01a	DAC01b	DAC01c	DAC02a	DAC02b	DAC02c	
Benthic Assemblage	C	C	C	C	C	C	
Chemistry Data (Dry Weight)							
Cadmium (mg/kg)		0.47	0.47	0.47	0.55	0.55	0.55
Copper (mg/kg)		181	181	181	177	177	177
Lead (mg/kg)		93.5	93.5	93.5	93.1	93.1	93.1
Mercury (mg/kg)		1.02	1.02	1.02	1.24	1.24	1.24
Zinc (mg/kg)		297	297	297	302	302	302
HPAH (ug/kg)		4930.2	4930.2	4930.2	4736.5	4736.5	4736.5
LPAH (ug/kg)		86.4	86.4	86.4	91.4	91.4	91.4
Alpha Chlordane (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Gamma Chlordane (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Dieldrin (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Trans Nonachlor (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
DDDs, total (ug/kg)		0.2	0.2	0.2	0.2	0.2	0.2
DDEs, total (ug/kg)		13.8	13.8	13.8	20.4	20.4	20.4
DDTs, total (ug/kg)		1.3	1.3	1.3	6.3	6.3	6.3
4,4'-DDT (ug/kg)		0.1	0.1	0.1	3.7	3.7	3.7
PCBs, total (ug/kg)		192.9	192.9	192.9	381.1	381.1	381.1

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Toxicity Data						
Station ID	DAC01a	DAC01b	DAC01c		DAC02b	DAC02c
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	98	98	98	98	98	98
Test 1 Raw Station Result	83	83	83	91	91	91
Significantly Different from Control	Yes	Yes	Yes	Yes	Yes	No
Percent Control	84.69387755	84.69387755	84.69387755	92.85714286	92.85714286	92.85714286
Toxicity Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Test 2 Raw Control Result	85	85	85	85	85	85
Test 2 Raw Station Result	89	89	89	96	96	96
Significantly Different from Control	No	No	No	No	No	No
Percent Control	104.7058824	104.7058824	104.7058824	112.9411765	112.9411765	112.9411765

Benthic Data						
Station ID	DAC01a	DAC01b	DAC01c	DAC02a	DAC02b	DAC02c
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.						
RIVPACS	0.39	0.29	0.34	0.49	0.44	0.34

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Chemistry						
Station ID	DAC03a	DAC03b	DAC03c	DAC04a	DAC04b	DAC04c
CA LRM value	0.71	0.71	0.71	0.6	0.6	0.6
CA LRM category	High Exposure	High Exposure	High Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
CSI value	2.58	2.58	2.58	2.37	2.37	2.37
CSI category	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
Integrated Chemistry Indicator	High Exposure	High Exposure	High Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
Toxicity						
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity
Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Test Method 3						
Toxicity Category						
Test Method 4						
Toxicity Category						
Integrated Toxicity Indicator	Nontoxic	Nontoxic	Nontoxic	Low Toxicity	Low Toxicity	Low Toxicity
Benthos						
BRI Score	49.50	61.82	54.66	55.74	50.43	48.30
BRI Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Low Disturbance
IBI Score	2	2	2	1	1	0
IBI Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Low Disturbance	Low Disturbance	Reference
RBI Score	0.22	0.02	0.05	0.03	0.10	0.28
RBI Category	Low Disturbance	High Disturbance	High Disturbance	High Disturbance	Moderate Disturbance	Reference
RIVPACS Score	0.44	0.34	0.15	0.44	0.49	0.49
RIVPACS Category	Moderate Disturbance	Moderate Disturbance	High Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	Moderate Disturbance	Moderate Disturbance	High Disturbance	Moderate Disturbance	Moderate Disturbance	Low Disturbance
Station Assessment	Likely impacted	Likely impacted	Likely impacted	Likely impacted	Likely impacted	Possibly impacted

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Station Data						
Sample#		7	8	9	1	2	3
Station ID	DAC03a	DAC03b	DAC03c	DAC04a	DAC04b	DAC04c	
Benthic Assemblage	C	C	C	C	C	C	
Chemistry Data (Dry Weight)							
Cadmium (mg/kg)		0.57	0.57	0.57	0.345	0.345	0.345
Copper (mg/kg)		146	146	146	88.6	88.6	88.6
Lead (mg/kg)		94.3	94.3	94.3	62.45	62.45	62.45
Mercury (mg/kg)		1.12	1.12	1.12	0.51	0.51	0.51
Zinc (mg/kg)		269	269	269	195	195	195
HPAH (ug/kg)		5411.4	5411.4	5411.4	2415.2	2415.2	2415.2
LPAH (ug/kg)		90.1	90.1	90.1	57.9	57.9	57.9
Alpha Chlordane (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Gamma Chlordane (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Dieldrin (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Trans Nonachlor (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
DDDs, total (ug/kg)		2.6	2.6	2.6	5.7	5.7	5.7
DDEs, total (ug/kg)		19.2	19.2	19.2	13.6	13.6	13.6
DDTs, total (ug/kg)		0.2	0.2	0.2	6.3	6.3	6.3
4,4'-DDT (ug/kg)		0.1	0.1	0.1	4.6	4.6	4.6
PCBs, total (ug/kg)		766.8	766.8	766.8	293.65	293.65	293.65

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Toxicity Data						
Station ID	DAC03a	DAC03b	DAC03c	DAC04a	DAC04b	DAC04c
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	98	98	98	98	98	98
Test 1 Raw Station Result	90	90	90	60	60	60
Significantly Different from Control	No	No	No	Yes	Yes	Yes
Percent Control	91.83673469	91.83673469	91.83673469	61.2244898	61.2244898	61.2244898
Toxicity Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Test 2 Raw Control Result	82	82	82	85	85	85
Test 2 Raw Station Result	90	90	90	77	77	77
Significantly Different from Control	No	No	No	No	No	No
Percent Control	109.7560976	109.7560976	109.7560976	90.58823529	90.58823529	90.58823529

Benthic Data						
Station ID	DAC03a	DAC03b	DAC03c	DAC04a	DAC04b	DAC04c
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.						
RIVPACS	0.44	0.34	0.15	0.44	0.49	0.49

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Chemistry						
Station ID	DAC05a	DAC05b	DAC05c	DAC06a	DAC06b	DAC06c
CA LRM value	0.6	0.6	0.6	0.63	0.63	0.63
CA LRM category	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
CSI value	1.82	1.82	1.82	2.29	2.29	2.29
CSI category	Low Exposure	Low Exposure	Low Exposure	Low Exposure	Low Exposure	Low Exposure
Integrated Chemistry Indicator	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
Toxicity						
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Test Method 3						
Toxicity Category						
Test Method 4						
Toxicity Category						
Integrated Toxicity Indicator	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Benthos						
BRI Score	46.79	44.19	46.81	51.42	59.37	59.91
BRI Category	Low Disturbance	Low Disturbance	Low Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
IBI Score	1	0	0	0	0	3
IBI Category	Low Disturbance	Reference	Reference	Reference	Reference	High Disturbance
RBI Score	0.08	0.09	0.30	0.07	0.05	0.03
RBI Category	High Disturbance	Moderate Disturbance	Reference	High Disturbance	High Disturbance	High Disturbance
RIVPACS Score	0.59	0.44	0.44	0.44	0.44	0.34
RIVPACS Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	Moderate Disturbance	Moderate Disturbance	Low Disturbance	Moderate Disturbance	Moderate Disturbance	High Disturbance
Station Assessment	Possibly impacted	Possibly impacted	Unimpacted	Possibly impacted	Possibly impacted	Possibly impacted

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Station Data						
Sample#		4	5	6	7	8	9
Station ID	DAC05a	DAC05b	DAC05c	DAC06a	DAC06b	DAC06c	
Benthic Assemblage	C	C	C	C	C	C	
Chemistry Data (Dry Weight)							
Cadmium (mg/kg)		0.49	0.49	0.49	0.32	0.32	0.32
Copper (mg/kg)		84.6	84.6	84.6	117	117	117
Lead (mg/kg)		57.3	57.3	57.3	65.9	65.9	65.9
Mercury (mg/kg)		0.46	0.46	0.46	0.88	0.88	0.88
Zinc (mg/kg)		192	192	192	222	222	222
HPAH (ug/kg)		4118.3	4118.3	4118.3	3892.4	3892.4	3892.4
LPAH (ug/kg)		80.7	80.7	80.7	85.4	85.4	85.4
Alpha Chlordane (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Gamma Chlordane (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Dieldrin (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Trans Nonachlor (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
DDDs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
DDEs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
DDTs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
4,4'-DDT (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
PCBs, total (ug/kg)		37.4	37.4	37.4	36.1	36.1	36.1

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Toxicity Data						
Station ID	DAC05a	DAC05b	DAC05c	DAC06a	DAC06b	DAC06c
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	98	98	98	98	98	98
Test 1 Raw Station Result	90	90	90	96	96	96
Significantly Different from Control	No	No	No	No	No	No
Percent Control	91.83673469	91.83673469	91.83673469	97.95918367	97.95918367	97.95918367
Toxicity Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Test 2 Raw Control Result	85	85	85	85	85	85
Test 2 Raw Station Result	89	89	89	100	100	100
Significantly Different from Control	No	No	No	No	No	No
Percent Control	104.7058824	104.7058824	104.7058824	117.6470588	117.6470588	117.6470588

Benthic Data						
Station ID	DAC05a	DAC05b	DAC05c	DAC06a	DAC06b	DAC06c
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.						
RIVPACS	0.59	0.44	0.44	0.44	0.44	0.34

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Chemistry						
Station ID	DAC07a	DAC07b	DAC07c	DAC08a	DAC08b	DAC08c
CA LRM value	0.61	0.61	0.61	0.57	0.57	0.57
CA LRM category	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
CSI value	2.13	2.13	2.13	1.63	1.63	1.63
CSI category	Low Exposure	Low Exposure	Low Exposure	Minimal Exposure	Minimal Exposure	Minimal Exposure
Integrated Chemistry Indicator	Moderate Exposure	Moderate Exposure	Moderate Exposure	Low Exposure	Low Exposure	Low Exposure
Toxicity						
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Low Toxicity	Low Toxicity	Low Toxicity	Moderate Toxicity	Moderate Toxicity	Moderate Toxicity
Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Test Method 3						
Toxicity Category						
Test Method 4						
Toxicity Category						
Integrated Toxicity Indicator	Low Toxicity	Low Toxicity	Low Toxicity	Low Toxicity	Low Toxicity	Low Toxicity
Benthos						
BRI Score	53.97	57.60	54.99	51.38	49.63	55.79
BRI Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
IBI Score	1	1	1	0	0	1
IBI Category	Low Disturbance	Low Disturbance	Low Disturbance	Reference	Reference	Low Disturbance
RBI Score	0.04	0.04	0.05	0.07	0.08	0.23
RBI Category	High Disturbance	High Disturbance	High Disturbance	High Disturbance	High Disturbance	Low Disturbance
RIVPACS Score	0.39	0.44	0.54	0.54	0.49	0.34
RIVPACS Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Station Assessment	Likely impacted	Likely impacted	Likely impacted	Possibly impacted	Possibly impacted	Possibly impacted

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Station Data						
Sample#		1	2	3	4	5	6
Station ID	DAC07a	DAC07b	DAC07c	DAC08a	DAC08b	DAC08c	
Benthic Assemblage	C	C	C	C	C	C	
Chemistry Data (Dry Weight)							
Cadmium (mg/kg)		0.32	0.32	0.32	0.31	0.31	0.31
Copper (mg/kg)		97.2	97.2	97.2	74.7	74.7	74.7
Lead (mg/kg)		66.6	66.6	66.6	56.9	56.9	56.9
Mercury (mg/kg)		0.73	0.73	0.73	0.53	0.53	0.53
Zinc (mg/kg)		188	188	188	167	167	167
HPAH (ug/kg)		3111	3111	3111	3572.9	3572.9	3572.9
LPAH (ug/kg)		60.31	60.31	60.31	66.01	66.01	66.01
Alpha Chlordane (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Gamma Chlordane (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Dieldrin (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Trans Nonachlor (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
DDDs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
DDEs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
DDTs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
4,4'-DDT (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
PCBs, total (ug/kg)		114	114	114	11.5	11.5	11.5

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Toxicity Data						
Station ID	DAC07a	DAC07b	DAC07c	DAC08a	DAC08b	DAC08c
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	98	98	98	98	98	98
Test 1 Raw Station Result	80	80	80	74	74	74
Significantly Different from Control	Yes	Yes	Yes	Yes	Yes	Yes
Percent Control	81.63265306	81.63265306	81.63265306	75.51020408	75.51020408	75.51020408
Toxicity Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Test 2 Raw Control Result	85	85	85	85	85	85
Test 2 Raw Station Result	86	86	86	90	90	90
Significantly Different from Control	No	No	No	No	No	No
Percent Control	101.1764706	101.1764706	101.1764706	105.8823529	105.8823529	105.8823529

Benthic Data						
Station ID	DAC07a	DAC07b	DAC07c	DAC08a	DAC08b	DAC08c
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.						
RIVPACS	0.39	0.44	0.54	0.54	0.49	0.34

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Chemistry			
Station ID	DAC09a	DAC09b	DAC09c
CA LRM value	0.59	0.59	0.59
CA LRM category	Moderate Exposure	Moderate Exposure	Moderate Exposure
CSI value	1.63	1.63	1.63
CSI category	Minimal Exposure	Minimal Exposure	Minimal Exposure
Integrated Chemistry Indicator	Low Exposure	Low Exposure	Low Exposure
Toxicity			
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Low Toxicity	Low Toxicity	Low Toxicity
Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI
Toxicity Category	Nontoxic	Nontoxic	Nontoxic
Test Method 3			
Toxicity Category			
Test Method 4			
Toxicity Category			
Integrated Toxicity Indicator	Low Toxicity	Low Toxicity	Low Toxicity
Benthos			
BRI Score	52.96	49.12	56.47
BRI Category	Moderate Disturbance	Low Disturbance	Moderate Disturbance
IBI Score	1	0	1
IBI Category	Low Disturbance	Reference	Low Disturbance
RBI Score	0.05	0.11	0.26
RBI Category	High Disturbance	Moderate Disturbance	Low Disturbance
RIVPACS Score	0.44	0.59	0.49
RIVPACS Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Station Assessment	Possibly impacted	Possibly impacted	Possibly impacted

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Station Data			
Sample#	7	8	9
Station ID	DAC09a	DAC09b	DAC09c
Benthic Assemblage	C	C	C
Chemistry Data (Dry Weight)			
Cadmium (mg/kg)	0.31	0.31	0.31
Copper (mg/kg)	93.3	93.3	93.3
Lead (mg/kg)	58	58	58
Mercury (mg/kg)	0.69	0.69	0.69
Zinc (mg/kg)	188	188	188
HPAH (ug/kg)	3082.5	3082.5	3082.5
LPAH (ug/kg)	54.6	54.6	54.6
Alpha Chlordane (ug/kg)	0.1	0.1	0.1
Gamma Chlordane (ug/kg)	0.1	0.1	0.1
Dieldrin (ug/kg)	0.1	0.1	0.1
Trans Nonachlor (ug/kg)	0.1	0.1	0.1
DDDs, total (ug/kg)	0.1	0.1	0.1
DDEs, total (ug/kg)	0.1	0.1	0.1
DDTs, total (ug/kg)	0.1	0.1	0.1
4,4'-DDT (ug/kg)	0.1	0.1	0.1
PCBs, total (ug/kg)	6.7	6.7	6.7

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Toxicity Data			
Station ID	DAC09a	DAC09b	DAC09c
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	98	98	98
Test 1 Raw Station Result	88	88	88
Significantly Different from Control	Yes	Yes	Yes
Percent Control	89.79591837	89.79591837	89.79591837
Toxicity Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI
Test 2 Raw Control Result	85	85	85
Test 2 Raw Station Result	79	79	79
Significantly Different from Control	No	No	No
Percent Control	92.94117647	92.94117647	92.94117647

Benthic Data			
Station ID	DAC09a	DAC09b	DAC09c
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.			
RIVPACS	0.44	0.59	0.49

Benthic Data Input Page Downtown Anchorage 7 pages

Station #1	DAC01a
TaxonName	Abundance
Acteocina inculta	1
Americhelidium sp	2
Campylaspis rubromaculata	1
Cirratulidae	1
Cossura sp A	2
Diplocirrus sp SD1	3
Dorvillea (Dorvillea) sp	5
Euphilomedes carcharodonta	1
Leitoscoloplos pugettensis	4
Mediomastus sp	7
Monticellina sp	1
Musculista senhousia	4
Prionospio (Prionospio) heterobranchia	2
Rudilemboides sp	1
Scoletoma sp A	2
Scoletoma sp C	9
Theora lubrica	1
Syllis (Typosyllis) nipponica	4

Station #2	DAC01b
TaxonName	Abundance
Alpheus californiensis	1
Cossura sp A	3
Diplocirrus sp SD1	6
Exogone lourei	2
Heteroserolis carinata	1
Leitoscoloplos pugettensis	7
Mediomastus sp	3

Station #1	DAC04a
TaxonName	Abundance
Amphideutopus oculatus	1
Capitella capitata Cmplx	2
Cossura sp A	12
Cylindroleberididae	1
Diplocirrus sp SD1	2
Dorvillea (Dorvillea) sp	1
Euphilomedes carcharodonta	1
Exogone lourei	3
Heteroserolis carinata	1
Leitoscoloplos pugettensis	5
Mediomastus sp	2
Musculista senhousia	2
Nemertea	0
Oligochaeta	3
Prionospio (Prionospio) heterobranchia	8
Pseudopolydora paucibranchiata	13
Scoletoma sp A	7
Scoletoma sp C	14
Theora lubrica	9

Station #2	DAC04b
TaxonName	Abundance
Americhelidium sp	1
Amphideutopus oculatus	1
Campylaspis rubromaculata	1
Cirratulidae	1
Cossura pygodactylata	1
Cossura sp A	13
Diplocirrus sp SD1	3

Station #1	DAC07a
TaxonName	Abundance
Diplocirrus sp SD1	9
Dorvillea (Dorvillea) sp	1
Euphilomedes carcharodonta	1
Leitoscoloplos pugettensis	8
Mediomastus sp	1
Musculista senhousia	1
Prionospio (Prionospio) heterobranchia	6
Pseudopolydora paucibranchiata	14
Scoletoma sp	1
Scoletoma sp A	3
Scoletoma sp C	16
Spiophanes duplex	2
Theora lubrica	3
Syllis (Typosyllis) nipponica	1

Station #2	DAC07b
TaxonName	Abundance
Caprellidea	2
Diplocirrus sp SD1	5
Euchone limnicola	3
Exogone lourei	2
Leitoscoloplos pugettensis	19
Mediomastus sp	1
Musculista senhousia	6

Musculista senhousia	5
Prionospio (Prionospio) heterobranchia	2
Pseudopolydora paucibranchiata	23
Scoletoma sp A	1
Scoletoma sp C	12
Syllis (Typosyllis) nipponica	1

Station #3	DAC01c
TaxonName	Abundance
Cossura pygodactylata	1
Cossura sp A	3
Diplocirrus sp SD1	3
Euphilomedes carcharodonta	1
Exogone lourei	6
Harmothoe imbricata Cmplx	1
Heteroserolis carinata	1
Leitoscoloplos pugettensis	9
Mediomastus sp	4
Musculista senhousia	6
Nemertea	1
Polydora cornuta	2
Prionospio (Prionospio) heterobranchia	6
Dorvillea (Dorvillea) sp	6
Eteone sp	1
Euchone limnicola	7
Euphilomedes carcharodonta	1
Exogone lourei	10
Leitoscoloplos pugettensis	15
Mayerella banksia	1
Mediomastus sp	6
Musculista senhousia	7
Pinnixa sp	1
Pista sp	2
Prionospio (Prionospio) heterobranchia	25
Pseudopolydora paucibranchiata	89
Scoletoma sp A	4
Scoletoma sp C	16
Spiophanes duplex	4
Theora lubrica	3

Station #3	DAC04c
TaxonName	Abundance
Amphideutopus oculatus	3
Asthenothaerus diegensis	1
Cossura pygodactylata	1
Cossura sp A	27
Diplocirrus sp SD1	4
Dorvillea (Dorvillea) sp	2
Euphilomedes carcharodonta	1
Exogone lourei	3
Leitoscoloplos pugettensis	11
Mediomastus sp	1
Musculista senhousia	8
Nemertea	2
Pista sp	4
Pista sp	1
Prionospio (Prionospio) heterobranchia	7
Pseudopolydora paucibranchiata	30
Scoletoma sp A	4
Scoletoma sp C	9
Spiophanes duplex	1
Theora lubrica	5
Syllis (Typosyllis) nipponica	1

Station #3	DAC07c
TaxonName	Abundance
Americhelidium sp	1
Campylaspis rubromaculata	1
Diplocirrus sp SD1	3
Edwardsiidae	1
Euchone limnicola	1
Glycera americana	1
Heterophoxus affinis	1
Leitoscoloplos pugettensis	12
Mediomastus sp	4
Musculista senhousia	3
Oligochaeta	1
Pista sp	1
Turbellaria	1

Pseudopolydora paucibranchiata	10
Scoletoma sp C	19
Syllis (Typosyllis) nipponica	2

Station #4	DAC02a
TaxonName	Abundance
Acteocina inculta	1
Campylaspis rubromaculata	1
Cossura pygodactylata	4
Diplocirrus sp SD1	8
Dorvillea (Dorvillea) sp	1
Eteone sp	1
Exogone lourei	12
Glycera americana	1
Leitoscoloplos pugettensis	6
Mediomastus sp	4
Musculista senhousia	13
Philine sp	3
Pista sp	3
Prionospio (Prionospio) heterobranchia	14
Pseudopolydora paucibranchiata	14
Scoletoma sp A	7
Scoletoma sp C	16
Scoletoma tetraura Cmplx	2
Spiophanes duplex	2
Theora lubrica	1
Syllis (Typosyllis) nipponica	1

Station #4	DAC05a
TaxonName	Abundance
Amphideutopus oculatus	6
Campylaspis rubromaculata	1
Cossura sp A	1
Diplocirrus sp SD1	7
Dorvillea (Dorvillea) sp	5
Euchone limnicola	4
Exogone lourei	2
Glycera americana	1
Leitoscoloplos pugettensis	18
Lyonsia californica	3
Mayerella banksia	2
Mediomastus sp	3
Musculista senhousia	3
Nemertea	1
Nemertea	1
Oligochaeta	1
Pista sp	2
Turbellaria	2
Prionospio (Prionospio) heterobranchia	9
Pseudopolydora paucibranchiata	79
Rudilemboides sp	4
Scoletoma sp A	8
Scoletoma sp C	10
Prionospio (Prionospio) heterobranchia	19
Pseudopolydora paucibranchiata	44
Rudilemboides sp	1
Scoletoma sp A	1
Scoletoma sp C	21
Spiophanes duplex	2
Theora lubrica	8
Trachycardium quadragenarium	1

Station #4	DAC08a
TaxonName	Abundance
Amphideutopus oculatus	1
Campylaspis rubromaculata	1
Capitella capitata Cmplx	1
Diplocirrus sp SD1	8
Dorvillea (Dorvillea) sp	4
Euphilomedes carcharodonta	1
Exogone lourei	12
Heteroserolis carinata	3
Heterophoxus affinis	1
Leitoscoloplos pugettensis	22
Lumbrineridae	1
Lyonsia californica	2
Mediomastus sp	4
Musculista senhousia	4
Nemertea	2
Nemertea	1
Oligochaeta	1
Pista sp	5
Prionospio (Prionospio) heterobranchia	16
Pseudopolydora paucibranchiata	59
Scoletoma sp A	5
Scoletoma sp C	29
Scoletoma tetraura Cmplx	1
Prionospio (Prionospio) heterobranchia	6
Pseudopolydora paucibranchiata	22
Scoletoma sp A	2
Scoletoma sp C	14
Spiophanes duplex	6
Theora lubrica	6

Station #5	DAC02b
TaxonName	Abundance
Americhelidium sp	2
Brania sp	1
Cossura sp A	1
Cylindroleberididae	3
Diplocirrus sp SD1	3
Dorvillea (Dorvillea) sp	14
Euchone limnicola	1
Exogone lourei	14
Heteroserolis carinata	1
Leitoscoloplos pugettensis	6
Listriella melanica	1
Mediomastus sp	2
Musculista senhousia	15
Pista sp	3
Platynereis bicanaliculata	1
Prionospio (Prionospio) heterobranchia	27
Pseudopolydora paucibranchiata	32
Scoletoma sp A	2
Scoletoma sp C	20
Spiophanes duplex	3
Theora lubrica	1
Syllis (Typosyllis) nipponica	2

Station #6	DAC02c
TaxonName	Abundance

Spiophanes duplex	4
Theora lubrica	4
Syllis (Typosyllis) nipponica	1

Station #5	DAC05b
TaxonName	Abundance
Americhelidium sp	1
Amphideutopus oculatus	4
Diplocirrus sp SD1	6
Dorvillea (Dorvillea) sp	5
Eteone sp	2
Euchone limnicola	7
Euclymeninae	1
Exogone lourei	9
Harmothoe imbricata Cmplx	1
Leitoscoloplos pugettensis	17
Leptochelia dubia	1
Lyonsia californica	2
Mediomastus sp	5
Musculista senhousia	1
Pinnixa sp	1
Pista sp	6
Prionospio (Prionospio) heterobranchia	15
Pseudopolydora paucibranchiata	28
Rudilemboides sp	5
Scoletoma sp A	5
Scoletoma sp C	15
Spiophanes duplex	4

Station #6	DAC05c
TaxonName	Abundance

Spiophanes duplex	1
Theora lubrica	3
Syllis (Typosyllis) nipponica	1
Vargula tsujii	1

Station #5	DAC08b
TaxonName	Abundance
Americhelidium sp	2
Campylaspis rubromaculata	3
Cylindroleberididae	1
Diplocirrus sp SD1	3
Dorvillea (Dorvillea) sp	3
Edwardsiidae	1
Euchone limnicola	3
Exogone lourei	11
Leitoscoloplos pugettensis	10
Leptochelia dubia	1
Mediomastus sp	6
Musculista senhousia	6
Nemertea	1
Pista sp	7
Polydora cornuta	1
Prionospio (Prionospio) heterobranchia	14
Pseudopolydora paucibranchiata	38
Scoletoma sp A	2
Scoletoma sp C	18
Spiophanes duplex	2
Theora lubrica	3
Vargula tsujii	1

Station #6	DAC08c
TaxonName	Abundance

Americhelidium sp	1
Cossura sp A	1
Cylindroleberididae	1
Diplocirrus sp SD1	3
Exogone lourei	9
Leitoscoloplos pugettensis	3
Musculista senhousia	4
Odontosyllis phosphorea	1
Prionospio (Prionospio) heterobranchia	6
Pseudopolydora paucibranchiata	3
Scoletoma sp A	6
Scoletoma sp C	9
Spiophanes duplex	1

Station #7	DAC03a
TaxonName	Abundance
Asthenothaerus diegensis	1
Cossura sp A	2
Diplocirrus sp SD1	1
Euchone limnicola	3
Euphilomedes carcharodonta	1
Glycera americana	1

Americhelidium sp	4
Amphideutopus oculatus	2
Asthenothaerus diegensis	1
Cylindroleberididae	1
Diplocirrus sp SD1	1
Dorvillea (Dorvillea) sp	1
Eteone sp	1
Euchone limnicola	10
Exogone lourei	2
Harmothoe imbricata Cmplx	1
Leitoscoloplos pugettensis	8
Leptochelia dubia	1
Lyonsia californica	1
Mediomastus sp	1
Mediomastus sp	5
Musculista senhousia	3
Philine sp	1
Pista sp	3
Prionospio (Prionospio) heterobranchia	17
Pseudopolydora paucibranchiata	63
Rudilemboides sp	4
Scolelepis sp	1
Scoletoma sp A	6
Scoletoma sp C	13
Theora lubrica	1

Station #7	DAC06a
TaxonName	Abundance
Acteocina sp	1
Anoplodactylus erectus	1
Campylaspis rubromaculata	1
Diplocirrus sp SD1	1
Eteone sp	2
Exogone lourei	1

Asthenothaerus diegensis	1
Diplocirrus sp SD1	1
Dorvillea (Dorvillea) sp	1
Leitoscoloplos pugettensis	16
Mediomastus sp	2
Musculista senhousia	4
Nemertea	1
Pista sp	3
Prionospio (Prionospio) heterobranchia	6
Pseudopolydora paucibranchiata	7
Scoletoma sp A	3
Scoletoma sp C	12
Theora lubrica	7

Station #7	DAC09a
TaxonName	Abundance
Brania sp	1
Cossura sp A	1
Diplocirrus sp SD1	3
Euchone limnicola	2
Heterophoxus affinis	3
Leitoscoloplos pugettensis	4

Leitoscoloplos pugettensis	1
Oligochaeta	2
Pinnixa sp	1
Pista sp	1
Prionospio (Prionospio) heterobranchia	14
Pseudopolydora paucibranchiata	12
Rudilemboides sp	1
Scoletoma sp A	2
Scoletoma sp C	20

Station #8	DAC03b
TaxonName	Abundance
Alpheus californiensis	1
Cossura sp A	5
Diplocirrus sp SD1	2
Euchone limnicola	2
Exogone lourei	1
Leitoscoloplos pugettensis	5
Mediomastus sp	6
Musculista senhousia	1
Oligochaeta	1
Pista sp	1
Prionospio (Prionospio) heterobranchia	7
Pseudopolydora paucibranchiata	5
Scoletoma sp C	18
Scoletoma tetraura Cmplx	1

Exogone lourei	1
Leitoscoloplos pugettensis	12
Lyonsia californica	2
Mediomastus sp	1
Musculista senhousia	10
Pista sp	1
Prionospio (Prionospio) heterobranchia	6
Pseudopolydora paucibranchiata	32
Rudilemboides sp	2
Scoletoma sp A	2
Scoletoma sp C	15
Spiophanes duplex	0
Theora lubrica	5
Syllis (Typosyllis) nipponica	1

Station #8	DAC06b
TaxonName	Abundance
Diplocirrus sp SD1	1
Euchone limnicola	1
Exogone lourei	3
Heteroserolis carinata	1
Leitoscoloplos pugettensis	11
Leitoscoloplos pugettensis	11
Mediomastus sp	1
Musculista senhousia	13
Pista sp	3
Prionospio (Prionospio) heterobranchia	1
Pseudopolydora paucibranchiata	16
Scoletoma sp A	2
Scoletoma sp C	11
Spiophanes duplex	1
Theora lubrica	1

Mediomastus sp	2
Musculista senhousia	2
Nemertea	1
Pseudopolydora paucibranchiata	6
Scoletoma sp A	4
Scoletoma sp C	8
Spiophanes duplex	1
Theora lubrica	1

Station #8	DAC09b
TaxonName	Abundance
Amphideutopus oculatus	1
Campylaspis rubromaculata	1
Diplocirrus sp SD1	1
Euchone limnicola	4
Exogone lourei	4
Glycera americana	1
Heteroserolis carinata	1
Heterophoxus affinis	2
Leitoscoloplos pugettensis	21
Lyonsia californica	2
Mediomastus sp	1
Musculista senhousia	2
Macoma nasuta	1
Pista sp	1
Prionospio (Prionospio) heterobranchia	5
Pseudopolydora paucibranchiata	54
Rudilemboides sp	1

Station #9	DAC03c
TaxonName	Abundance
Campylaspis rubromaculata	1
Cossura pygodactylata	1
Cossura sp A	1
Dorvillea (Dorvillea) sp	1
Leitoscoloplos pugettensis	2
Musculista senhousia	14
Pseudopolydora paucibranchiata	2
Pyromaia tuberculata	1
Scoletoma sp C	14
Scoletoma tetraura Cmplx	1
Theora lubrica	2

Station #9	DAC06c
TaxonName	Abundance
Diplocirrus sp SD1	2
Euchone limnicola	2
Leitoscoloplos pugettensis	8
Mediomastus sp	2
Musculista senhousia	4
Pista sp	1
Prionospio (Prionospio) heterobranchia	7
Pseudopolydora paucibranchiata	17
Scoletoma sp A	2
Scoletoma sp C	18
Spiophanes duplex	1
Syllis (Typosyllis) nipponica	1

Scoletoma sp A	2
Scoletoma sp C	9
Spiophanes duplex	2
Theora lubrica	11

Station #9	DAC09c
TaxonName	Abundance
Acteocina sp	1
Anoplodactylus erectus	1
Asthenothaerus diegensis	1
Cossura sp A	1
Diplocirrus sp SD1	6
Dorvillea (Dorvillea) sp	1
Eteone sp	1
Euchone limnicola	7
Euphilomedes carcharodonta	1
Heterophoxus affinis	3
Leitoscoloplos pugettensis	21
Lyonsia californica	1
Mediomastus sp	4
Musculista senhousia	2
Prionospio (Prionospio) heterobranchia	10
Pseudopolydora paucibranchiata	32
Scoletoma sp C	10
Theora lubrica	7
Syllis (Typosyllis) nipponica	1

All Information taken directly from CA SQO Tool spreadsheets

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Chemistry						
Station ID	BST01a	BST01b	BST01c	BST02a	BST02b	BST02c
CA LRM value	0.69	0.69	0.69	0.63	0.63	0.63
CA LRM category	High Exposure	High Exposure	High Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
CSI value	2.15	2.15	2.15	2.01	2.01	2.01
CSI category	Low Exposure	Low Exposure	Low Exposure	Low Exposure	Low Exposure	Low Exposure
Integrated Chemistry Indicator	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
Toxicity						
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Low Toxicity	Low Toxicity	Low Toxicity
Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Low Toxicity	Low Toxicity	Low Toxicity
Test Method 3						
Toxicity Category						
Test Method 4						
Toxicity Category						
Integrated Toxicity Indicator	Nontoxic	Nontoxic	Nontoxic	Low Toxicity	Low Toxicity	Low Toxicity
Benthos						
BRI Score	49.67	47.12	45.56	48.78	50.90	48.45
BRI Category	Moderate Disturbance	Low Disturbance	Low Disturbance	Low Disturbance	Moderate Disturbance	Low Disturbance
IBI Score	1	0	1	1	2	1
IBI Category	Low Disturbance	Reference	Low Disturbance	Low Disturbance	Moderate Disturbance	Low Disturbance
RBI Score	0.26	0.06	0.08	0.26	0.03	0.26
RBI Category	Low Disturbance	High Disturbance	High Disturbance	Low Disturbance	High Disturbance	Low Disturbance
RIVPACS Score	0.406	0.457	0.304	0.406	0.507	0.507
RIVPACS Category	Moderate Disturbance	Moderate Disturbance	High Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Low Disturbance	Moderate Disturbance	Low Disturbance
Station Assessment	Possibly impacted	Possibly impacted	Possibly impacted	Possibly impacted	Likely impacted	Possibly impacted

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Station ID	BST01a	BST01b	BST01c	BST02a	BST02b	BST02c
Benthic Assemblage	C	C	C	C	C	C
Chemistry Data (Dry Weight)						
Cadmium (mg/kg)	0.7	0.7	0.7	0.24	0.24	0.24
Copper (mg/kg)	174	174	174	129	129	129
Lead (mg/kg)	71.8	71.8	71.8	48.2	48.2	48.2
Mercury (mg/kg)	0.86	0.86	0.86	0.77	0.77	0.77
Zinc (mg/kg)	287	287	287	220	220	220
HPAH (ug/kg)	22553.3	22553.3	22553.3	14899.9	14899.9	14899.9
LPAH (ug/kg)	239.4	239.4	239.4	549.11	549.11	549.11
Alpha Chlordane (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Gamma Chlordane (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Dieldrin (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Trans Nonachlor (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
DDDs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
DDEs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
DDTs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
4,4'-DDT (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
PCBs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1

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Toxicity Data

Station ID	BST01a	BST01b	BST01c	BST02a	BST02b	BST02c
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	98	98	98	98	98	98
Test 1 Raw Station Result	93	93	93	88	88	88
Significantly Different from Contro	No	No	No	Yes	Yes	Yes
Percent Control	94.89795918	94.89795918	94.89795918	89.79591837	89.79591837	89.79591837
Toxicity Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Test 2 Raw Control Result	82	82	82	82	82	82
Test 2 Raw Station Result	82	82	82	70	70	70
Significantly Different from Contro	No	No	No	Yes	Yes	Yes
Percent Control	100	100	100	85.36585366	85.36585366	85.36585366

Benthic Data

Station ID	BST01a	BST01b	BST01c	BST02a	BST02b	BST02c
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.						
RIVPACS	0.406	0.457	0.304	0.406	0.507	0.507

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Chemistry						
Station ID	BST03a	BST03b	BST03c	BST04a	BST04b	BST04c
CA LRM value	0.56	0.56	0.56	0.86	0.86	0.86
CA LRM category	Moderate Exposure	Moderate Exposure	Moderate Exposure	High Exposure	High Exposure	High Exposure
CSI value	1.64	1.64	1.64	2.2	2.2	2.2
CSI category	Minimal Exposure	Minimal Exposure	Minimal Exposure	Low Exposure	Low Exposure	Low Exposure
Integrated Chemistry Indicator	Low Exposure	Low Exposure	Low Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
Toxicity						
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Low Toxicity	Low Toxicity	Low Toxicity	Nontoxic	Nontoxic	Nontoxic
Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Test Method 3						
Toxicity Category						
Test Method 4						
Toxicity Category						
Integrated Toxicity Indicator	Low Toxicity	Low Toxicity	Low Toxicity	Nontoxic	Nontoxic	Nontoxic
Benthos						
BRI Score	49.14	45.73	40.45	42.42	40.00	50.27
BRI Category	Low Disturbance	Low Disturbance	Low Disturbance	Low Disturbance	Low Disturbance	Moderate Disturbance
IBI Score	0	0	0	0	0	3
IBI Category	Reference	Reference	Reference	Reference	Reference	High Disturbance
RBI Score	0.10	0.11	0.32	0.09	0.10	0.02
RBI Category	Moderate Disturbance	Moderate Disturbance	Reference	Moderate Disturbance	Moderate Disturbance	High Disturbance
RIVPACS Score	0.494	0.642	0.642	0.445	0.545	0.346
RIVPACS Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	Moderate Disturbance	Moderate Disturbance	Low Disturbance	Moderate Disturbance	Moderate Disturbance	High Disturbance
Station Assessment	Possibly impacted	Possibly impacted	Likely unimpacted	Possibly impacted	Possibly impacted	Possibly impacted

DATA INPUT 1 PAGE 2 of 6 B Street/ Broadway Piers Sites

Sample#				1	2	3
Station ID	BST03a	BST03b	BST03c	BST04a	BST04b	BST04c
Benthic Assemblage	C	C	C	C	C	C
Chemistry Data (Dry Weight)						
Cadmium (mg/kg)	0.18	0.18	0.18	1.05	1.05	1.05
Copper (mg/kg)	92	92	92	211	211	211
Lead (mg/kg)	35.6	35.6	35.6	80.7	80.7	80.7
Mercury (mg/kg)	0.56	0.56	0.56	5.17	5.17	5.17
Zinc (mg/kg)	167	167	167	270	270	270
HPAH (ug/kg)	7941.1	7941.1	7941.1	17483.2	17483.2	17483.2
LPAH (ug/kg)	218.9	218.9	218.9	297.1	297.1	297.1
Alpha Chlordane (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Gamma Chlordane (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Dieldrin (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Trans Nonachlor (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
DDDs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
DDEs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
DDTs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
4,4'-DDT (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
PCBs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1

DATA INPUT 2 PAGE 2 of 6 B Street/ Broadway Piers Sites

Toxicity Data

Station ID	BST03a	BST03b	BST03c	BST04a	BST04b	BST04c
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	98	98	98	98	98	98
Test 1 Raw Station Result	89	89	89	95	95	95
Significantly Different from Cc	Yes	Yes	Yes	No	No	No
Percent Control	90.81632653	90.81632653	90.81632653	97	97	97
Toxicity Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Test 2 Raw Control Result	82	82	82	82	82	82
Test 2 Raw Station Result	79	79	79	79	79	79
Significantly Different from Cc	No	No	No	No	No	No
Percent Control	96.34146341	96.34146341	96.34146341	96	96	96

Benthic Data

Station ID	BST03a	BST03b	BST03c	BST04a	BST04b	BST04c
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.						
RIVPACS	0.494	0.642	0.642	0.445	0.545	0.346

SQO Output Page 3 of 6 B Street/ Broadway Piers Sites

Chemistry						
Station ID	BST05a	BST05b	BST05c	BST06a	BST06b	BST06c
CA LRM value	0.56	0.56	0.56	0.55	0.55	0.55
CA LRM category	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
CSI value	1.65	1.65	1.65	1.63	1.63	1.63
CSI category	Minimal Exposure	Minimal Exposure	Minimal Exposure	Minimal Exposure	Minimal Exposure	Minimal Exposure
Integrated Chemistry Indicator	Low Exposure	Low Exposure	Low Exposure	Low Exposure	Low Exposure	Low Exposure
Toxicity						
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Low Toxicity	Low Toxicity	Low Toxicity	Nontoxic	Nontoxic	Nontoxic
Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Test Method 3						
Toxicity Category						
Test Method 4						
Toxicity Category						
Integrated Toxicity Indicator	Low Toxicity	Low Toxicity	Low Toxicity	Nontoxic	Nontoxic	Nontoxic
Benthos						
BRI Score	47.84	49.52	56.86	43.64	42.48	40.78
BRI Category	Low Disturbance	Moderate Disturbance	Moderate Disturbance	Low Disturbance	Low Disturbance	Low Disturbance
IBI Score	2	1	1	1	0	1
IBI Category	Moderate Disturbance	Low Disturbance	Low Disturbance	Low Disturbance	Reference	Low Disturbance
RBI Score	0.05	0.08	0.05	0.29	0.08	0.08
RBI Category	High Disturbance	High Disturbance	High Disturbance	Reference	High Disturbance	High Disturbance
RIVPACS Score	0.395	0.493	0.444	0.444	0.444	0.444
RIVPACS Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Low Disturbance	Moderate Disturbance	Moderate Disturbance
Station Assessment	Possibly impacted	Possibly impacted	Possibly impacted	Unimpacted	Likely unimpacted	Likely unimpacted

DATA INPUT 1 PAGE 3 of 6 B Street/ Broadway Piers Sites

Sample#	4	5	6	7	8	9
Station ID	BST05a	BST05b	BST05c	BST06a	BST06b	BST06c
Benthic Assemblage	C	C	C	C	C	C

Chemistry Data (Dry Weight)

Cadmium (mg/kg)	0.175	0.175	0.175	0.22	0.22	0.22
Copper (mg/kg)	91.1	91.1	91.1	86.2	86.2	86.2
Lead (mg/kg)	35.8	35.8	35.8	34.2	34.2	34.2
Mercury (mg/kg)	0.915	0.915	0.915	0.75	0.75	0.75
Zinc (mg/kg)	166	166	166	158	158	158
HPAH (ug/kg)	7681.6	7681.6	7681.6	3952.2	3952.2	3952.2
LPAH (ug/kg)	374.4	374.4	374.4	85.41	85.41	85.41
Alpha Chlordane (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Gamma Chlordane (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Dieldrin (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Trans Nonachlor (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
DDDs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
DDEs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
DDTs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
4,4'-DDT (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
PCBs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1

DATA INPUT 2 PAGE 3 of 6 B Street/ Broadway Piers Sites

Toxicity Data

Station ID	BST05a	BST05b	BST05c	BST06a	BST06b	BST06c
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	98	98	98	98	98	98
Test 1 Raw Station Result	86	86	86	96	96	96
Significantly Different from Co	Yes	Yes	Yes	No	No	No
Percent Control	88	88	88	98	98	98
Toxicity Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Test 2 Raw Control Result	82	82	82	82	82	82
Test 2 Raw Station Result	80	80	80	90	90	90
Significantly Different from Co	No	No	No	Yes	Yes	Yes
Percent Control	98	98	98	110	110	110

Benthic Data

Station ID	BST05a	BST05b	BST05c	BST06a	BST06b	BST06c
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.						
RIVPACS	0.395	0.493	0.444	0.444	0.444	0.444

SQO Output Page 4 of 6 B Street/ Broadway Piers Sites

Chemistry						
Station ID	BST07a	BST07b	BST07c	BST08a	BST08b	BST08c
CA LRM value	0.79	0.79	0.79	0.66	0.66	0.66
CA LRM category	High Exposure	High Exposure	High Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
CSI value	2.15	2.15	2.15	2	2	2
CSI category	Low Exposure	Low Exposure	Low Exposure	Low Exposure	Low Exposure	Low Exposure
Integrated Chemistry Indicator	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
Toxicity						
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Low Toxicity	Low Toxicity	Low Toxicity	Nontoxic	Nontoxic	Nontoxic
Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Test Method 3						
Toxicity Category						
Test Method 4						
Toxicity Category						
Integrated Toxicity Indicator	Low Toxicity	Low Toxicity	Low Toxicity	Nontoxic	Nontoxic	Nontoxic
Benthos						
BRI Score	52.47	49.53	45.35	49.13	52.05	44.06
BRI Category	Moderate Disturbance	Moderate Disturbance	Low Disturbance	Low Disturbance	Moderate Disturbance	Low Disturbance
IBI Score	3	1	1	1	1	1
IBI Category	High Disturbance	Low Disturbance	Low Disturbance	Low Disturbance	Low Disturbance	Low Disturbance
RBI Score	0.01	0.05	0.38	0.28	0.06	0.08
RBI Category	High Disturbance	High Disturbance	Reference	Reference	High Disturbance	High Disturbance
RIVPACS Score	0.247	0.494	0.543	0.543	0.444	0.494
RIVPACS Category	High Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	High Disturbance	Moderate Disturbance	Low Disturbance	Low Disturbance	Moderate Disturbance	Moderate Disturbance
Station Assessment	Likely impacted	Likely impacted	Possibly impacted	Unimpacted	Possibly impacted	Possibly impacted

DATA INPUT 1 PAGE 4 of 6 B Street/ Broadway Piers Sites

Sample#	1	2	3	4	5	6
Station ID	BST07a	BST07b	BST07c	BST08a	BST08b	BST08c
Benthic Assemblage	C	C	C	C	C	C
Chemistry Data (Dry Weight)						
Cadmium (mg/kg)	0.43	0.43	0.43	0.38	0.38	0.38
Copper (mg/kg)	183	183	183	116	116	116
Lead (mg/kg)	71.5	71.5	71.5	45.2	45.2	45.2
Mercury (mg/kg)	1.02	1.02	1.02	0.75	0.75	0.75
Zinc (mg/kg)	297	297	297	252	252	252
HPAH (ug/kg)	59268	59268	59268	12396.8	12396.8	12396.8
LPAH (ug/kg)	942.21	942.21	942.21	275.91	275.91	275.91
Alpha Chlordane (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Gamma Chlordane (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Dieldrin (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Trans Nonachlor (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
DDDs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
DDEs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
DDTs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
4,4'-DDT (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
PCBs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1

DATA INPUT 2 PAGE 4 of 6 B Street/ Broadway Piers Sites

Toxicity Data						
Station ID	BST07a	BST07b	BST07c	BST08a	BST08b	BST08c
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	98	98	98	98	98	98
Test 1 Raw Station Result	87	87	87	97	97	97
Significantly Different from Contro	Yes	Yes	Yes	No	No	No
Percent Control	88.7755102	88.7755102	88.7755102	98.97959184	98.97959184	98.97959184
Toxicity Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Test 2 Raw Control Result	82	82	82	82	82	82
Test 2 Raw Station Result	82	82	82	82	82	82
Significantly Different from Contro	No	No	No	No	No	No
Percent Control	100	100	100	100	100	100

Benthic Data						
Station ID	BST07a	BST07b	BST07c	BST08a	BST08b	BST08c
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.						
RIVPACS	0.247	0.494	0.543	0.543	0.444	0.494

SQO Output Page 5 of 6 B Street/ Broadway Piers Sites

Chemistry						
Station ID	BST09a	BST09b	BST09c	BST10a	BST10b	BST10c
CA LRM value	0.56	0.56	0.56	0.56	0.56	0.56
CA LRM category	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
CSI value	1.68	1.68	1.68	1.65	1.65	1.65
CSI category	Minimal Exposure	Minimal Exposure	Minimal Exposure	Minimal Exposure	Minimal Exposure	Minimal Exposure
Integrated Chemistry Indicator	Low Exposure	Low Exposure	Low Exposure	Low Exposure	Low Exposure	Low Exposure
Toxicity						
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Test Method 3						
Toxicity Category						
Test Method 4						
Toxicity Category						
Integrated Toxicity Indicator	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Benthos						
BRI Score	36.80	41.28	42.88	48.52	39.96	46.55
BRI Category	Reference	Low Disturbance	Low Disturbance	Low Disturbance	Low Disturbance	Low Disturbance
IBI Score	0	1	3	0	2	2
IBI Category	Reference	Low Disturbance	High Disturbance	Reference	Moderate Disturbance	Moderate Disturbance
RBI Score	0.12	0.07	0.05	0.10	0.10	0.05
RBI Category	Moderate Disturbance	High Disturbance	High Disturbance	Moderate Disturbance	Moderate Disturbance	High Disturbance
RIVPACS Score	0.505	0.404	0.354	0.543	0.395	0.395
RIVPACS Category	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	Low Disturbance	Moderate Disturbance	High Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Station Assessment	Unimpacted	Likely unimpacted	Likely unimpacted	Likely unimpacted	Likely unimpacted	Likely unimpacted

DATA INPUT 1 PAGE 5 of 6 B Street/ Broadway Piers Sites

Sample#	7	8	9	1	2	3
Station ID	BST09a	BST09b	BST09c	BST10a	BST10b	BST10c
Benthic Assemblage	C	C	C	C	C	C
Chemistry Data (Dry Weight)						
Cadmium (mg/kg)	0.22	0.22	0.22	0.175	0.175	0.175
Copper (mg/kg)	80.9	80.9	80.9	91.1	91.1	91.1
Lead (mg/kg)	31	31	31	35.8	35.8	35.8
Mercury (mg/kg)	0.5	0.5	0.5	0.915	0.915	0.915
Zinc (mg/kg)	166	166	166	166	166	166
HPAH (ug/kg)	16660	16660	16660	7681.6	7681.6	7681.6
LPAH (ug/kg)	2372.31	2372.31	2372.31	374.4	374.4	374.4
Alpha Chlordane (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Gamma Chlordane (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Dieldrin (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
Trans Nonachlor (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
DDDs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
DDEs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
DDTs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
4,4'-DDT (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1
PCBs, total (ug/kg)	0.1	0.1	0.1	0.1	0.1	0.1

DATA INPUT 2 PAGE 5 of 6 B Street/ Broadway Piers Sites

Toxicity Data						
Station ID	BST09a	BST09b	BST09c	BST10a	BST10b	BST10c
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	98	98	98	98	98	98
Test 1 Raw Station Result	90	90	90	93	93	93
Significantly Different from Control	Yes	Yes	Yes	Yes	Yes	Yes
Percent Control	91.83673469	91.83673469	91.83673469	94.89795918	94.89795918	94.89795918
Toxicity Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Test 2 Raw Control Result	82	82	82	82	82	82
Test 2 Raw Station Result	79	79	79	82	82	82
Significantly Different from Control	No	No	No	No	No	No
Percent Control	96.34146341	96.34146341	96.34146341	100	100	100

Benthic Data						
Station ID	BST09a	BST09b	BST09c	BST10a	BST10b	BST10c
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.						
RIVPACS	0.505	0.404	0.354	0.543	0.395	0.395

SQO Output Page 6 of 6 B Street/ Broadway Piers Sites

Chemistry						
Station ID	BST11a	BST11b	BST11c	BST12a	BST12b	BST12c
CA LRM value	0.52	0.52	0.52	0.6	0.6	0.6
CA LRM category	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
CSI value	1.63	1.63	1.63	1.8	1.8	1.8
CSI category	Minimal Exposure	Minimal Exposure	Minimal Exposure	Low Exposure	Low Exposure	Low Exposure
Integrated Chemistry Indicator	Low Exposure	Low Exposure	Low Exposure	Moderate Exposure	Moderate Exposure	Moderate Exposure
Toxicity						
Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Toxicity Category	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Test Method 3						
Toxicity Category						
Test Method 4						
Toxicity Category						
Integrated Toxicity Indicator	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic	Nontoxic
Benthos						
BRI Score	44.32	38.29	38.41	50.81	41.01	43.39
BRI Category	Low Disturbance	Reference	Reference	Moderate Disturbance	Low Disturbance	Low Disturbance
IBI Score	0	1	0	0	1	0
IBI Category	Reference	Low Disturbance	Reference	Reference	Low Disturbance	Reference
RBI Score	0.28	0.08	0.13	0.10	0.07	0.09
RBI Category	Reference	High Disturbance	Moderate Disturbance	Moderate Disturbance	High Disturbance	Moderate Disturbance
RIVPACS Score	0.304	0.557	0.507	0.355	0.406	0.406
RIVPACS Category	High Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Integrated Benthic Indicator	Low Disturbance	Moderate Disturbance	Low Disturbance	Moderate Disturbance	Moderate Disturbance	Moderate Disturbance
Station Assessment	Unimpacted	Likely unimpacted	Unimpacted	Possibly impacted	Possibly impacted	Possibly impacted

DATA INPUT 1 PAGE 6 of 6 B Street/ Broadway Piers Sites

Sample#		4	5	6	7	8	9
Station ID	BST11a	BST11b	BST11c	BST12a	BST12b	BST12c	
Benthic Assemblage	C	C	C	C	C	C	
Chemistry Data (Dry Weight)							
Cadmium (mg/kg)		0.16	0.16	0.16	0.19	0.19	0.19
Copper (mg/kg)		73.4	73.4	73.4	106	106	106
Lead (mg/kg)		29.8	29.8	29.8	41.2	41.2	41.2
Mercury (mg/kg)		0.53	0.53	0.53	0.83	0.83	0.83
Zinc (mg/kg)		142	142	142	194	194	194
HPAH (ug/kg)		3340.9	3340.9	3340.9	4408.6	4408.6	4408.6
LPAH (ug/kg)		49.23	49.23	49.23	85.03	85.03	85.03
Alpha Chlordane (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Gamma Chlordane (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Dieldrin (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
Trans Nonachlor (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
DDDs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
DDEs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
DDTs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
4,4'-DDT (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1
PCBs, total (ug/kg)		0.1	0.1	0.1	0.1	0.1	0.1

DATA INPUT 2 PAGE 6 of 6 B Street/ Broadway Piers Sites

Toxicity Data						
Station ID	BST11a	BST11b	BST11c	BST12a	BST12b	BST12c
Toxicity Test Method 1	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day	Eohaustorius 10-day
Test 1 Raw Control Result	98	98	98	98	98	98
Test 1 Raw Station Result	97	97	97	95	95	95
Significantly Different from Control	Yes	Yes	Yes	Yes	Yes	Yes
Percent Control	98.97959184	98.97959184	98.97959184	96.93877551	96.93877551	96.93877551
Toxicity Test Method 2	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI	Mytilus SWI
Test 2 Raw Control Result	82	82	82	82	82	82
Test 2 Raw Station Result	80	80	80	76	76	76
Significantly Different from Control	No	No	No	No	No	No
Percent Control	97.56097561	97.56097561	97.56097561	92.68292683	92.68292683	92.68292683

Benthic Data						
Station ID	BST11a	BST11b	BST11c	BST12a	BST12b	BST12c
Enter data for calculation of benthic indicies other than RIVPACS on next sheet. Enter RIVPACS index value below.						
RIVPACS	0.304	0.557	0.507	0.355	0.406	0.406

Benthic Data Input Page
B Street/ Broadway Piers Sites

Station #1	BST01a
TaxonName	Abundance
Americhelidium sp	4
Aphelochaeta sp	1
Asthenothaerus diegensis	1
Cirratulidae	2
Cylindroleberididae	1
Diplocirrus sp SD1	7
Dorvillea (Dorvillea) sp	5
Eteone sp	1
Euchone limnicola	1
Eupolymnia heterobranchia	3
Harmothoe imbricata Cmplx	2
Heterophoxus affinis	2
Leitoscoloplos pugettensis	15
Mediomastus sp	24
Monticellina cryptica	1
Musculista senhousia	1
Nemertea	2
Oligochaeta	1
Phtisica marina	1
Pinnixa sp	1
Pista sp	4
Prionospio (Prionospio) heterobranchia	15
Pseudopolydora paucibranchiata	63
Pyromaia tuberculata	1
Scoletoma sp A	7
Scoletoma sp C	20
Spiophanes duplex	7
Theora lubrica	16

Benthic Data Input Page

Station #1	BST04a
TaxonName	Abundance
Amphideutopus oculatus	1
Asteropella slatteryi	1
Cirratulidae	1
Cossura sp A	1
Cylindroleberididae	1
Diopatra splendidissima	1
Diplocirrus sp SD1	1
Eteone sp	1
Exogone lourei	1
Heterophoxus affinis	1
Leitoscoloplos pugettensis	2
Mediomastus sp	6
Monticellina cryptica	1
Musculista senhousia	3
Mytilus sp	1
Pinnixa sp	3
Pista sp	2
Prionospio (Prionospio) heterobranchia	5
Pseudopolydora paucibranchiata	19
Scoletoma sp A	2
Scoletoma sp C	7
Spiophanes duplex	1
Theora lubrica	4

Benthic Data Input Page 1 of 8 Pages

Station #1	BST07a
TaxonName	Abundance
Chone sp	1
Diplocirrus sp SD1	2
Mediomastus sp	8
Pista sp	1
Scoletoma sp A	6
Scoletoma sp C	3
Spiophanes duplex	2

Americhelidium sp	1
Aruga sp	1
Asteropella slatteryi	1
Cylindroleberididae	2
Diplocirrus sp SD1	2
Dorvillea (Dorvillea) sp	1
Leitoscoloplos pugettensis	4
Mediomastus sp	10
Monticellina cryptica	2
Prionospio (Prionospio) heterobranchia	3
Pseudopolydora paucibranchiata	5
Scoletoma sp A	8
Scoletoma sp C	5
Spiophanes duplex	1
Tagelus subteres	2
Theora lubrica	1

Amphideutopus oculatus	1
Apoprionospio pygmaea	1
Asteropella slatteryi	1
Cylindroleberididae	1
Diplocirrus sp SD1	1
Dorvillea (Dorvillea) sp	6
Euchone limnicola	1
Fabricinuda limnicola	2
Heterophoxus affinis	1
Leitoscoloplos pugettensis	6
Leptochelia dubia	1
Mediomastus sp	4
Musculista senhousia	1
Mytilus sp	1
Prionospio (Prionospio) heterobranchia	10
Pseudopolydora paucibranchiata	12
Rudilemboides sp	5
Scoletoma sp A	6
Scoletoma sp C	11
Spiophanes duplex	14
Theora lubrica	1

Asteropella slatteryi	1
Capitella capitata Cmplx	1
Cylindroleberididae	1
Diopatra splendidissima	1
Diplocirrus sp SD1	16
Dorvillea (Dorvillea) sp	6
Euchone limnicola	2
Exogone lourei	2
Harmothoe imbricata Cmplx	2
Heterophoxus affinis	7
Leitoscoloplos pugettensis	14
Mediomastus sp	15
Microspio pigmentata	1
Musculista senhousia	15
Nemertea	2
Odontosyllis phosphorea	1
Pista sp	6
Prionospio (Prionospio) heterobranchia	6
Pseudopolydora paucibranchiata	28
Rudilemboides sp	4
Scoletoma sp A	7
Scoletoma sp C	18
Scoletoma tetraura Cmplx	3
Spiophanes duplex	10

Station #3	BST01c
TaxonName	Abundance
Americhelidium sp	1
Chaetozone sp	1
Chone sp	2
Cylindroleberididae	1
Diopatra splendidissima	1
Diplocirrus sp SD1	17
Dorvillea (Dorvillea) sp	4
Heterophoxus affinis	3
Leitoscoloplos pugettensis	8
Mediomastus sp	7
Musculista senhousia	1
Nemertea	1
Pinnixa sp	4
Pista sp	1
Prionospio (Prionospio) heterobranchia	15
Pseudopolydora paucibranchiata	6
Pyromaia tuberculata	2
Scoletoma sp A	3
Scoletoma sp C	13
Scyphoproctus oculatus	1
Theora lubrica	4

Station #3	BST04c
TaxonName	Abundance
Asteropella slatteryi	2
Cylindroleberididae	1
Diplocirrus sp SD1	2
Dorvillea (Dorvillea) sp	4
Euchone limnicola	1
Mediomastus sp	7
Nemertea	1
Nemertea	1
Prionospio (Prionospio) heterobranchia	10
Pseudopolydora paucibranchiata	6
Scoletoma sp A	1
Scoletoma sp C	11

Station #3	BST07c
TaxonName	Abundance
Alpheus californiensis	1
Americhelidium sp	2
Asthenothaerus diegensis	3
Cylindroleberididae	2
Diplocirrus sp SD1	9
Dorvillea (Dorvillea) sp	18
Euchone limnicola	1
Exogone lourei	2
Harmothoe sp	1
Hartmanodes hartmanae	1
Leitoscoloplos pugettensis	15
Mayerella banksia	1
Mediomastus sp	14
Monticellina sp	1
Musculista senhousia	9
Nemertea	1
Nemertea	1
Odontosyllis phosphorea	2
Philine sp	1
Pinnixa sp	1
Pista sp	9
Prionospio (Prionospio) heterobranchia	15
Pseudopolydora paucibranchiata	96
Rudilemboides sp	3
Scoletoma sp A	9
Scoletoma sp C	13
Solen rostriformis	1
Spiophanes duplex	7
Theora lubrica	7

Station #4	BST02a
TaxonName	Abundance
Apoprionospio pygmaea	1
Armandia brevis	1
Asthenothaerus diegensis	1
Diplocirrus sp SD1	17
Euchone limnicola	1
Glycera americana	1
Heteroserolis carinata	2
Heterophoxus affinis	1
Leitoscoloplos pugettensis	7
Mediomastus sp	7
Musculista senhousia	3
Pista sp	5
Polydora cornuta	1
Praxillella sp	1
Prionospio (Prionospio) heterobranchia	7
Pseudopolydora paucibranchiata	9
Scoletoma sp A	6
Scoletoma sp C	14
Spiophanes duplex	5
Theora lubrica	21

Station #5	BST02b
TaxonName	Abundance
Actiniaria	1
Cossura sp A	1
Diplocirrus sp SD1	11
Dorvillea (Dorvillea) sp	4
Euchone limnicola	2

Station #4	BST05a
TaxonName	Abundance
Actiniaria	1
Amphideutopus oculatus	1
Diplocirrus sp SD1	17
Dorvillea (Dorvillea) sp	3
Heterophoxus affinis	1
Leitoscoloplos pugettensis	5
Mediomastus sp	1
Nephtys cornuta	2
Pista sp	1
Praxillella sp	1
Prionospio (Prionospio) heterobranchia	4
Pseudopolydora paucibranchiata	3
Scoletoma sp A	8
Scoletoma sp C	5
Spiophanes duplex	3
Theora lubrica	10

Station #5	BST05b
TaxonName	Abundance
Alpheus californiensis	1
Aphrodita sp	2
Diplocirrus sp SD1	18
Eteone sp	1
Euchone limnicola	1

Station #4	BST08a
TaxonName	Abundance
Americhelidium sp	2
Asthenothaerus diegensis	1
Cossura sp A	1
Diplocirrus sp SD1	18
Dorvillea (Dorvillea) sp	2
Euchone limnicola	8
Exogone lourei	1
Heterophoxus affinis	3
Leitoscoloplos pugettensis	14
Lyonsia californica	1
Mediomastus sp	13
Musculista senhousia	2
Nemertea	1
Nephtys cornuta	1
Pista sp	3
Prionospio (Prionospio) heterobranchia	12
Pseudopolydora paucibranchiata	21
Rudilemboides sp	6
Scoletoma sp A	8
Scoletoma sp C	12
Spiophanes duplex	11
Theora lubrica	10

Station #5	BST08b
TaxonName	Abundance
Cossura sp A	1
Diplocirrus sp SD1	27
Euchone limnicola	1
Heterophoxus affinis	2
Leitoscoloplos pugettensis	8

Exogone lourei	1
Glycera americana	1
Leitoscoloplos pugettensis	11
Mediomastus sp	4
Nemertea	1
Oligochaeta	1
Phtisica marina	1
Pinnixa sp	1
Pista sp	1
Prionospio (Prionospio) heterobranchia	4
Pseudopolydora paucibranchiata	3
Scoletoma sp A	5
Scoletoma sp C	14
Spiophanes duplex	1
Theora lubrica	12

Station #6	BST02c
TaxonName	Abundance
Asteropella slatteryi	1
Asthenothaerus diegensis	1
Campylaspis rubromaculata	1
Chaetozone corona	1
Diplocirrus sp SD1	13
Dorvillea (Dorvillea) sp	1
Euchone limnicola	2
Exogone lourei	1
Heterophoxus affinis	1
Leitoscoloplos pugettensis	8
Mediomastus sp	8
Musculista senhousia	1
Oligochaeta	2
Pista sp	14
Prionospio (Prionospio) heterobranchia	6
Pseudopolydora paucibranchiata	1

Heterophoxus affinis	4
Heteroserolis carinata	1
Leitoscoloplos pugettensis	1
Listriella melanica	2
Mediomastus sp	9
Nephtys cornuta	1
Pista sp	8
Prionospio (Prionospio) heterobranchia	3
Pseudopolydora paucibranchiata	23
Rudilemboides sp	1
Scoletoma sp A	3
Scoletoma sp C	10
Spiophanes duplex	5
Theora lubrica	16

Station #6	BST05c
TaxonName	Abundance
Cossura sp A	1
Cylindroleberididae	1
Diplocirrus sp SD1	2
Dorvillea (Dorvillea) sp	1
Euchone limnicola	3
Heterophoxus affinis	1
Leitoscoloplos pugettensis	6
Mediomastus sp	6
Musculista senhousia	2
Nephtys cornuta	2
Pista sp	6
Prionospio (Prionospio) heterobranchia	2
Pseudopolydora paucibranchiata	16
Scoletoma sp A	7
Scoletoma sp C	11
Spiophanes duplex	3

Lyonsia californica	1
Mediomastus sp	10
Pinnixa sp	2
Pista sp	7
Prionospio (Prionospio) heterobranchia	11
Pseudopolydora paucibranchiata	19
Scoletoma sp A	6
Scoletoma sp C	7
Spiophanes duplex	9
Theora lubrica	14

Station #6	BST08c
TaxonName	Abundance
Amphideutopus oculatus	1
Asteropella slatteryi	1
Chaetozone corona	2
Cossura sp A	3
Cylindroleberididae	1
Diplocirrus sp SD1	15
Euphilomedes carcharodonta	1
Heterophoxus affinis	2
Leitoscoloplos pugettensis	21
Mediomastus sp	9
Microspio pigmentata	1
Pista sp	5
Prionospio (Prionospio) heterobranchia	7
Pseudopolydora paucibranchiata	27
Rudilemboides sp	2
Scoletoma sp A	9

Scoletoma sp A	4
Scoletoma sp C	11
Scoletoma tetraura Cmplx	2
Solen rostriformis	1
Spiophanes duplex	6
Theora lubrica	26

Station #7	BST03a
TaxonName	Abundance
Americhelidium sp	3
Aphelochaeta sp	1
Asteropella slatteryi	1
Cylindroleberididae	1
Diplocirrus sp SD1	6
Dorvillea (Dorvillea) sp	5
Exogone lourei	1
Harmothoe imbricata Cmplx	1
Heterophoxus affinis	4
Leitoscoloplos pugettensis	3
Mediomastus sp	12
Musculista senhousia	3
Pista sp	4
Prionospio (Prionospio) heterobranchia	4
Pseudopolydora paucibranchiata	51
Pyromaia tuberculata	1
Rudilemboides sp	2
Scoletoma sp A	6
Scoletoma sp C	9
Spiophanes duplex	9
Theora lubrica	1
Vargula tsujii	1

Theora lubrica	10

Station #7	BST06a
TaxonName	Abundance
Actiniaria	2
Americhelidium sp	4
Asteropella slatteryi	2
Asthenothaerus diegensis	1
Campylaspis rubromaculata	1
Diplocirrus sp SD1	4
Dorvillea (Dorvillea) sp	1
Euchone limnicola	2
Heterophoxus affinis	6
Leitoscoloplos pugettensis	2
Lyonsia californica	3
Mediomastus sp	12
Nemertea	1
Nephtys cornuta	2
Pinnixa sp	1
Pista sp	4
Prionospio (Prionospio) heterobranchia	1
Pseudopolydora paucibranchiata	1
Scoletoma sp A	6
Scoletoma sp C	4
Spiophanes duplex	1
Theora lubrica	7

Scoletoma sp C	10
Spiophanes duplex	11
Theora lubrica	16

Station #7	BST09a
TaxonName	Abundance
Ampelisca cristata	1
Amphideutopus oculatus	1
Apoprionospio pygmaea	1
Asteropella slatteryi	2
Cylindroleberididae	1
Diopatra splendidissima	1
Diplocirrus sp SD1	6
Dorvillea (Dorvillea) sp	2
Euphilomedes carcharodonta	1
Exogone lourei	2
Harmothoe imbricata Cmplx	1
Heterophoxus affinis	1
Leitoscoloplos pugettensis	2
Lyonsia californica	3
Mediomastus sp	3
Microspio pigmentata	1
Musculista senhousia	1
Nemertea	1
Pinnixa sp	5
Pista sp	2
Prionospio (Prionospio) heterobranchia	1
Pseudopolydora paucibranchiata	4
Scoletoma sp A	6
Scoletoma sp C	10
Scyphoproctus oculatus	1

Station #8	BST03b
TaxonName	Abundance
Americhelidium sp	1
Ampelisca cristata	1
Amphideutopus oculatus	2
Asteropella slatteryi	1
Diplocirrus sp SD1	22
Dorvillea (Dorvillea) sp	1
Euchone limnicola	5
Euphilomedes carcharodonta	1
Exogone lourei	2
Fabricinuda limnicola	2
Leitoscoloplos pugettensis	9
Listriella melanica	1
Mediomastus sp	6
Musculista senhousia	4
Nephtys cornuta	1
Phtisica marina	1
Pista sp	1
Prionospio (Prionospio) heterobranchia	3
Pseudopolydora paucibranchiata	22
Scoletoma sp A	10
Scoletoma sp C	7
Spiophanes duplex	13
Tagelus subteres	1
Theora lubrica	8

Station #9	BST03c
TaxonName	Abundance
Aphelochaeta sp	1

Station #8	BST06b
TaxonName	Abundance
Americhelidium sp	1
Amphideutopus oculatus	2
Chone sp	1
Cylindroleberididae	2
Diplocirrus sp SD1	12
Eteone sp	1
Euchone limnicola	2
Heteroserolis carinata	1
Leitoscoloplos pugettensis	2
Lyonsia californica	1
Mediomastus sp	3
Microspio pigmentata	1
Nemertea	1
Nephtys caecoides	1
Nephtys cornuta	1
Nereis procera	1
Pista sp	5
Prionospio (Prionospio) heterobranchia	3
Pseudopolydora paucibranchiata	1
Scoletoma sp A	11
Scoletoma sp C	7
Spiophanes duplex	3
Theora lubrica	5

Station #9	BST06c
TaxonName	Abundance
Alpheus californiensis	1

Station #8	BST09b
TaxonName	Abundance
Americhelidium sp	2
Apoprionospio pygmaea	2
Diplocirrus sp SD1	5
Dorvillea (Dorvillea) sp	1
Heterophoxus affinis	2
Leitoscoloplos pugettensis	7
Lyonsia californica	1
Mediomastus sp	23
Nemertea	1
Nephtys cornuta	1
Pinnixa sp	1
Prionospio (Prionospio) heterobranchia	1
Pseudopolydora paucibranchiata	2
Scoletoma sp A	8
Scoletoma sp C	7
Scyphoproctus oculatus	3
Spiophanes duplex	5
Theora lubrica	2

Station #9	BST09c
TaxonName	Abundance
Cylindroleberididae	1

Asthenothaerus diegensis	2
Cirratulidae	1
Cylindroleberididae	1
Diplocirrus sp SD1	12
Eteone sp	1
Euchone limnicola	2
Exogone lourei	1
Fabricinuda limnicola	2
Glycera americana	1
Heteroserolis carinata	1
Leitoscoloplos pugettensis	5
Lyonsia californica	1
Mediomastus sp	25
Melinna sp	1
Nemertea	3
Pinnixa sp	1
Prionospio (Prionospio) heterobranchia	16
Pseudopolydora paucibranchiata	5
Rudilemboides sp	1
Scoletoma sp A	12
Scoletoma sp C	6
Scyphoproctus oculatus	3
Spiophanes duplex	9
Theora lubrica	7
Vargula tsujii	1

Amphipholis squamata	1
Apoprionospio pygmaea	1
Diplocirrus sp SD1	3
Euchone limnicola	5
Glycinde sp	1
Heteroserolis carinata	4
Leitoscoloplos pugettensis	4
Mediomastus sp	13
Nemertea	1
Nereis procera	2
Philine sp	1
Pinnixa sp	1
Pista sp	8
Pseudopolydora paucibranchiata	4
Rhynchospio glutaea	1
Rudilemboides sp	2
Scoletoma sp A	2
Scoletoma sp C	5
Spiophanes duplex	2
Theora lubrica	2

Diplocirrus sp SD1	3
Euphilomedes carcharodonta	2
Heterophoxus affinis	1
Leitoscoloplos pugettensis	2
Mediomastus sp	6
Nemertea	1
Pinnixa sp	2
Scoletoma sp A	7
Scoletoma sp C	8
Spiophanes duplex	1
Theora lubrica	2

CALIFORNIA Water Boards

Edmund G. Brown Jr.
Governor

Matthew Rodriquez
Secretary for
Environmental Protection

San Diego Regional Water Quality Control Board

Appendix I-2:

Numeric Target Qualification: Human Health and Aquatic-Dependent Wildlife for the Mouths of Chollas, Paleta, and Switzer Creeks in San Diego Bay

This report was prepared under the direction of
Jeremy Haas, Chief, *Water Quality Restoration and Standards Branch*
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Southern Cleanup Unit

with technical support from Tetra Tech, Inc.

June 2012

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I-2.1. Introduction

Beginning in the 1990s sediment studies in San Diego Bay were conducted to identify polluted areas and assess bay health as part of the Bay Protection and Toxics Cleanup Program. This, and subsequent sampling studies, have resulted in the mouths of Chollas, Paleta, and Switzer Creeks in San Diego Bay being listed as impaired on the Clean Water Act (CWA) section 303(d) list of impaired water bodies. The three locations are currently listed as impaired for sediment toxicity, benthic community effects, chlordane, and polycyclic aromatic hydrocarbons (PAHs), with Total Maximum Daily Loads being developed for chlordane, polychlorinated biphenyls (PCBs), and PAHs (see Table 1 below).

Table 1. 303(d) Listing and Proposed TMDLs

Location	CWA 303(d) Listing	Proposed TMDL
Mouth of Chollas Creek	Sediment Toxicity Benthic Community Degradation	PCBs, PAHs, Chlordane
Mouth of Paleta Creek	Sediment Toxicity Benthic Community Degradation	PCBs, PAHs, Chlordane
Mouth of Switzer Creek	PAHs and Chlordane	PCBs, PAHs, Chlordane

The purpose of this report is to provide theoretical human health and aquatic-dependent wildlife risk assessment screening values for discharges of sediment from Chollas, Paleta, and Switzer Creek mouths into San Diego Bay. Future discharges of sediment from the creeks into San Diego Bay will be subject to a TMDL to attain water quality standards and protect the benthic communities within San Diego Bay at those locations. The development of human health and aquatic-dependent wildlife screening values specific to the TMDL will determine if the numeric targets developed in the TMDL are also protective of human health and aquatic-dependent wildlife. These human health and aquatic-dependent wildlife screening values, expressed as concentrations, should be utilized to evaluate the protectiveness of numeric targets developed by the TMDL, as pollutant concentrations protective of benthic communities may not be protective of human health and/or aquatic-dependent wildlife due to bioaccumulation through the San Diego Bay food web.

I-2.2. Methods

Overview

Phase I sampling for the Chollas, Paleta, and Switzer Creek mouths (hereinafter collected referred to as "Phase I Studies") performed bay sediment sampling to determine concentrations of pollutants within the sediment at the impaired locations and San Diego Bay reference sites. In addition, a 28 day bioaccumulation test was performed ex-situ using a bivalve native to San Diego Bay, *Macoma nasuta* ("Macoma"). The bioaccumulation testing was conducted in order to determine how sediment samples taken from the sites would bioaccumulate within San Diego Bay benthic species. For those pollutants subject to the TMDL, the San Diego Water Board used Phase I sampling data to develop biota (Macoma) to sediment accumulation factors (BSAFs) as described in Zeeman 2004. Calculation of the bioaccumulation of a pollutant(s) within a prey species given a concentration of pollutant(s) in sediment allows for the use of published toxicity values to back-calculate the concentrations of pollutants in sediments that would be protective of human health and/or aquatic-dependent wildlife that consume that species of prey. As data were not collected for site-specific higher trophic level biota, Macoma was used as the bioaccumulating prey item for human and wildlife assessment purposes.

Aquatic-Dependent Wildlife

For PCBs, the U.S. Fish and Wildlife Service (Zeeman 2004) previously developed San Diego Bay BSAFs and species specific numeric risk levels by utilizing reference sites sampled within San Diego Bay. For PAHs and chlordane, the San Diego Water Board utilized the same approach to develop BSAFs and species specific numeric risk levels using reference sites sampled during the Phase I studies and in Zeeman 2004.

To use the BSAFs and develop aquatic-dependent wildlife screening levels, the San Diego Water Board first identified four avian species and one mammalian species present in San Diego Bay and suitable for use in the assessment. Species evaluated included the California least tern (*Sterna antillarum brownie*, piscivore), California brown pelican (*Pelecanus occidentalis californicus*, piscivore), surf scoter (*Melanitta perspicillata*, molluscivore), western grebe (*Aechmorphorus occidentalis*, non-specialist), and the California sea lion (*Zalophus californianus*, dominant piscivore). The organisms utilized have been identified as suitable receptors by state and federal trustee resource agencies, are native to San Diego Bay, have suitable literature-based benchmark toxicity values (e.g. TRVs) and exposure factors (ingestion rates), and have a well-known life history as documented in the literature.

The toxicity value and exposure factor for each species was utilized in conjunction with a pollutant specific BSAF to determine numeric sediment concentrations than would result in the associate level of toxicity value risk.

Information regarding the toxicity values and ingestion rates can be found in Attachment 1. For each pollutant of concern, three toxicity values (TRVs) were evaluated to provide a range of numeric concentrations for each pollutant in each species. These included a high value, low value and a geometric mean. Equations utilized to calculate the concentrations are in Table 2 below.

Table 2. Equations for Aquatic-Dependent Wildlife Sediment Concentrations

Organics:
ppm_{sed} = TRV / [(sediment ingestion rate) + (BSAF)(f-lipid/f-TOC)(food ingestion rate)]
Inorganics:
ppm_{sed} = TRV / [(sediment ingestion rate) + (BSAF)(food ingestion rate)]
Note: TRV = Toxicity Reference Value, BSAF = Biota to Sediment Accumulation Factor f-lipid = Fraction Lipid in Biota, f-TOC = Fraction Total Organic Carbon in Sediment

Human Health

To determine human health numeric sediment risk values for each pollutant, the BSAFs calculated for each pollutant were utilized to calculate a range of risk levels for recreational and subsistence fishermen using published pollutant specific cancer slope factors and parameters for consumption rates, body mass, averaging time, exposure duration, and fraction intake. Cancer slope factors and reference levels are from U.S. Environmental Protection Agency (USEPA) and/or California Office of Environmental Health Hazard Assessment (OEHHA) technical guidance documents. Concentration risk levels were calculated for non-cancer and cancer risk to humans, with cancer risks evaluated at levels of 10^{-4}, 10^{-5}, and 10^{-6}. Specific pollutant cancer slope factors and parameters can be found in Attachment 2. The calculation required a step-wise series of equations to calculate the concentrations:

First, edible tissue concentrations associated with a threshold exposure point (TEP) were calculated. This calculation was conducted for risk thresholds of 10^{-4}, 10^{-5}, and 10^{-6}:

$$\mathbf{TEP = Risk/CSF}$$

where:

TEP = threshold exposure point for carcinogenic exposure (mg/kg per day)
Risk = cancer probability (10^{-4}, 10^{-5}, and 10^{-6})
CSF = oral carcinogenic slope factor (mg/kg per day)

Once TEP values are calculated, tissue concentrations in biota (Macoma as prey) for those specific risk levels were calculated:

CTEP = TEP [(BW*AT*CF) / (CR*FI*ED)]

where:

CTEP = tissue concentration in prey (µg/kg Macoma)
TEP = threshold exposure point (mg/kg per day)
BW = body weight (kg)
AT = averaging time (years)
CR = consumption rate (kg/day)
FI = fraction ingested from the site (unitless)
ED = exposure duration (years)
CF = conversion factor (1000 µg/mg)

Once a tissue concentration in Macoma was calculated for each risk threshold (10^{-4}, 10^{-5}, 10^{-6}) for recreational and subsistence anglers, the BSAF was used to calculate the sediment concentration that would result in the resulting level of pollutant bioaccumulation in Macoma:

SED = CTEP/BSAF

where:
SED = sediment concentration (ppm)
CTEP = tissue concentration in prey (µg/kg Macoma)
BSAF = biota to sediment accumulation factor
(organics: kg_{toc}/kg_{lipid}, inorganics $kg_{tissue}/kg_{sediment}$)

Handling of PAHs and PCBs

As discussed in detail in the introduction, the TMDL development targeted PAHs and PCBs as two of the three pollutants causing benthic impairment. While the report references PAHs and PCBs as two pollutants, PAHs and PCBs are each comprised of groups of compounds exhibiting similar characteristics resulting in a general classification as a PCB or PAH.

PAHs

PAHs are generally a class of organic compounds found in petroleum and emissions from fossil fuel utilization and conversion processes. PAHs are neutral, nonpolar organic molecules that comprise two or more benzene rings arranged in various configurations. Due to the large number of PAHs, federal guidance regarding toxicity reference values and cancer slope factors is not available for total, priority, or each individual PAH. USEPA and OEHHA guidance is available for some PAHs, including benzo[a]pyrene (BAP), which is considered one of the most toxic PAHs. For BAP two human health cancer slope factors are available, in addition to a low and high TRV for aquatic-dependent wildlife. While BAP is a pollutant of concern, it is not the only PAH of concern for human health and

aquatic-dependent wildlife. USEPA classifies 16 PAHs as “priority pollutant” PAHs (PPPAH) due to their prevalence and toxicity, including BAP. The TMDL development approach addresses the PAH impairment by establishing watershed loads for PPPAH.

For aquatic-dependent wildlife there is not sufficient information in the literature to calculate individual risk levels for all 16 PPPAHs. As such, BAP toxicity values and a BAP BSAF were utilized to determine sediment concentrations of BAP that would be protective of aquatic dependent wildlife. While BAP is a PPPAH constituent of concern per the TMDL, watershed load modeling and numeric target calculations are not finite enough to utilize BAP as a proxy for PPPAHs. Thus, a site-specific mean ratio of BAP/PPPAHs from watershed data (Chollas and Broadway watersheds) was used to convert BAPs to PPPAHs, which will allow for a protective level of BAPs to be used for the watershed loading and modeling.

For human health risk, USEPA published a draft list of relative potency factors (RPFs, relative potency when compared to BAP) which were utilized to calculate the cancer slope factors for 14 of the 16 PPPAHs (USEPA 2010). No information was available regarding the relative potency of 2 PPPAHs. These cancer slope factors were then combined with a PPPAH BSAF to conduct individual risk assessments for the 14 PPPAHs. The concentrations from the individual assessments for each PPPAH were then summed to get target concentrations for total PPPAHs.

PCBs
Similar to PAHs, PCBs include a broad family of anthropogenically constructed chemicals with a range of toxicity. The calculations conducted utilized PCB congeners, which include the single, unique well-defined chemical compounds in the PCB category. This approach is consistent with the approach taken for the development of the TMDL.

I-2.3. Results

Aquatic-Dependent Wildlife

High and low toxicity reference values were available and results were obtained for all pollutants for each species. Further information regarding the organisms and the calculations can be found in Attachments 1. Results for each species and each pollutant are exhibited in Table 3 below. The most sensitive species to every pollutant was the California least tern. The least sensitive species to every pollutant was the California sea lion. The California brown pelican, surf scoter and western grebe sediment screening concentration ranges were relatively closely matched.

Table 3. Sediment Screening Concentrations for Aquatic Dependent Wildlife

	Aquatic-Dependent Wildlife Sediment Screening Levels		
	TRV-L (mg/kg dry-weight)	**TRV-H (mg/kg dry-weight)**	**Geometric Mean TRV (mg/kg dry-weight)**
Brown Pelican			
Total Chlordane	2.24	11.20	5.01
Total PCB Congeners	0.04	0.55	0.15
Benzo(a)pyrene	0.52	5.24	1.66
Priority PAHs*	7.33	73.30	23.18
Least Tern			
Total Chlordane	0.73	3.65	1.63
Total PCB Congeners	0.01	0.18	0.05
Benzo(a)pyrene	.17	1.71	0.54
Priority PAHs*	2.39	23.88	7.55
Surf Scoter			
Total Chlordane	2.40	11.98	5.36
Total PCB Congeners	0.04	0.59	0.16
Benzo(a)pyrene	.56	5.57	1.76
Priority PAHs*	7.79	77.87	24.63
Western Grebe			
Total Chlordane	2.44	12.21	5.46
Total PCB Congeners	0.04	0.61	0.16
Benzo(a)pyrene	.57	5.68	1.79
Priority PAHs*	7.94	79.38	25.10
Sea Lion			
Total Chlordane	16.36	32.71	23.13
Total PCB Congeners	0.54	1.91	1.01
Benzo(a)pyrene	12.77	127.71	40.38
Priority PAHs*	178.61	1786.10	564.81

*PPPAHs calculated using an average ratio of BAP/PPPAH = .0715 at watershed receiving water stations

Human Health

A range of human health sediment screening concentrations were successfully calculated for each pollutant at set fractional intakes of 25-100 percent, at risk ranges of 10^{-4} to 10^{-6}, and for consumption rates inclusive of cooking losses[1].

Chlordane

Chlordane sediment concentration risk levels for recreational anglers ranged from 414 to 2.96 µg/kg for 100 percent fractional intake with expected cooking losses. Subsistence angler risk concentrations ranged from 41.15 to 0.41 µg/kg at the same fractional intake level. For comparative purposes, the calculated

[1] Note: Tables do not reflect significant figure calculations.

mean sediment concentration at the TMDL references site was 3.15 µg/kg, which is between 10^{-5} and 10^{-6} for recreational and subsistence anglers (see Table 4 and Table 5 below).

Table 4. Angler Risk Levels for Chlordane with 50% Cooking Loss

Risk Levels for Total Chlordane* in Sediment (µg/kg)									
Fractional Intake	Reference Sites Mean Sediment Concentration	Recreational Cancer Risk Level**			Subsistence Cancer Risk Level***			Recreational Non-cancer Risk Level	Subsistence Non-cancer Risk Level
		-4	-5	-6	-4	-5	-6		
25	3.15	1656.29	165.63	16.56	164.60	16.46	1.65	304.52	30.26
50		828.14	82.81	8.28	82.30	8.23	0.82	152.26	15.13
75		552.10	55.21	5.52	54.87	5.49	0.55	101.51	10.09
100		414.07	41.41	4.14	41.15	4.11	0.41	76.13	7.57

*Utilizing a bivalve total chlordane BSAF from Chollas/Paleta Phase I reference stations and Zeeman 2004.
**50% cooking loss factor for recreational angler (i.e. allows 50% of contaminants to remain after cooking).
***No cooking loss factor for subsistence anglers.

Table 5. Angler Risk Levels for Chlordane with 70% Cooking Loss

Risk Levels for Total Chlordane* in Sediment (µg/kg)									
Fractional Intake	Reference Sites Mean Sediment Concentration	Recreational Cancer Risk Level**			Subsistence Cancer Risk Level***			Recreational Non-cancer Risk Level	Subsistence Non-cancer Risk Level
		-4	-5	-6	-4	-5	-6		
25	3.15	1183.06	118.31	11.83	164.60	16.46	1.65	217.51	30.26
50		591.53	59.15	5.92	82.30	8.23	0.82	108.76	15.13
75		394.35	39.44	3.94	54.87	5.49	0.55	72.50	10.09
100		295.77	29.58	2.96	41.15	4.11	0.41	54.38	7.57

*Utilizing a bivalve total chlordane BSAF from Chollas/Paleta Phase I reference stations and Zeeman 2004.
**50% cooking loss factor for recreational angler (i.e. allows 50% of contaminants to remain after cooking).
***No cooking loss factor for subsistence anglers.

PCBs

PCB sediment concentration risk levels for recreational anglers ranged from 112 to 0.80 µg/kg for 100 percent fractional intake with expected cooking losses. Subsistence angler risk concentrations ranged from 11.5 to 0.11 µg/kg at the same fractional intake. For comparative purposes, the calculated mean sediment concentration at the TMDL references site was 70 µg/kg, which is between 10^{-4} and 10^{-5} for recreational anglers, but poses a greater than 10^{-4} risk for subsistence anglers (Table 6 and Table 7 below).

Table 6. Angler Risk Levels for PCBs with 50% Cooking Loss

Risk Levels for Total PCBs* in Sediment (µg/kg)

Fractional Intake	Reference Sites Mean Sediment Concentration	Recreational Cancer Risk Level**			Subsistence Cancer Risk Level***			Recreational Non-cancer Risk Level	Subsistence Non-cancer Risk Level
		-4	-5	-6	-4	-5	-6		
25	70	448.95	44.89	4.49	44.62	4.46	0.45	76.96	7.65
50		224.47	22.45	2.24	22.31	2.23	0.22	38.48	3.82
75		149.65	14.96	1.50	14.87	1.49	0.15	25.65	2.55
100		112.24	11.22	1.12	11.15	1.12	0.11	19.24	1.91

*Utilizing a bivalve PCB cogeners BSAF from Chollas/Paleta Phase I reference stations and Zeeman 2004.
**50% cooking loss factor for recreational angler (i.e. allows 50% of contaminants to remain after cooking).
***No cooking loss factor for subsistence anglers.

Table 7. Angler Risk Levels for PCBs with 70% Cooking Loss

Risk Levels for Total PCBs* in Sediment (µg/kg)									
Fractional Intake	Reference Sites Mean Sediment Concentration	Recreational Cancer Risk Level**			Subsistence Cancer Risk Level***			Recreational Non-cancer Risk Level	Subsistence Non-cancer Risk Level
		-4	-5	-6	-4	-5	-6		
25	70	320.68	32.07	3.21	44.62	4.46	0.45	54.97	7.65
50		160.34	16.03	1.60	22.31	2.23	0.22	27.49	3.82
75		106.89	10.69	1.07	14.87	1.49	0.15	18.32	2.55
100		80.17	8.02	0.80	11.15	1.12	0.11	13.74	1.91

*Utilizing a bivalve PCB cogeners BSAF from Chollas/Paleta Phase I reference stations and Zeeman 2004.
**70% cooking loss factor for recreational angler (i.e. allows 70% of contaminants to remain after cooking).
***No cooking loss factor for subsistence anglers.

Priority Pollutant PAHs

PPPAH sediment concentration risk levels were calculated utilizing the RPFs for 14 of 16 PPPAHs combined with 2 different cancer slope. The first set of results, presented in Table 8 and Table 10, utilized a BAP cancer slope factor of 12 (OEHHA 2001) as the standard for relative potency calculations. The second set of results, presented in Table 9 and Table 11, utilized a BAP cancer slope factor of 7.3 (USEPA 2004) as the standard for relative potency calculations. For the cancer slope factor of 12, recreational angler risk ranged from 18,107 to 129 µg/kg for 100 percent fractional intake with expected cooking losses. Subsistence angler risk concentrations ranged from 1799 to 17.99 µg/kg at the same fractional intake. For comparative purposes, the calculated mean sediment concentration at the TMDL references site was 1640 µg/kg, which for a cancer slope factor of 12 is between 10^{-4} and 10^{-6} for recreational anglers, depending on cooking losses, and between 10^{-4} and 10^{-5} for subsistence anglers.

For the cancer slope factor of 7.3, recreational angler risk ranged from 29765 to 212 µg/kg for 100 percent fractional intake with expected cooking losses. Subsistence angler risk concentrations ranged from 2958 to 29.58 µg/kg at the same fractional intake. For comparative purposes, the calculated mean sediment concentration at the TMDL references site was 1640 µg/kg, which for a cancer slope factor of 7.3 is between 10^{-4} and 10^{-6} for recreational anglers, depending on cooking losses, and between 10^{-4} and 10^{-5} for subsistence anglers.

Table 8. OEHHA Angler Risk Levels with 50% Cooking Loss

Risk Levels for PPPAHs* in Sediment (µg/kg)							
Fractional Intake	Reference Sites Mean Sediment Concentration	Recreational Cancer Risk Level*			Subsistence Cancer Risk Level**		
		-4	-5	-6	-4	-5	-6
25	1640	72429.54	7242.95	724.30	7197.97	719.80	71.98
50		36214.77	3621.48	362.15	3598.98	359.90	35.99
75		24143.18	2414.32	241.43	2399.32	239.93	23.99
100		18107.39	1810.74	181.07	1799.49	179.95	17.99

*Utilizing a cancer slope factor of 12 and a bivalve PPPAH BSAF from Chollas/Paleta Phase I reference stations and Zeeman, C.Q.T. 2004. RPFs from USEPA 2010.
**50% cooking loss factor for recreational angler (i.e. allows 50% of contaminants to remain after cooking).
***No cooking loss for subsistence anglers.

Table 9. USEPA Angler Risk Levels with 50% Cooking Loss

Risk Levels for PPPAHs* in Sediment (µg/kg)							
Fractional Intake	Reference Sites Mean Sediment Concentration	Recreational Cancer Risk Level*			Subsistence Cancer Risk Level**		
		-4	-5	-6	-4	-5	-6
25	1640	119062.26	11906.23	1190.62	11832.27	1183.23	118.32
50		59531.13	5953.11	595.31	5916.14	591.61	59.16
75		39687.42	3968.74	396.87	3944.09	394.41	39.44
100		29765.57	2976.56	297.66	2958.07	295.81	29.58

*Utilizing a cancer slope factor of 7.3 and a bivalve PPPAH BSAF from Chollas/Paleta Phase I reference stations and Zeeman, C.Q.T. 2004. RPFs from USEPA 2010.
**50% cooking loss factor for recreational angler (i.e. allows 50% of contaminants to remain after cooking).
***No cooking loss for subsistence anglers.

Table 10. OEHHA Angler Risk Levels with 70% Cooking Loss

Risk Levels for PPPAHs* in Sediment (µg/kg)							
Fractional Intake	Reference Sites Mean Sediment Concentration	Recreational Cancer Risk Level*			Subsistence Cancer Risk Level**		
		-4	-5	-6	-4	-5	-6
25	1640	51735.39	5173.54	517.35	7197.97	719.80	71.98
50		25867.69	2586.77	258.68	3598.98	359.90	35.99
75		17245.13	1724.51	172.45	2399.32	239.93	23.99
100		12933.85	1293.38	129.34	1799.49	179.95	17.99

*Utilizing a cancer slope factor of 12 and a bivalve PPPAH BSAF from Chollas/Paleta Phase I reference stations and Zeeman, C.Q.T. 2004. RPFs from USEPA 2010.
**70% cooking loss factor for recreational angler (i.e. allows 70% of contaminants to remain after cooking).
***No cooking loss for subsistence anglers.

Table 11. USEPA Angler Risk Levels with 70% Cooking Loss

Risk Levels for PPPAHs* in Sediment (µg/kg)							
Fractional Intake	Reference Sites Mean Sediment Concentration	Recreational Cancer Risk Level*			Subsistence Cancer Risk Level**		
		-4	-5	-6	-4	-5	-6
25	1640	85044.47	8504.45	850.44	11832.27	1183.23	118.32
50		42522.24	4252.22	425.22	5916.14	591.61	59.16
75		28348.16	2834.82	283.48	3944.09	394.41	39.44
100		21261.12	2126.11	212.61	2958.07	295.81	29.58

*Utilizing a cancer slope factor of 7.3 and a bivalve PPPAH BSAF from Chollas/Paleta Phase I reference stations and Zeeman, C.Q.T. 2004. RPFs from USEPA 2010.
**70% cooking loss factor for recreational angler (i.e. allows 70% of contaminants to remain after cooking).
***No cooking loss for subsistence anglers.

I-2.4. Discussion

Purpose

The sediment concentration levels calculated represent a screening level assessment for the purposes of comparison to numeric watershed targets established for the TMDL. The TMDL assigns load and waste load allocations for pollutants from the watersheds into San Diego Bay. The use of the risk level concentrations in this report should be limited to evaluating the concentrations of pollutants transported from the watersheds into San Diego Bay for the purposes of the TMDL. The concentrations within this report provide a screening tool for the interpretation of water quality standards pursuant to the TMDL process. The purpose of the calculations conducted was not to assess the human health and aquatic-dependent wildlife risk for sediment currently present with the intertidal and/or subtidal environment at the location of the impairment. Nor does this report constitute or attempt to determine pollutants of concern within the actual sediment at the TMDL locations.

Assumptions and Variables

The process of determining screening levels for human health and aquatic dependent wildlife involves multiple variables and assumptions for which state and federal guidance is available. For example, USEPA recommendations were followed for setting criteria such as body weight (USEPA 1989). These factors are included in more detail in Attachments 1 and 2. Other variables are also included in the calculations which result in conservative assumptions and/or levels of inherent uncertainty. As such, where feasible a reasonable range of concentrations was analyzed for consideration. The selection and interpretation of the variables and concentrations within a range is a policy and/or best professional judgment decision. Specific variables considered and factors evaluated are outlined in greater detail below.

Aquatic-Dependent Wildlife

Predator/Prey Relationship

For aquatic dependent wildlife, the study utilized a range of species of concern native to San Diego Bay. Multiple assumptions make the calculations conducted more conservative. First, it is assumed that each species forages only within the area that the TMDL is located. While it is highly unlikely for the species analyzed to forage entirely within a site or the sites, as a policy decision it is suggested that consideration should be made that a species should be able to forage only within the TMDL area(s). A second factor of consideration is the use of Macoma as a prey species. It is assumed that Macoma is the forage prey of choice for all species and/or is assumed to be representative of the level of bioaccumulation present in other prey species at the site that would be consumed. While Macoma is indeed a good indicator for certain species that feed on molluscs (e.g. surf scoter, see Cottam 1939), for piscivorous species (e.g. terns) there is an

inherent level of uncertainty in using Macoma as a surrogate prey species. It is unknown if this assumption is conservative. Lastly, although Zeeman provided a risk assessment for the Pacific green sea turtle (*Chelonia mydas*), calculations were not conducted due to the limited information available regarding toxicity reference values (see Zeeman 2004) and inaccurate assumptions regarding prey selection (Lemons et al. 2011). However, it is important to note that bioaccumulation, specifically for chlordane, has been documented within the San Diego Bay population, and selection of numeric values should consider those pollutants found to be bioaccumulating within this federally listed endangered species (Komoroske et al. 2011). Additional efforts to estimate risk for the species using updated consumption and toxicity information may be conducted in the future.

Toxicity Reference Values
To address the discussed uncertainty, a range of risk levels were analyzed for each species by using three toxicity reference values: low, high and geomean. The low value is the most conservative value, while the high is the least conservative. The geomean represents an intermediate estimation. For a more accurate representation of risk, additional targeted species specific prey would need to be collected in situ.

Human Health

Angler Types, Methods, and Species Consumed
For human health calculations, multiple assumptions and policy level considerations were included. First, consumption calculations were made separately for recreational and subsistence anglers. Recreational anglers were assumed to have a lesser rate of consumption than that of subsistence anglers. Additionally, recreational anglers were assumed to have a portion of the pollutants removed via varying cooking methods, whereas subsistence anglers were assumed to consume all pollutants present via consumption of the entire organism and/or use of differing cooking methods. Thus, two estimates of cooking losses were analyzed for recreational anglers. Due to higher consumption rates and different cooking practices, subsistence angler concentration levels are more conservative than recreational. Similar to aquatic-dependent wildlife, the calculations conducted also assumed that an angler consumes 100 percent of their intake from the TMDL location(s). While this assumption regarding fractional intake is likely inaccurate and conservative, it can be argued that an angler should be able to consume 100 percent of a catch from the TMDL sites. This is a conservative assumption and a policy decision. However, the report includes a range of different fractional intakes for each pollutant of concern.

An additional assumption, again similar to aquatic-dependent wildlife, is the use of Macoma as a surrogate for consumption of marine organisms by anglers.

While it is expected that anglers may consume shellfish from the TMDL areas, the assumption that Macoma represents all shellfish and finfish targeted and consumed by anglers must incorporate an inherent level of uncertainty. While Macoma are a species of shellfish that humans have and can consume, it is highly unlikely that Macoma are the target species of consumption and/or the only species consumed. Fish species that utilize unvegetated subtidal bay habitat and that are targeted by anglers, such as spotted sand bass (*Paralabrax masculatofasciatus*) or California halibut (*Paralichthys californicus*), would be the preferred representative species for analysis. However, none were collected for fish tissue analysis. Fish and shellfish tissue data was collected from reference sites associated with Cleanup and Abatement Order No. R9-2011-0001 (CAO). The technical report for the CAO examined angler risk levels for PCBs associated with the consumption of California spiny lobster (*Panulirus interruptus*) and spotted sand bass (*Paralabrax mculatofasciatus*). These results are presented for comparative purposes in Table 12 and Table 13:

Table 12. PCB Angler Risk Levels for California Spiny Lobster

Risk Levels for Total PCBs* in Sediment (µg/kg)								
Fractional Intake	Recreational Cancer Risk Level**			Subsistence Cancer Risk Level***			Recreational Non-cancer Risk Level	Subsistence Non-cancer Risk Level
	-4	-5	-6	-4	-5	-6		
25	60646.98	6064.70	606.47	1433.32	143.33	14.33	10396.62	245.71
50	30323.49	3032.35	303.23	716.66	71.67	7.17	5198.31	122.86
75	20215.66	2021.57	202.16	477.77	47.78	4.78	3465.54	81.90
100	15161.74	1516.17	151.62	358.33	35.83	3.58	2599.16	61.43

*Source: Technical Report to Cleanup and Abatement Order No. R9-2011-0001
**For recreational angler consuming edible tissue
***No cooking loss factor for subsistence anglers.

Table 13. PCB Angler Risk Levels for Spotted Sand Bass

Risk Levels for Total PCBs* in Sediment (µg/kg)								
Fractional Intake	Recreational Cancer Risk Level**			Subsistence Cancer Risk Level***			Recreational Non-cancer Risk Level	Subsistence Non-cancer Risk Level
	-4	-5	-6	-4	-5	-6		
25	4490.26	449.03	44.90	109.73	10.97	1.10	769.76	18.81
50	2245.13	224.51	22.45	54.87	5.49	0.55	384.88	9.41
75	1496.75	149.68	14.97	36.58	3.66	0.37	256.59	6.27
100	1122.57	112.26	11.23	27.43	2.74	0.27	192.44	4.70

*Source: Technical Report to Cleanup and Abatement Order No. R9-2011-0001
**50% cooking loss factor for recreational angler consuming fish fillet
***No cooking loss factor for subsistence anglers.

The results from the CAO indicate that, for PCBs, spotted sand bass tissue concentrations are more conservative than lobster, or that lower concentrations of pollutants result in higher levels of bioaccumulation in sand bass and resulting health risks. When compared to results for Macoma, the spotted sand bass results have cancer and non-cancer risk levels an order of magnitude less for recreational anglers with 50 percent cooking losses. For subsistence anglers, the cancer and non-cancer risk levels for spotted sand bass are roughly double the levels calculated for Macoma.

Cancer Risk

The calculation of cancer risk must be evaluated with a consideration of different factors. First, PAHs have different recommended cancer slope factors depending on the government agency, with OEHHA recommending a more conservative factor than USEPA. This report provides calculations conducted using both factors. Additionally, cancer calculations included a range of cancer risk from 10^{-4} to 10^{-6}, with 10^{-6} being the most conservative. Similar to aquatic-dependent wildlife, choice of risk levels for comparison to a numeric target is a policy decision that differs between and among governmental agencies. Lastly, the calculation of cancer risk, while incorporating conservative assumptions, is based upon estimations for an average human adult. The levels presented are not expected or likely to be conservative for certain humans, such as for children and pregnant women. Seafood consumption advisories by OEHHA, for example, generally recommend a reduction of 50 percent of the advisory level for children and pregnant women (OEHHA 2008).

For PPPAH calculations, draft USEPA RPFs were used with a PPPAH BSAF to calculate individual PPPAH risk levels, with total PPPAHs calculated by subsequently summing the individual concentrations at each risk level. The RPFs, the BSAF, and the summation each carry assumptions and uncertainty. First, the RPFs used are draft guidance from USEPA still undergoing external peer review. These RPFs were also incomplete, as none were available for 2 of the PPPAHs, specifically Acenaphthene and Acenaphthylene. Thus, there is a level of uncertainty regarding the potential toxicity of these two PPPAHs. Second, the BSAF used for each individual PPPAH calculation was for total PPPAHs. This is a conservative assumption as the individual PPPAHs likely have a lower BSAF values than the total PPPAHs. Third, and perhaps most important, is that by summing the individual PPPAHs to get the risk levels for the total PPPAHs there is an assumption that each individual PPPAH has an equally proportionate representation in the PPPAH mixture. Additional analysis and modeling could be done by applying a proportional representation to each PPPAH based on monitoring data in the watershed (e.g. calculating mean percentage for each of the 16 PPPAHs).

I-2.5. References

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Attachment 1: Aquatic Dependent Wildlife Calculations

Table 14. Calculations for the California Brown Pelican (Pelecanus occidentalis californicus).

CA BROWN PELICAN	TRV-low (mg/kg-day)	TRV-high (mg/kg-day)	TRV Geometric Mean (mg/kg-day)	Sediment Ingestion Rate (kg/kg_{BW}-day)	Food Ingestion Rate (kg/kg_{BW}-day)	BSAF (unitless)	f-lipid/toc (unitless)	Sediment Screening TRV-L (mg/kg dry-weight)	Sediment Screening TRV-H (mg/kg dry-weight)	Sediment Screening Geometric Mean TRV (mg/kg dry-weight)
Total Chlordane (1)	2.14	10.7	4.785185472	0.0016	0.0812	1.896428	6.19307	2.24E+00	1.12E+01	5.01E+00
Total PCB Congeners (2)	0.09	1.27	0.33808283	0.0016	0.0812	4.547698	6.19307	3.93E-02	5.55E-01	1.48E-01
Benzo(a)pyrene (3)	0.14	1.4	0.442718872	0.0016	0.0812	0.528002	6.19307	5.24E-01	5.24E+00	1.66E+00

(1) TRV-low = Toxicological Benchmarks for Wildlife: 1996 Revision (June 1996)
TRV-high = Toxicological Benchmarks for Wildlife: 1996 Revision (June 1996)
Sediment Ingestion Rate = Zeeman (December 2004)
Food Ingestion Rate = Zeeman (December 2004)
BSAF = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)
f-lipid/toc = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)

(2) TRV-low = U.S. Navy/U.S. EPA Region 9 BTAG TRVs
TRV-high = U.S. Navy/U.S. EPA Region 9 BTAG TRVs
Sediment Ingestion Rate = Zeeman (December 2004)
Food Ingestion Rate = Zeeman (December 2004)
BSAF = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)
f-lipid/toc = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)

(3) TRV-low = Exponent 2003
TRV-high = Exponent 2003
Sediment Ingestion Rate = Zeeman (December 2004)
Food Ingestion Rate = Zeeman (December 2004)
BSAF = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)
f-lipid/toc = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)

Table 15. Calculations for the California Least Tern (*Sterna antillarum brownie*).

CA LEAST TERN										
	TRV-low (mg/kg-day)	TRV-high (mg/kg-day)	TRV Geometric Mean (mg/kg-day)	Sediment Ingestion Rate (kg/kg_{BW}-day)	Food Ingestion Rate (kg/kg_{BW}-day)	BSAF (unitless)	f-lipid/toc (unitless)	Sediment Screening TRV-L (mg/kg dry-weight)	Sediment Screening TRV-H (mg/kg dry-weight)	Sediment Screening Geometric Mean TRV (mg/kg dry-weight)
Total Chlordane (1)	2.14	10.7	4.785185472	0.005	0.2492	1.896428	6.19307	0.7299	3.6497	1.6322
Total PCB Congeners (2)	0.09	1.27	0.33808283	0.005	0.2492	4.547698	6.19307	0.0128	0.1808	0.0481
Benzo(a)pyrene (3)	0.14	1.4	0.442718872	0.005	0.2492	0.528002	6.19307	0.1708	1.7076	0.5400

(1) TRV-low = Toxicological Benchmarks for Wildlife: 1996 Revision (June 1996)
TRV-high = Toxicological Benchmarks for Wildlife: 1996 Revision (June 1996)
Sediment Ingestion Rate = Zeeman (December 2004)
Food Ingestion Rate = Zeeman (December 2004)
BSAF = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)
f-lipid/toc = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)

(2) TRV-low = U.S. Navy/U.S. EPA Region 9 BTAG TRVs
TRV-high = U.S. Navy/U.S. EPA Region 9 BTAG TRVs
Sediment Ingestion Rate = Zeeman (December 2004)
Food Ingestion Rate = Zeeman (December 2004)
BSAF = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)
f-lipid/toc = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)

(3) TRV-low = Exponent 2003
TRV-high = Exponent 2003
Sediment Ingestion Rate = Zeeman (December 2004)
Food Ingestion Rate = Zeeman (December 2004)
BSAF = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)
f-lipid/toc = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)

Table 16. Calculations for the Surf Scoter (*Melanitta perspicillata*).

SURF SCOTER											
		TRV-low (mg/kg-day)	TRV-high (mg/kg-day)	TRV Geometric Mean (mg/kg-day)	Sediment Ingestion Rate (kg/kg_{BW}-day)	Food Ingestion Rate (kg/kg_{BW}-day)	BSAF (unitless)	f-lipid/toc (unitless)	Sediment Screening TRV-L (mg/kg dry-weight)	Sediment Screening TRV-H (mg/kg dry-weight)	Sediment Screening Geometric Mean TRV (mg/kg dry-weight)
Total Chlordane (1)		2.14	10.7	4.785185472	0.0038	0.0757	1.896428	6.19307	2.3968	11.9838	5.3593
Total PCB Congeners (2)		0.09	1.27	0.33808283	0.0038	0.0757	4.547698	6.19307	0.0421	0.5946	0.1583
Benzo(a)pyrene (3)		0.14	1.4	0.442718872	0.0038	0.0757	0.528002	6.19307	0.5570	5.5702	1.7615
(1)	TRV-low = Toxicological Benchmarks for Wildlife: 1996 Revision (June 1996)										
	TRV-high = Toxicological Benchmarks for Wildlife: 1996 Revision (June 1996)										
	Sediment Ingestion Rate = Zeeman (December 2004)										
	Food Ingestion Rate = Zeeman (December 2004)										
	BSAF = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)										
	f-lipid/toc = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)										
(2)	TRV-low = U.S. Navy/U.S. EPA Region 9 BTAG TRVs										
	TRV-high = U.S. Navy/U.S. EPA Region 9 BTAG TRVs										
	Sediment Ingestion Rate = Zeeman (December 2004)										
	Food Ingestion Rate = Zeeman (December 2004)										
	BSAF = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)										
	f-lipid/toc = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)										
(3)	TRV-low = Exponent 2003										
	TRV-high = Exponent 2003										
	Sediment Ingestion Rate = Zeeman (December 2004)										
	Food Ingestion Rate = Zeeman (December 2004)										
	BSAF = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)										
	f-lipid/toc = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)										

Table 17. Calculations for the Western Grebe (*Aechmorphorus occidentalis*).

WESTERN GREBE											
		TRV-low (mg/kg-day)	TRV-high (mg/kg-day)	TRV Geometric Mean (mg/kg-day)	Sediment Ingestion Rate (kg/kg_{BW}-day)	Food Ingestion Rate (kg/kg_{BW}-day)	BSAF (unitless)	f-lipid/toc (unitless)	Sediment Screening TRV-L (mg/kg dry-weight)	Sediment Screening TRV-H (mg/kg dry-weight)	Sediment Screening Geometric Mean TRV (mg/kg dry-weight)
Total Chlordane (1)		2.14	10.7	4.785185472	0.0037	0.0743	1.896428	6.19307	2.4420	12.2100	5.4605
Total PCB Congeners (2)		0.09	1.27	0.33808283	0.0037	0.0743	4.547698	6.19307	0.0429	0.6058	0.1613
Benzo(a)pyrene (3)		0.14	1.4	0.442718872	0.0037	0.0743	0.528002	6.19307	0.5676	5.6759	1.7949
(1)	TRV-low = Toxicological Benchmarks for Wildlife: 1996 Revision (June 1996)										
	TRV-high = Toxicological Benchmarks for Wildlife: 1996 Revision (June 1996)										
	Sediment Ingestion Rate = Zeeman (December 2004)										
	Food Ingestion Rate = Zeeman (December 2004)										
	BSAF = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)										
	f-lipid/toc = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)										
(2)	TRV-low = U.S. Navy/U.S. EPA Region 9 BTAG TRVs										
	TRV-high = U.S. Navy/U.S. EPA Region 9 BTAG TRVs										
	Sediment Ingestion Rate = Zeeman (December 2004)										
	Food Ingestion Rate = Zeeman (December 2004)										
	BSAF = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)										
	f-lipid/toc = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)										
(3)	TRV-low = Exponent 2003										
	TRV-high = Exponent 2003										
	Sediment Ingestion Rate = Zeeman (December 2004)										
	Food Ingestion Rate = Zeeman (December 2004)										
	BSAF = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)										
	f-lipid/toc = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)										

Table 18. Calculations for the California Sea Lion (*Zalophus californianus*).

CA SEA LION											
		TRV-low (mg/kg-day)	TRV-high (mg/kg-day)	TRV Geometric Mean (mg/kg-day)	Sediment Ingestion Rate (kg/kg_{BW}-day)	Food Ingestion Rate (kg/kg_{BW}-day)	BSAF (unitless)	f-lipid/toc (unitless)	Sediment Screening TRV-L (mg/kg dry-weight)	Sediment Screening TRV-H (mg/kg dry-weight)	Sediment Screening Geometric Mean TRV (mg/kg dry-weight)
Total Chlordane (1)		4.58	9.16	6.477098116	0.00048	0.0238	1.896428	6.19307	16.3569	32.7138	23.1321
Total PCB Congeners (2)		0.36	1.28	0.67882251	0.00048	0.0238	4.547698	6.19307	0.5367	1.9082	1.0120
Benzo(a)pyrene (3)		1	10	3.16227766	0.00048	0.0238	0.528002	6.19307	12.7706	127.7061	40.3842
(1)	TRV-low = Toxicological Benchmarks for Wildlife: 1996 Revision (June 1996)										
	TRV-high = Toxicological Benchmarks for Wildlife: 1996 Revision (June 1996)										
	Sediment Ingestion Rate = Zeeman (December 2004)										
	Food Ingestion Rate = Zeeman (December 2004)										
	BSAF = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)										
	f-lipid/toc = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)										
(2)	TRV-low = U.S. Navy/U.S. EPA Region 9 BTAG TRVs										
	TRV-high = U.S. Navy/U.S. EPA Region 9 BTAG TRVs										
	Sediment Ingestion Rate = Zeeman (December 2004)										
	Food Ingestion Rate = Zeeman (December 2004)										
	BSAF = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)										
	f-lipid/toc = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)										
(3)	TRV-low = Exponent 2003										
	TRV-high = Exponent 2003										
	Sediment Ingestion Rate = Zeeman (December 2004)										
	Food Ingestion Rate = Zeeman (December 2004)										
	BSAF = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)										
	f-lipid/toc = Data from Chollas/Paleta reference stations and Shipyard reference stations (Zeeman)										

Attachment 2: Human Health Calculations

Table 19. Exposure Factors Used in Human Health Calculations.

Exposure Factors		Value	Unit	Reference
Body Weight (BW)	Recreational, Subsistence	70	kg	OEHHA 2008, USEPA 1989
Averaging Time (AT)	Cancer	70	years	OEHHA 2008, USEPA 1989
	Non-cancer	30	years	OEHHA 2008, USEPA 1989
Consumption Rate (CR)	Recreational	0.032	kg/day	OEHHA 2008
	Subsistence	0.161	kg/day	SCCWRP and MBC 1994
Fractional Intake (FI)	ALL	1	unitless	
Exposure Duration (ED)	ALL	30	years	OEHHA 2008
Cooking Loss Factor	Recreational (assumes skin-off fillet)	0.5	unitless	OEHHA 2008
	Recreational (assumes skin-on fillet)	0.7	unitless	OEHHA 2008
	Subsistence	1	unitless	
Conversion Factor		1000	µg/mg	
Cancer Slope Factor (CSF)	PCBs	2	mg/kg-day	OEHHA 2008
	BAP	12	mg/kg-day	OEHHA 2001
	BAP	7.3	mg/kg-day	USEPA 1993
	Chlordane	1.3	mg/kg-day	OEHHA 2008
Reference Dose (RfD)	PCBs	0.00002	mg/kg-day	OEHHA 2008
	Chlordane	0.000033	mg/kg-day	OEHHA 2008

Table 20. OEHHA-Based PPPAH TEP Calculations

PPPAH COC	Angler	Slope/Reference OEHHA	TEP		
			0.0001	0.00001	0.000001
Anthracene	Recreational	0	NA	NA	NA
Anthracene	Subsistence	0	NA	NA	NA
Benz(a)anthracene	Recreational	2.4	4.16667E-05	4.16667E-06	4.16667E-07
Benz(a)anthracene	Subsistence	2.4	4.16667E-05	4.16667E-06	4.16667E-07
Benzo(a)pyrene	Recreational	12	8.33333E-06	8.33333E-07	8.33333E-08
Benzo(a)pyrene	Subsistence	12	8.33333E-06	8.33333E-07	8.33333E-08
Benzo(b)fluoranthene	Recreational	9.6	1.04167E-05	1.04167E-06	1.04167E-07
Benzo(b)fluoranthene	Subsistence	9.6	1.04167E-05	1.04167E-06	1.04167E-07
Benzo(g,h,i)perylene	Recreational	0.108	0.000925926	9.25926E-05	9.25926E-06
Benzo(g,h,i)perylene	Subsistence	0.108	0.000925926	9.25926E-05	9.25926E-06
Benzo(k)fluoranthene	Recreational	0.36	0.000277778	2.77778E-05	2.77778E-06
Benzo(k)fluoranthene	Subsistence	0.36	0.000277778	2.77778E-05	2.77778E-06
Chrysene	Recreational	1.2	8.33333E-05	8.33333E-06	8.33333E-07
Chrysene	Subsistence	1.2	8.33333E-05	8.33333E-06	8.33333E-07
Dibenz(a,h)anthracene	Recreational	120	8.33333E-07	8.33333E-08	8.33333E-09
Dibenz(a,h)anthracene	Subsistence	120	8.33333E-07	8.33333E-08	8.33333E-09
Fluoranthene	Recreational	0.96	0.000104167	1.04167E-05	1.04167E-06
Fluoranthene	Subsistence	0.96	0.000104167	1.04167E-05	1.04167E-06
Fluorene	Recreational	0	NA	NA	NA
Fluorene	Subsistence	0	NA	NA	NA
Indeno(1,2,3-c,d)pyrene	Recreational	0.84	0.000119048	1.19048E-05	1.19048E-06
Indeno(1,2,3-c,d)pyrene	Subsistence	0.84	0.000119048	1.19048E-05	1.19048E-06
Naphthalene	Recreational	0	NA	NA	NA
Naphthalene	Subsistence	0	NA	NA	NA
Phenanthrene	Recreational	0	NA	NA	NA
Phenanthrene	Subsistence	0	NA	NA	NA
Pyrene	Recreational	0	NA	NA	NA
Pyrene	Subsistence	0	NA	NA	NA

Table 21. USEPA-Based PPPAH TEP Calculations

COC	Angler	Slope/Reference	TEP		
			0.0001	0.00001	0.000001
Anthracene	Recreational	0	NA	NA	NA
Anthracene	Subsistence	0	NA	NA	NA
Benz(a)anthracene	Recreational	1.46	6.84932E-05	6.84932E-06	6.84932E-07
Benz(a)anthracene	Subsistence	1.46	6.84932E-05	6.84932E-06	6.84932E-07
Benzo(a)pyrene	Recreational	7.3	1.36986E-05	1.36986E-06	1.36986E-07
Benzo(a)pyrene	Subsistence	7.3	1.36986E-05	1.36986E-06	1.36986E-07
Benzo(b)fluoranthene	Recreational	5.84	1.71233E-05	1.71233E-06	1.71233E-07
Benzo(b)fluoranthene	Subsistence	5.84	1.71233E-05	1.71233E-06	1.71233E-07
Benzo(g,h,i)perylene	Recreational	0.0657	0.00152207	0.000152207	1.52207E-05
Benzo(g,h,i)perylene	Subsistence	0.0657	0.00152207	0.000152207	1.52207E-05
Benzo(k)fluoranthene	Recreational	0.219	0.000456621	4.56621E-05	4.56621E-06
Benzo(k)fluoranthene	Subsistence	0.219	0.000456621	4.56621E-05	4.56621E-06
Chrysene	Recreational	0.73	0.000136986	1.36986E-05	1.36986E-06
Chrysene	Subsistence	0.73	0.000136986	1.36986E-05	1.36986E-06
Dibenz(a,h)anthracene	Recreational	73	1.36986E-06	1.36986E-07	1.36986E-08
Dibenz(a,h)anthracene	Subsistence	73	1.36986E-06	1.36986E-07	1.36986E-08
Fluoranthene	Recreational	0.584	0.000171233	1.71233E-05	1.71233E-06
Fluoranthene	Subsistence	0.584	0.000171233	1.71233E-05	1.71233E-06
Fluorene	Recreational	0	NA	NA	NA
Fluorene	Subsistence	0	NA	NA	NA
Indeno(1,2,3-c,d)pyrene	Recreational	0.511	0.000195695	1.95695E-05	1.95695E-06
Indeno(1,2,3-c,d)pyrene	Subsistence	0.511	0.000195695	1.95695E-05	1.95695E-06
Naphthalene	Recreational	0	NA	NA	NA
Naphthalene	Subsistence	0	NA	NA	NA
Phenanthrene	Recreational	0	NA	NA	NA
Phenanthrene	Subsistence	0	NA	NA	NA
Pyrene	Recreational	0	NA	NA	NA
Pyrene	Subsistence	0	NA	NA	NA

Table 22. OEHHA-Based PPPAH CTEP Calculations for Cooking Losses

			50% Cooking Loss			70% Cooking Loss		
			CTEP (µg/kg)			CTEP (µg/kg)		
COC	Angler	Slope	-4	-5	-6	-4	-5	-6
Anthracene	Recreational	0	NA	NA	NA	NA	NA	NA
Anthracene	Subsistence	0	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	Recreational	1.46	425.35	42.53	4.25	303.82	30.38	3.04
Benz(a)anthracene	Subsistence	1.46	42.27	4.23	0.42	42.27	4.23	0.42
Benzo(a)pyrene	Recreational	7.3	85.07	8.51	0.85	60.76	6.08	0.61
Benzo(a)pyrene	Subsistence	7.3	8.45	0.85	0.08	8.45	0.85	0.08
Benzo(b)fluoranthene	Recreational	5.84	106.34	10.63	1.06	75.95	7.60	0.76
Benzo(b)fluoranthene	Subsistence	5.84	10.57	1.06	0.11	10.57	1.06	0.11
Benzo(g,h,i)perylene	Recreational	0.0657	9452.16	945.22	94.52	6751.54	675.15	67.52
Benzo(g,h,i)perylene	Subsistence	0.0657	939.35	93.93	9.39	939.35	93.93	9.39
Benzo(k)fluoranthene	Recreational	0.219	2835.65	283.56	28.36	2025.46	202.55	20.25
Benzo(k)fluoranthene	Subsistence	0.219	281.80	28.18	2.82	281.80	28.18	2.82
Chrysene	Recreational	0.73	850.69	85.07	8.51	607.64	60.76	6.08
Chrysene	Subsistence	0.73	84.54	8.45	0.85	84.54	8.45	0.85
Dibenz(a,h)anthracene	Recreational	73	8.51	0.85	0.09	6.08	0.61	0.06
Dibenz(a,h)anthracene	Subsistence	73	0.85	0.08	0.01	0.85	0.08	0.01
Fluoranthene	Recreational	0.584	1063.37	106.34	10.63	759.55	75.95	7.60
Fluoranthene	Subsistence	0.584	105.68	10.57	1.06	105.68	10.57	1.06
Fluorene	Recreational	0	NA	NA	NA	NA	NA	NA
Fluorene	Subsistence	0	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-c,d)pyrene	Recreational	0.511	1215.28	121.53	12.15	868.06	86.81	8.68
Indeno(1,2,3-c,d)pyrene	Subsistence	0.511	120.77	12.08	1.21	120.77	12.08	1.21
Naphthalene	Recreational	0	NA	NA	NA	NA	NA	NA
Naphthalene	Subsistence	0	NA	NA	NA	NA	NA	NA
Phenanthrene	Recreational	0	NA	NA	NA	NA	NA	NA
Phenanthrene	Subsistence	0	NA	NA	NA	NA	NA	NA
Pyrene	Recreational	0	NA	NA	NA	NA	NA	NA
Pyrene	Subsistence	0	NA	NA	NA	NA	NA	NA

Table 23. USEPA-Based PPPAH CTEP Calculations for Cooking Losses

			50% Cooking Loss			70% Cooking Loss		
			CTEP (µg/kg)			CTEP (µg/kg)		
COC	Angler	Slope	-4	-5	-6	-4	-5	-6
Anthracene	Recreational	0	NA	NA	NA	NA	NA	NA
Anthracene	Subsistence	0	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	Recreational	1.46	699.20	69.92	6.99	499.43	49.94	4.99
Benz(a)anthracene	Subsistence	1.46	69.49	6.95	0.69	69.49	6.95	0.69
Benzo(a)pyrene	Recreational	7.3	139.84	13.98	1.40	99.89	9.99	1.00
Benzo(a)pyrene	Subsistence	7.3	13.90	1.39	0.14	13.90	1.39	0.14
Benzo(b)fluoranthene	Recreational	5.84	174.80	17.48	1.75	124.86	12.49	1.25
Benzo(b)fluoranthene	Subsistence	5.84	17.37	1.74	0.17	17.37	1.74	0.17
Benzo(g,h,i)perylene	Recreational	0.0657	15537.80	1553.78	155.38	11098.43	1109.84	110.98
Benzo(g,h,i)perylene	Subsistence	0.0657	1544.13	154.41	15.44	1544.13	154.41	15.44
Benzo(k)fluoranthene	Recreational	0.219	4661.34	466.13	46.61	3329.53	332.95	33.30
Benzo(k)fluoranthene	Subsistence	0.219	463.24	46.32	4.63	463.24	46.32	4.63
Chrysene	Recreational	0.73	1398.40	139.84	13.98	998.86	99.89	9.99
Chrysene	Subsistence	0.73	138.97	13.90	1.39	138.97	13.90	1.39
Dibenz(a,h)anthracene	Recreational	73	13.98	1.40	0.14	9.99	1.00	0.10
Dibenz(a,h)anthracene	Subsistence	73	1.39	0.14	0.01	1.39	0.14	0.01
Fluoranthene	Recreational	0.584	1748.00	174.80	17.48	1248.57	124.86	12.49
Fluoranthene	Subsistence	0.584	173.71	17.37	1.74	173.71	17.37	1.74
Fluorene	Recreational	0	NA	NA	NA	NA	NA	NA
Fluorene	Subsistence	0	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-c,d)pyrene	Recreational	0.511	1997.72	199.77	19.98	1426.94	142.69	14.27
Indeno(1,2,3-c,d)pyrene	Subsistence	0.511	198.53	19.85	1.99	198.53	19.85	1.99
Naphthalene	Recreational	0	NA	NA	NA	NA	NA	NA
Naphthalene	Subsistence	0	NA	NA	NA	NA	NA	NA
Phenanthrene	Recreational	0	NA	NA	NA	NA	NA	NA
Phenanthrene	Subsistence	0	NA	NA	NA	NA	NA	NA
Pyrene	Recreational	0	NA	NA	NA	NA	NA	NA
Pyrene	Subsistence	0	NA	NA	NA	NA	NA	NA

Table 24. 50% Cooking Loss Calculations for PCBs and Chlordane

50% Cooking Losses

COC	Angler	CSF	TEP			CTEP (µg/kg)			Noncancer (µg/kg)
			0.0001	0.00001	0.000001	-4	-5	-6	
PCBs Cancer	Recreational	2	0.00005	0.000005	0.0000005	510.4167	51.0417	5.1042	
PCBs Cancer	Subsistence	2	0.00005	0.000005	0.0000005	50.7246	5.0725	0.5072	
PCBs Noncancer	Recreational	0.00002							87.5000
PCBs Noncancer	Subsistence	0.00002							8.6957
Chlordane Cancer	Recreational	1.3	7.69231E-05	7.69231E-06	7.692E-07	785.2564	78.5256	7.8526	
Chlordane Cancer	Subsistence	1.3	7.69231E-05	7.69231E-06	7.692E-07	78.0379	7.8038	0.7804	
Chlordane Noncancer	Recreational	0.000033							144.3750
Chlordane Noncancer	Subsistence	0.000033							14.3478

Table 25. 70% Cooking Loss Calculations for PCBs and Chlordane

70% Cooking Losses

COC	Angler	CSF	TEP			CTEP (µg/kg)			Noncancer (µg/kg)
			0.0001	0.00001	0.000001	-4	-5	-6	
PCBs Cancer	Recreational	2	0.00005	0.000005	0.0000005	364.5833	36.4583	3.6458	
PCBs Cancer	Subsistence	2	0.00005	0.000005	0.0000005	50.7246	5.0725	0.5072	
PCBs Noncancer	Recreational	0.00002							62.5000
PCBs Noncancer	Subsistence	0.00002							8.6957
Chlordane Cancer	Recreational	1.3	7.69231E-05	7.69231E-06	7.692E-07	560.8974	56.0897	5.6090	
Chlordane Cancer	Subsistence	1.3	7.69231E-05	7.69231E-06	7.692E-07	78.0379	7.8038	0.7804	
Chlordane Noncancer	Recreational	0.000033							103.1250
Chlordane Noncancer	Subsistence	0.000033							14.3478

Table 26. BSAF Calculations by Site

	CP Reference Stations					
Analyte (µg/kg)	**2231**	**2243**	**2433**	**2440**	**2441**	**2238**
Fraction Lipid%	0.072	0.081	0.067	0.067	0.068	0.048
Fraction TOC%	0.01	0.0056	0.0053	0.0104	0.0182	0.0101
Tissue Total Chlordane	2.2	1.5	0.72	26	0.23	0.5
Tissue Total PCB Congeners	164	159	138	449	77	56
Tissue BAP	58	35	69	220	110	6.2
Tissue HPAH	448	297	386	3972	1336	58
Tissue LPAH	158	77	109	429	185	39
Tissue PPPAH	878	560	774	5144	1911	126
Sediment Total Chlordane	0.91	0.21	0.57	16.2	0.83	0.18
Sediment Total PCB Congeners	43	21	27	283	34	12
Sediment BAP	120	28	90	360	220	19
Sediment HPAH	536	118	415	3049	1210	103
Sediment LPAH	86	20	56	1052	236	17
Sediment PPPAH	1063	267	780	5387	2143	199
TOC/LIPID	0.1389	0.0691	0.0791	0.1552	0.2676	0.2104
LIPID/TOC	7.2000	14.4643	12.6415	6.4423	3.7363	4.7525
BSAF Total Chlordane	0.3358	0.4938	0.0999	0.2491	0.0742	0.5845
BSAF Total PCB Congeners	0.5297	0.5235	0.4043	0.2463	0.6061	0.9819
BSAF BAP	0.0671	0.0864	0.0606	0.0949	0.1338	0.0687
BSAF HPAH	0.1161	0.1740	0.0736	0.2022	0.2955	0.1185
BSAF LPAH	0.2552	0.2662	0.1540	0.0633	0.2098	0.4827
BSAF PPPAH	0.1147	0.1450	0.0785	0.1482	0.2387	0.1332

BSAF = (ppmtissue/ppmsediment) * (fractionTOC/fractionLIPID)

Table 27. Mean BSAF Calculations

MEANS	CP	Zeeman 2004	Combined	Combined * Lipid/TOC
TOC/LIPID	0.15340			
LIPID/TOC	8.20614	4.18	6.19307	
Mean BSAF Total Chlordane	0.30622		0.30622	1.89643
Mean BSAF Total PCB Congeners	0.54864	0.92	0.73432	4.54770
Mean BSAF BAP	0.08526		0.08526	0.52800
Mean BSAF PPPAH	0.14306		0.14306	0.88596