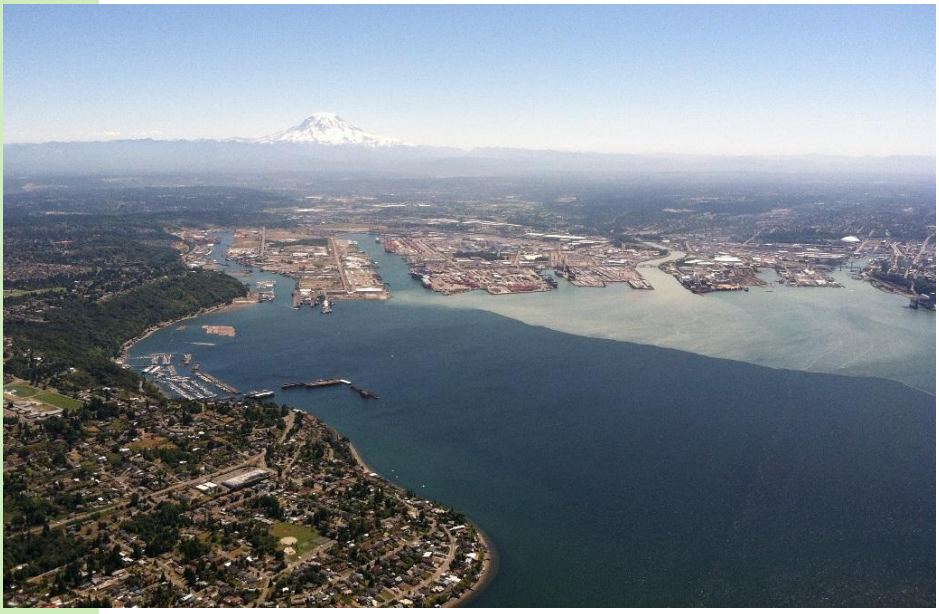

Appendices for:

Puget Sound Regional Toxics Model: Evaluation of PCBs, PBDEs, PAHs, Copper, Lead, and Zinc

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Cover photo: Looking southeast over Commencement Bay to Mount Rainier. Photographed for Eyes Over Puget Sound (http://www.ecy.wa.gov/programs/eap/mar_wat/surface.html) by Laura Hermanson of Ecology's Marine Monitoring Unit.

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Appendix A. Re-calculation of Phase 3 Loading Estimates

Studies conducted in Phase 3 of the Puget Sound Toxics Loading Analysis (PSTLA) developed estimates of contaminant loadings to Puget Sound via four major pathways:

- Atmospheric deposition to the marine water surface[1]
- Surface water runoff
- Publicly-owned treatment works (POTWs)
- Direct groundwater discharge to the marine boundary[2]

However, the usability of the published Phase 3 loads was severely limited for the purposes of the present modeling study for several reasons. First, model inputs required pathway-specific loads for each of the Puget Sound Regional Toxics Model (PSRTM) regions, but most of the Phase 3 studies reported total loading estimates to the entire Puget Sound Basin and not to the separate regions of the Sound. Attempts to obtain the intermediate calculations of regional loads from the study authors were largely unsuccessful. Secondly, the 14 regions used to define the Puget Sound Basin in the Phase 3 studies were not the same as the 10 regions currently used in the PSRTM. The Phase 3 regions included U.S. portions of the Straits of Juan de Fuca and Georgia, along with several subdivisions of model regions, and so those regional loading estimates were not appropriate for model inputs. In addition, inconsistent data rules between the Phase 3 studies yielded maximum loading estimates for some pathways and minimum estimates for others. Such inconsistencies distorted both the magnitude of total loading estimates and the relative contribution of each pathway to the total loads.

Considering the limitations of the loading estimates reported in the Phase 3 studies, it was necessary to re-calculate pathway-specific contaminant loads to the 10 model regions. The same data, rules, and calculation procedures employed in the Phase 3 studies were typically adopted for load regeneration, as those methods had previously been vetted and approved. However, in some cases Phase 3 methods were modified to fix inconsistencies and to make the pathway loads more comparable. To verify that the Phase 3 methods were applied correctly, all of the published Puget Sound Basin loads were reproduced prior to regenerating loads for the PSRTM regions. Any errors discovered in the process of reproducing the published loads were also rectified during load re-calculation.

The regeneration of Phase 3 loading estimates for each pathway is described in the following sub-sections. Spreadsheets detailing the re-calculation process are available on request. The final regenerated loads to the model regions via the major pathways are summarized in Table A-9, and the relative contribution of each pathway to the total Puget Sound Basin load and to the total regional load for each contaminant is shown in Figures A-1 through A-3. While the regenerated loads represent the best available estimates to the model regions, an overview of the major limitations and uncertainties of these loading estimates is given in Table A-10.

[1] Atmospheric deposition of contaminants on the Puget Sound watershed (and the mobilization and transport therefrom) is implicit in the surface runoff loads.

[2] The groundwater marine boundary is defined as a vertical surface extending downward from the marine shoreline of Puget Sound. *Indirect* groundwater contributions of contaminants to freshwater streams and rivers draining to Puget Sound are assumed to be represented in the baseflow component of the surface runoff loads.

Atmospheric Deposition

The annual mass of contaminants of concern (COCs) atmospherically deposited directly to the surface of Puget Sound marine waters was estimated by Brandenberger et al. (2010) for Phase 3 of the PSTLA. Their sampling network consisted of seven locations geographically dispersed around Puget Sound that represented a variety of possible air pollution influences and precipitation patterns. Over the course of 14 months during 2008-2009, funnel-type sampling devices were deployed for two week intervals to collect bulk deposition samples (i.e., wet + dry deposition). Contaminant concentrations were measured in the samples, and daily fluxes (ng COC/m^2/day) were calculated based on the sample volumes, funnel area, and elapsed time of collection. Regional loads were estimated by applying location-specific deposition fluxes to geographically associated marine compartments based on the model regions in Pelletier and Mohamedali (2009), and the total annual load to Puget Sound was the sum of the regional loading estimates.

The study data rules for the handling of non-detects (NDs) and congener/compound summation were not the same for all contaminants.

- *Total PCBs*
  - If at least one congener was detected in a sample, all ND congeners in that sample were assigned zero. Total PCBs was therefore the sum of detected congeners.
  - If all congeners in a sample were ND, the value of 1/2 the maximum detection limit (DL) of the congeners in the sample was assigned as the Total PCB sum.
- *Other contaminants*
  - For "total" contaminants (e.g., Total PBDEs, Total PAHs), all ND constituents in a sample were assigned the congener- or compound-specific DL. The "total" value was therefore the sum of detected results and any substituted DLs.
  - For metals, all ND samples were assigned the DL.

The rules applied to PCBs were comparable to methods used for other loading studies and yielded the *minimum* possible estimates of loads. In contrast, the rules applied to all other contaminants resulted in a strong upward bias of the results, producing *maximum* estimates.

Re-calculation of the Phase 3 loads was principally aimed at consistently applying the PCB substitution and summation rules to all contaminants, as the PCB methods were preferred by Ecology. The original measured concentrations were obtained from the study authors, and from those data daily fluxes and loads were regenerated. Specific issues that were addressed during the load regeneration process included the following:

- For published Total PCB loads, samples for which all congeners were ND had incorrectly substituted the maximum detection limit instead of one-half that value prior to the calculation of daily fluxes and loads. The appropriate substitution (one-half the maximum DL) was applied during re-calculation of the fluxes and loads.
- For Total PCBs, ND substitution rules had been applied incorrectly in the daily flux calculations at site HC7, and that mistake had been carried through calculations of the published loads. The error was fixed prior to regenerating Total PCB loads.

- For all contaminants, the published loadings to Elliott Bay and Commencement Bay had been computed using incorrect region areas. Loads to these regions were regenerated for all parameters using the correct areas of the model regions.
- For Total PBDEs and Total PAHs, the published daily fluxes and loads had been computed using site-region associations that were not consistent with those defined in Table 15 of the study report (i.e., data from the wrong sampling sites had been used to derive the fluxes and loads to several regions). The site-region associations in Table 15 were used for all contaminants when regional fluxes and loads were regenerated.
- The PAH groups defined in the atmospheric deposition report included high molecular weight PAHs (HPAHs), carcinogenic PAHs (cPAHs), and pyrogenic PAHs (Pyr-PAHs). Some of these groups and/or the compounds comprising the groups did not match other Phase 3 definitions. The regenerated loads used PAH group definitions consistent with the other Phase 3 loading studies to improve comparability. However, Naphthalene was not measured in the atmospheric deposition study, and so the atmospheric loading estimates for Total PAHs and LPAHs do not include that compound.
- DLs were not available for individual PAH compounds, and so it was not possible to apply the preferred substitution (i.e., one-half the maximum DL) when all compounds in the LPAH group were ND. In such cases (7 of 109 samples), zero was assigned to the sum and then daily fluxes and loads were regenerated. This may have imparted a small downward bias to the loading estimates for Total LPAHs in some regions.
- PAH samples from four wet-season sampling events were contaminated during analysis, and the results for four HPAH compounds (Benzo(a)anthracene, Chrysene, Fluoranthene, and Pyrene) and all five LPAH compounds were unusable from those events. Following Brandenberger et al. (2010), correlations with non-contaminated measurements were used to estimate sample concentrations for the contaminated compounds as follows:
    - Excluding the samples from the four affected events, the correlation between ∑(six never-contaminated HPAH compounds) and ∑(all HPAH compounds) was strong ($r^2 = 0.986$). That regression equation was used to estimate ∑(all HPAH compounds) for samples where individual HPAH compounds had contaminated results.
    - Excluding the samples from the four affected events, the correlations between ∑(all HPAH compounds) and the individual contamination-affected HPAH compounds were strong (r^2 values of 0.955 for Benzo(a)anthracene, 0.996 for Chrysene, 0.977 for Fluoranthene, and 0.980 for Pyrene). Those regression equations were used with the predicted ∑(all HPAH compounds) values from above to estimate the concentrations of the four HPAH compounds in samples affected by contamination.
    - Correlations could not be developed for LPAH compounds and sums, and so those contamination-affected sample results were not used in daily flux or load calculations. Consequently, the regenerated Total LPAH and Total PAH load estimates were derived using fewer wet-season samples.

The Phase 3 study report offered three "Scenarios" for estimating loads from the measured fluxes: (1) no seasonal or spatial differentiation, (2) spatial differentiation of sub-basins, or (3) spatial-temporal differentiation of fluxes into sub-basins. For the purposes of the model, Scenario 2 was recommended by the report authors since it allowed for differentiation of urban versus rural areas and since the study data were insufficient for a rigorous analysis of seasonal

load differences (Jill Brandenberger, Battelle, personal communication, 2012). All regenerated loads therefore followed the Scenario 2 guidelines described in Brandenberger et al. (2010).

The regenerated Phase 3 atmospheric deposition loads to the 10 model regions are presented in Table A-1. Regenerated loads to the entire Puget Sound Basin are compared to the previous Phase 3 atmospheric deposition loading estimates in Table A-2.

The regenerated loading estimates to the entire Puget Sound Basin were universally lower than those given in Brandenberger et al. (2010). This was due in part to the exclusion of the regional load to the Straits of Juan de Fuca and Georgia (SJF/SOG) in the re-calculated estimates. Another important factor was the adoption of non-detect substitution and summation rules that provided *minimum* loading estimates for all contaminants, as opposed to the Phase 3 rules that yielded *maximum* loads for many contaminants.

Surface Water Runoff

The Phase 3 study to estimate the mass loading of contaminants to Puget Sound via surface water runoff was conducted by Herrera (2011). Eight sub-basins in both the Snohomish River and Puyallup River watersheds comprised the sampling network, with each sub-basin representing one of the following land cover types: commercial/industrial, residential, agricultural, or forests. Surface runoff samples were collected from each sub-basin twice during baseflow and six times during storm event conditions between October 2009 and July 2010. Samples were analyzed for COCs, and continuous discharges (i.e., flows) were recorded during the study period.

Summary statistics[3] for the measured concentrations were used with the stream gauging data to develop baseflow and storm event unit area loads (UALs; kg COC/km^2/y) for the four land cover types. Land areas in the watershed of the entire Puget Sound Basin were categorized as one of the four land cover types, and the contaminant UALs were used to "scale-up" to regional and Puget Sound-wide estimates of surface runoff loadings for baseflow and storm event conditions.

A large proportion of the concentration data for organics were non-detects. PAH compounds were rarely detected or not detected at all, while only a few individual PCB and PBDE congeners were commonly detected. The study-specific rules for handling non-detects and congener-or-compound summation were as follows:

- *Summation rules for contaminant class "totals" (e.g., Total PCBs, Total PAHs)*
  - If at least one constituent (i.e., congener or compound) in a sample was detected, all ND constituents in the sample were assigned zero and the sum of the detected constituents was the "total" value for the sample.
  - If all constituents in a sample were non-detects, the maximum reporting limit (RL) of the constituents in the sample was assigned as the "total" value.
- *Rules for computing concentration summary statistics*
  - If at least one sample was detected, each ND sample was assigned 1/2 the sample-specific RL prior to the calculation of summary statistics (even in cases when an ND sample had been assigned the maximum RL by the constituent summation rules).

[3] Summary statistics included the *minimum*, *25th percentile*, *median*, *75th percentile*, and *maximum*.

- If all samples were non-detects, the summary statistic *maximum* was assigned the value of the maximum RL. All other summary statistics were not reported, but were treated as zero in subsequent UAL and load calculations (discussed below).

According to Ecology (2011), the study rules produced minimum or near-minimum possible values for loading estimates of summed "total" contaminants. However, the very high frequency of non-detects for many PAH compounds caused PAH group loading estimates to be determined largely by reporting limit values, which may have imparted an upward bias (Antweiler and Taylor, 2008).

Re-calculation of the Phase 3 surface runoff loads was necessary because the published loads were computed using regions and areas that do not match the current model. The published loads used 14 regions with a total area of 35,554 km^2. For the PSRTM, 3 of those 14 regions were not used and two were combined into a single region, resulting in 10 model regions with a total area of 28,111 km^2.

For the load re-calculation exercise, summary statistics of the measured concentrations were obtained from the Phase 3 surface runoff report (Herrera, 2011) and UALs were regenerated using the published drainage basin areas[4] and baseflow/storm event discharges. Regional loading estimates were then derived for the two flow regimes using the UALs and land cover areas appropriate to each PSRTM region. Aside from the modification of region areas and updated region-specific land cover areas, load re-calculation generally followed the same procedures used by the Phase 3 surface runoff study. Notable details included:

- The surface runoff loading to The Narrows was zero because that model region had a drainage basin area of zero.
- The published loading estimates were given as a range of values when a contaminant had only ND samples for a specific land cover type and flow regime (see Table 15 in Herrera, 2011). Though not explicitly discussed in the report, the low end of the loading range was derived assuming a concentration of zero. The high value of the loading range was calculated using the maximum RL of the involved samples (i.e., following the summary statistics rules described above). For PAH groups the published ranges were often very broad, with the low value likely exhibiting a downward bias and the high value an upward bias due to the concentration summary statistic substitutions. Regenerated loads for PAH groups were derived using an intermediate substitution when all samples were NDs, assigning 1/2 the maximum RL of the involved samples and then proceeding to calculate UALs and loads. This method deviates from the Phase 3 study methods, but the predicted loads were within the envelope of the published values (toward the lower end of the range).

Regenerated surface runoff loads to the 10 model regions are presented in Table A-3. The re-generated surface runoff loads to the entire Puget Sound Basin are compared to the Phase 3 estimates in Table A-4. The new estimates of surface runoff loading were lower than those in Herrera (2011) due to the exclusion of areas draining to the Straits of Juan de Fuca and Georgia (SJF/SOG). For PAH groups, the regenerated loads that were derived using intermediate substitution rules fell near the lower/middle end of the ranges given in the Phase 3 report.

[4] The drainage basin areas in Table 1 of Herrera (2011) are incorrect; the correct values are given in Table 2 of that project's QAPP Addendum.

Publicly-Owned Treatment Works (POTWs)

The Phase 3 project to assess contaminant loadings to Puget Sound via POTWs was conducted by Ecology and Herrera (2010). Ten facilities geographically distributed around the Sound were selected to represent varying types of treatment process, size, and source of wastewater. Effluent sampling was conducted at each POTW during two events in February and July of 2009, and low detection limit methods were used to analyze contaminant concentrations in the effluent samples. Summary statistics for the measured concentrations were multiplied by the average annual volume of treated wastewater discharged (i.e., flow) from all regional POTWs to compute regional loading estimates, which were then summed to estimate the total loading to the Puget Sound Basin.

The study data rules for handling NDs and congener/compound summation were quite different from the other Phase 3 studies. In some cases regression-on-order statistical analysis (ROS) was used to calculate summary concentration statistics rather than simple substitution (e.g., with one-half the DL). The study rules were as follows:

- *For individual contaminants (e.g. Copper, Pyrene)*
  - If the number of samples, n, was $\geq$ 10 and the frequency of detection, FOD, was $\geq$ 50%, ROS was used to calculate summary statistics.
  - If n < 10 and FOD $\geq$ 65%, the value of 1/2 the maximum RL of the samples was assigned to ND samples prior to the calculation of summary statistics.
  - When FOD < 50%, no attempt was made to derive summary statistics.
- *For contaminant class "totals" (e.g., Total PCBs, Total PAHs)*
  - If at least one constituent (i.e., congener or compound) was detected in a sample, all ND constituents in that sample were assigned zero. The "total" was therefore the sum of detected constituents.
  - If all constituents in a sample were ND, the value of the maximum RL of the constituents in the sample was assigned as the "total."

According to Ecology (2011), the study rules imparted a downward bias in the loading estimates compared to those that would have been obtained using the methods applied in the Phase 3 surface runoff study. In that the POTW methods yielded minimum or near-minimum possible values for loading estimates of "total" contaminants, the study rules were nonetheless deemed acceptable for the purposes of the present modeling work.

Re-calculation of the Phase 3 loads was necessary because the published loads were computed using regions and region-specific POTW discharges that were not identical to the model regions. The Phase 3 study used 14 regions with a total flow of 124,142 MGY. For the PSRTM, three of those 14 regions were not used and 2 were combined into a single region, resulting in 10 model regions with a total flow of 116,136 MGY.

The published concentration summary statistics were obtained from the Phase 3 study authors, and regional loading estimates were regenerated for all modeled contaminants using the updated PSRTM region and flow definitions. Aside from these minor modifications, load re-calculation followed the same procedures used by the Phase 3 POTW study. Notable details of the re-calculation included:

- Due to the very small sample size ($n \leq 20$), all regional loads were computed using concentration data for samples from throughout Puget Sound. That is, regional loads were not calculated using only region-specific concentrations, but from concentrations measured throughout the entire Puget Sound Basin.
- Regional flows were the sum of the average annual flows from *all* POTWs discharging to a region (i.e., all known POTW discharges, not just those from the set of 10 project POTWs).
- The Phase 3 report did not give representative concentrations for parameters for which the frequency of detection was below 50% (i.e., 50% or more of the results were non-detects), and so it was not possible to generate regional loads for some contaminants.
- The loading estimates from POTWs to Elliott Bay and The Narrows model regions were zero because those regions had no POTWs discharging to them.

The regenerated Phase 3 POTW loads to the 10 model regions are presented in Table A-5. Regenerated loads to the entire Puget Sound Basin are compared to the previous Phase 3 POTW loading estimates in Table A-6. The regenerated loading estimates to the Puget Sound Basin were generally slightly lower than those given in Ecology and Herrera (2011) due to the exclusion of the regional loads to the San Juan Islands and to the Straits of Juan de Fuca and Georgia (SJF/SOG) in the re-calculated estimates.

Direct Groundwater Discharge

The Phase 3 groundwater loading study was conducted by Pitz (2011). The study was not a sampling-based assessment; instead, readily-available data on groundwater contaminant concentrations around Puget Sound were used to develop COC loading estimates to the marine boundary through the direct groundwater pathway (indirect groundwater contributions to freshwater streams draining to Puget Sound were assumed to be included in the surface runoff pathway loading estimates). Contaminant data from within 500-m of the marine shoreline were compiled and divided into three categories: impacted areas, urban ambient areas, and non-urban ambient areas. Representative concentrations from each category were derived, and fluxes were calculated by multiplying the discharge (i.e., flow) from each shoreline segment by the concentration representing the groundwater data category for the associated 500-m buffer.

A very large proportion of the concentration data set were from "impacted" locations such as industrial or commercial sites or from facilities that are known or suspected to have point-source-related toxic contamination (e.g., sites typically sampled in response to the Model Toxics Control Act or state Dangerous Waste regulations). The "ambient" data sets were comparatively small since most of the COCs are not typically analyzed during routine groundwater monitoring. The quantity of available data for metals was generally sufficient for the estimation of loads, but data on groundwater concentrations of organic contaminants were scarce. In particular, data on PCBs and PBDEs were not sufficient to derive usable representative concentrations.

Non-detect results were a very large fraction of the COC data sets, comprising 80-90% of the organics data and approximately 70% of the inorganic contaminant data. Possible causes of the high frequency of NDs included 1) many of the contaminants have a strong affinity to sorb to sediment, 2) many of the organic contaminants do not occur naturally in groundwater, and

3) analytical detection limits were generally high relative to contaminant concentrations. The study employed two substitution methods for the handling of non-detect data:

- *Method 1:* Substitute 1/2 the sample RL.
- *Method 2:* Substitute the lowest RL of the contaminant-specific data set.

These rules were applied to the data for each individual contaminant and used to develop representative concentrations for the three shoreline categories in each region. Regional loads were then calculated for low- and high-flow scenarios. Due to the prevalence of non-detect data, the Phase 3 loading estimates were largely driven by the ND substitution methods and resulted in upper-bound (i.e., worst-case) loading estimates for the groundwater pathway. In addition, loading estimates for PAH groups were calculated as the sum of constituent compound loads, which was not consistent with the other Phase 3 studies and introduced a strong upward bias to PAH group loading estimates (constituent results were summed at the individual sample level in the other Phase 3 studies).

Re-calculation of the Phase 3 loads was necessary because the published loads were computed using regions (and region-specific groundwater characteristics) that were not identical to the model regions. The Phase 3 study used 14 regions with a total shoreline length of 3,524 km, total recharge rate of 32,345 L/s, total low-flow discharge of 2,832 L/s, and total high-flow discharge of 28,320 L/s. In contrast, the 10 PSRTM regions had a total shoreline length of 2,353 km, total recharge rate of 28,736 L/s, total low-flow discharge of 2,515 L/s, and total high-flow discharge of 25,160 L/s.

The published representative contaminant concentrations were obtained from the Phase 3 study author, and regional loading estimates were regenerated using groundwater characteristics of the 10 PSRTM regions. Aside from these minor modifications, load re-calculation followed the same procedures used by the Phase 3 groundwater study.

The regenerated Phase 3 groundwater loads to the 10 model regions are presented in Table A-7. Regenerated loads to the entire Puget Sound Basin are compared to the previous Phase 3 direct groundwater discharge loading estimates in Table A-8. Following Ecology (2011), these tables present the lowest, highest, and mid-point of the loads derived using Method 1 and Method 2 substitutions and low- and high-flow scenarios (instead of the usual 25^{th} percentile, 75^{th} percentile, and median loads). The regenerated loading estimates were generally slightly lower than those given in Pitz (2011) due to the exclusion of groundwater loads to several regions outside the PSRTM domain.

Table A-1. Regenerated Scenario 2 atmospheric deposition loads to the 10 model regions.

Contaminant	Statistic	Units	Admiralty Inlet	Hood North	Hood South	Main Basin	The Narrows	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sincl./Dyes Inlet	Puget Sound Total
	25th %tile	kg/yr	85.6	24.8	43.5	191	39.1	194	173	53.9	59.4	23.7	888
Copper	Median	kg/yr	126	33.5	58.7	250	56.0	276	298	77.3	85.1	37.0	1299
	75th %tile	kg/yr	205	51.6	90.6	421	91.0	335	324	126	138	52.8	1835
	25th %tile	kg/yr	25.2	7.80	13.7	63.3	20.3	75.9	47.3	28.0	30.8	6.58	319
Lead	Median	kg/yr	51.3	16.0	28.2	93.7	27.7	117	97.2	38.3	42.2	12.9	524
	75th %tile	kg/yr	73.1	19.3	33.8	137	41.1	175	116	56.6	62.4	14.9	729
	25th %tile	kg/yr	520	167	292	961	143	976	877	197	217	82.2	4432
Zinc	Median	kg/yr	1024	244	428	1268	230	1363	1549	318	350	166	6942
	75th %tile	kg/yr	1473	426	747	2009	249	1850	2301	343	378	281	10056
	25th %tile	g/yr	29.9	7.92	13.9	44.9	5.74	42.9	54.2	7.92	8.72	9.22	225
Total PCBs	Median	g/yr	46.5	12.1	21.2	111	8.51	99.5	89.9	11.7	12.9	13.1	426
	75th %tile	g/yr	240	50.1	87.9	219	13.3	226	387	18.3	20.2	31.3	1294
	25th %tile	g/yr	274	92.6	163	613	54.2	408	432	74.8	82.3	77.2	2270
Total PBDEs	Median	g/yr	425	134	236	943	101	590	641	140	154	127	3492
	75th %tile	g/yr	736	223	391	1459	119	920	1229	164	181	208	5630
	25th %tile	kg/yr	2.16	0.482	0.845	8.12	1.76	3.15	3.54	2.43	2.68	1.07	26.2
Total PAHs	Median	kg/yr	4.72	1.64	2.88	16.2	3.50	5.49	6.86	4.83	5.32	2.60	54.0
	75th %tile	kg/yr	8.28	2.05	3.61	24.0	4.30	12.1	16.1	5.93	6.53	3.47	86.3
	25th %tile	kg/yr	0.198	0.087	0.153	0.878	0.433	0.420	0.304	0.598	0.659	0.194	3.92
Total LPAHs	Median	kg/yr	0.838	0.421	0.739	8.11	0.886	1.20	0.562	1.22	1.35	1.30	16.6
	75th %tile	kg/yr	1.64	0.536	0.941	11.7	1.46	3.55	5.67	2.01	2.22	1.89	31.6
	25th %tile	kg/yr	2.13	0.633	1.11	5.83	1.47	2.77	3.47	2.02	2.23	0.797	22.5
Total HPAHs	Median	kg/yr	4.31	1.25	2.20	11.5	2.63	5.63	7.94	3.62	3.99	1.45	44.5
	75th %tile	kg/yr	6.63	1.95	3.42	15.4	3.10	9.24	11.1	4.27	4.70	2.19	61.9
	25th %tile	kg/yr	0.903	0.268	0.471	2.37	0.564	1.09	1.51	0.779	0.857	0.328	9.14
Total cPAHs	Median	kg/yr	2.03	0.589	1.03	4.70	1.09	2.48	3.62	1.51	1.66	0.421	19.1
	75th %tile	kg/yr	3.18	1.01	1.77	6.79	1.28	3.98	5.61	1.77	1.95	0.957	28.3

Table A-2. Comparison of the Phase 3 published loads to the regenerated loads for the atmospheric deposition pathway. Loading estimates shown are for the entire Puget Sound Basin.

Contaminant	Statistic	Atmospheric Deposition [a]		Units
		Phase 3 [b]	PSRTM [c]	
Copper	25th %tile	1.9	0.9	t/yr
	Median	2.8	1.3	
	75th %tile	4.2	1.8	
Lead	25th %tile	0.6	0.3	t/yr
	Median	1.1	0.5	
	75th %tile	1.6	0.7	
Zinc	25th %tile	10	4	t/yr
	Median	19	7	
	75th %tile	27	10	
Total PCBs	25th %tile	0.6	0.2	kg/yr
	Median	1.0	0.4	
	75th %tile	4.1	1.3	
Total PBDEs	25th %tile	12.7	2.3	kg/yr
	Median	15.6	3.5	
	75th %tile	21.4	5.6	
Total PAHs [d]	25th %tile	NC	26	kg/yr
	Median	NC	54	
	75th %tile	NC	86	
Total LPAHs [d]	25th %tile	NC	4	kg/yr
	Median	NC	17	
	75th %tile	NC	32	
Total HPAHs	25th %tile	50	22	kg/yr
	Median	94	45	
	75th %tile	140	62	
Total cPAHs	25th %tile	21	9	kg/yr
	Median	40	19	
	75th %tile	61	28	

NC = Not calculated. PSRTM = Puget Sound Regional Toxics Model. t = metric ton (i.e., 1000 kg).

[a] All loads shown are Scenario 2 estimates; see Brandenberger et al. (2010) for details.

[b] Phase 3 loading estimates are from Tables 16, 17, 18, and G-5 of Brandenberger et al. (2010). Loading estimates for Total PCBs used different non-detect substitution and summation rules than those used for all other contaminants (Total PCB loads were minimum possible values, while all others were maximum values). Loads to the entire Puget Sound Basin were computed as the sum of the loads to 10 model regions *plus* the load to the Straits of Juan de Fuca and Georgia (SJF/SOG). The surface areas used in the calculation of two regional loads were incorrect (i.e., areas were too high). For Total PBDEs, Total HPAHs, and Total cPAHs, the sampling sites used to derive the loads to several regions were not consistent with the site-region associations used for all other contaminants. Scenario 2 loading estimates for Lead in Table 18 of Brandenberger et al. (2010) were incorrect; the values given here were obtained from Jill Brandenberger (personal communication, 2012). Loading estimates for Total PAHs and Total LPAHs were not calculated in the Phase 3 study.

[c] Regenerated loads for all contaminants were derived using the same non-detect substitution rules that were used for Total PCB loading estimates in the Phase 3 study; those rules yield minimum possible values for loading estimates. Regenerated loads to the entire Puget Sound Basin were computed as the sum of the loads to 10 model regions, *excluding* the SJF/SOG load.

[d] Naphthalene was not measured for the Phase 3 study, and so regenerated loads for Total PAHs and Total LPAHs do not include that compound.

Table A-3. Regenerated surface runoff loads to the 10 model regions.

Contaminant	Statistic	Units	Admiralty Inlet	Hood North	Hood South	Main Basin	The Narrows	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sincl./Dyes Inlet	Puget Sound Total
	25th %tile	kg/yr	232	254	1807	1529	0.00	3300	11016	2062	1054	274	21528
Copper	Median	kg/yr	303	325	2285	2039	0.00	4294	14095	2664	1375	363	27744
	75th %tile	kg/yr	557	595	4271	3405	0.00	7788	26304	4839	2400	621	50779
	25th %tile	kg/yr	24	26.8	166	248	0.00	367	1025	227	143	40.4	2267
Lead	Median	kg/yr	39	44.5	289	376	0.00	598	1762	374	227	62.1	3772
	75th %tile	kg/yr	64	71.7	455	627	0.00	973	2801	604	370	103	6069
	25th %tile	kg/yr	883	1046	7744	6280	0.00	13207	45501	8571	4642	1088	88963
Zinc	Median	kg/yr	1001	1122	7897	7846	0.00	14799	47823	9405	5369	1326	96588
	75th %tile	kg/yr	1130	1174	8008	9317	0.00	16427	50593	10306	6307	1527	104788
	25th %tile	g/yr	19.4	23.4	174	138	0.00	292	1016	191	103	23.9	1980
Total PCBs	Median	g/yr	41.5	48.5	353	321	0.00	625	2091	405	231	54.1	4170
	75th %tile	g/yr	122	145	1050	1062	0.00	1890	6193	1244	769	172	12646
	25th %tile	g/yr	38.9	49.8	382	253	0.00	594	2165	393	197	45.7	4118
Total PBDEs	Median	g/yr	43.2	52.4	386	368	0.00	674	2256	447	274	59.7	4561
	75th %tile	g/yr	66.0	72.9	510	1098	0.00	1203	3199	859	840	142	7989
	25th %tile	kg/yr	2.56	3.15	23.4	18.8	0.00	39.0	135	25.5	13.8	3.26	264
Total PAHs	Median	kg/yr	3.35	4.11	30.3	25.8	0.00	51.4	176	33.7	18.8	4.38	348
	75th %tile	kg/yr	3.46	4.21	31.0	28.7	0.00	53.7	181	35.5	21.1	4.73	363
	25th %tile	kg/yr	1.64	2.05	15.2	9.88	0.00	24.3	87.2	15.6	7.02	1.89	165
Total LPAHs	Median	kg/yr	1.66	2.06	15.3	10.2	0.00	24.5	87.9	15.8	7.23	1.93	167
	75th %tile	kg/yr	2.30	2.86	21.2	14.6	0.00	34.2	121	22.0	10.3	2.74	232
	25th %tile	kg/yr	3.26	4.08	30.7	21.9	0.00	49.3	176	32.2	16.3	3.93	337
Total HPAHs	Median	kg/yr	3.33	4.14	30.8	24.6	0.00	51.0	177	33.5	18.1	4.26	347
	75th %tile	kg/yr	3.43	4.19	30.9	27.7	0.00	53.1	180	35.0	20.4	4.61	359
	25th %tile	kg/yr	2.39	3.01	22.7	15.4	0.00	36.0	129	23.5	11.4	2.82	247
Total cPAHs	Median	kg/yr	2.45	3.05	22.8	17.1	0.00	37.1	131	24.2	12.5	3.03	253
	75th %tile	kg/yr	2.53	3.10	22.8	18.8	0.00	38.5	132	25.1	13.6	3.25	260

Table A-4. Comparison of the Phase 3 published loads to the regenerated loads for the surface runoff pathway. Loading estimates shown are for the entire Puget Sound Basin.

Contaminant	Statistic	Surface Runoff		Units
		Phase 3 [a]	PSRTM [b]	
Copper	25th %tile	27.6	21.5	t/yr
	Median	35.7	27.7	
	75th %tile	65.7	50.8	
Lead	25th %tile	2.8	2.3	t/yr
	Median	4.7	3.8	
	75th %tile	7.6	6.1	
Zinc	25th %tile	113	89	t/yr
	Median	122	97	
	75th %tile	134	105	
Total PCBs	25th %tile	2.5	2.0	kg/yr
	Median	5.3	4.2	
	75th %tile	15.9	12.6	
Total PBDEs	25th %tile	5.2	4.1	kg/yr
	Median	5.7	4.6	
	75th %tile	9.7	8.0	
Total PAHs [c]	25th %tile	119-545	264	kg/yr
	Median	223-649	348	
	75th %tile	241-667	363	
Total LPAHs [c]	25th %tile	102-314	165	kg/yr
	Median	104-316	167	
	75th %tile	187-398	232	
Total HPAHs [c]	25th %tile	25-824	337	kg/yr
	Median	36-835	347	
	75th %tile	50-849	359	
Total cPAHs [c]	25th %tile	18-603	247	kg/yr
	Median	25-610	253	
	75th %tile	34-620	260	

PSRTM = Puget Sound Regional Toxics Model.
t = metric ton (i.e., 1000 kg).

[a] Phase 3 estimates of surface runoff loads for the entire Puget Sound basin are from Table 15 of Herrera (2011). The total drainage basin area for these estimates was 35,554 km^2 and comprised 14 regions (*including* areas draining to the Straits of Juan de Fuca and Georgia and the San Juan Islands). These loads were generally considered to be minimum or near-minimum estimates (Ecology, 2011).

[b] Regenerated surface runoff loads to the Puget Sound basin included 10 model regions with a drainage basin area of 28,111 km^2 and *excluded* loads to the Straits. Regenerated loads for all contaminants except PAHs were derived using the same non-detect substitution and summation rules that were used by the Phase 3 study.

[c] PAHs were rarely detected in samples for the Phase 3 study. Surface runoff loads for PAHs were derived using two different substitution methods when all samples were non-detects, and the loading estimates were given as a range of values in Herrera (2011). Regenerated loads for PAHs were derived using an intermediate substitution when all samples were non-detects; see text for details.

Table A-5. Regenerated POTW loads to the 10 model regions.

Contaminant	Statistic	Units	Admiralty Inlet	Hood North	Hood South	Main Basin	The Narrows	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sincl./Dyes Inlet	Puget Sound Total
Copper	25th %tile	kg/yr	6.69	1.48	0.118	1462	0.00	238	314	245	0.00	73.0	2340
	Median	kg/yr	11.6	2.56	0.205	2532	0.00	413	543	425	0.00	126	4053
	75th %tile	kg/yr	14.7	3.26	0.261	3220	0.00	525	691	540	0.00	161	5155
Lead	25th %tile	kg/yr	0.374	0.0827	0.00661	81.7	0.00	13.3	17.5	13.7	0.00	4.08	131
	Median	kg/yr	0.496	0.110	0.00878	108	0.00	17.7	23.3	18.2	0.00	5.42	174
	75th %tile	kg/yr	0.679	0.150	0.0120	148	0.00	24.2	31.8	24.9	0.00	7.41	237
Zinc	25th %tile	kg/yr	42.9	9.48	0.758	9371	0.00	1528	2010	1572	0.00	468	15002
	Median	kg/yr	50.8	11.2	0.898	11094	0.00	1809	2380	1861	0.00	554	17761
	75th %tile	kg/yr	63.7	14.1	1.13	13909	0.00	2268	2984	2333	0.00	695	22267
Total PCBs	25th %tile	g/yr	0.339	0.0749	0.00599	74.0	0.00	12.1	15.9	12.4	0.00	3.70	118
	Median	g/yr	0.917	0.203	0.0162	200	0.00	32.7	43.0	33.6	0.00	10.0	321
	75th %tile	g/yr	4.69	1.04	0.0829	1024	0.00	167	220	172	0.00	51.2	1640
Total PBDEs	25th %tile	g/yr	18.8	4.15	0.332	4101	0.00	669	880	688	0.00	205	6566
	Median	g/yr	28.3	6.26	0.501	6190	0.00	1009	1328	1038	0.00	309	9909
	75th %tile	g/yr	55.4	12.3	0.980	12108	0.00	1974	2597	2031	0.00	605	19384
Total PAHs	25th %tile	kg/yr	0.0202	0.00447	0.000357	4.41	0.00	0.720	0.947	0.740	0.00	0.221	7.07
	Median	kg/yr	0.0496	0.0110	0.000878	10.8	0.00	1.77	2.33	1.82	0.00	0.542	17.4
	75th %tile	kg/yr	0.123	0.0271	0.00217	26.8	0.00	4.37	5.75	4.50	0.00	1.34	42.9
Total LPAHs	25th %tile	kg/yr	0.00876	0.00194	0.000155	1.91	0.00	0.312	0.410	0.321	0.00	0.0956	3.06
	Median	kg/yr	0.0216	0.00477	0.000381	4.71	0.00	0.768	1.01	0.790	0.00	0.235	7.54
	75th %tile	kg/yr	0.0933	0.0206	0.00165	20.4	0.00	3.32	4.37	3.42	0.00	1.02	32.6
Total HPAHs	25th %tile	kg/yr	0.00993	0.00220	0.000176	2.17	0.00	0.354	0.466	0.364	0.00	0.108	3.47
	Median	kg/yr	0.0132	0.00292	0.000233	2.88	0.00	0.470	0.618	0.484	0.00	0.144	4.62
	75th %tile	kg/yr	0.0200	0.00442	0.000353	4.37	0.00	0.712	0.937	0.732	0.00	0.218	6.99
Total cPAHs	25th %tile	kg/yr	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
	Median	kg/yr	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
	75th %tile	kg/yr	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

Table A-6. Comparison of the Phase 3 published loads to the regenerated loads for the POTWs pathway. Loading estimates shown are for the entire Puget Sound Basin.

Contaminant	Statistic	POTWs		Units
		Phase 3 [a]	PSRTM [b]	
Copper	25th %tile	2.5	2.3	t/yr
	Median	4.3	4.1	
	75th %tile	5.5	5.2	
Lead	25th %tile	0.1	0.1	t/yr
	Median	0.2	0.2	
	75th %tile	0.3	0.2	
Zinc	25th %tile	16	15	t/yr
	Median	19	18	
	75th %tile	24	22	
Total PCBs	25th %tile	0.1	0.1	kg/yr
	Median	0.3	0.3	
	75th %tile	1.8	1.6	
Total PBDEs	25th %tile	7.0	6.6	kg/yr
	Median	10.6	9.9	
	75th %tile	20.7	19.4	
Total PAHs	25th %tile	8	7	kg/yr
	Median	19	17	
	75th %tile	46	43	
Total LPAHs	25th %tile	3	3	kg/yr
	Median	8	8	
	75th %tile	35	33	
Total HPAHs	25th %tile	4	3	kg/yr
	Median	5	5	
	75th %tile	7	7	
Total cPAHs	25th %tile	NC	NC	kg/yr
	Median	NC	NC	
	75th %tile	NC	NC	

NC = Not calculated due to insufficient data.
PSRTM = Puget Sound Regional Toxics Model.
t = metric ton (i.e., 1000 kg).

[a] Phase 3 estimates of POTW loads for the entire Puget Sound basin are from Appendix H of Ecology and Herrera (2010). The total flow for these estimates was 124,142 MGY (million gallons per year) and comprised 14 regions (*including* areas draining to the Straits of Juan de Fuca and Georgia and the San Juan Islands).

[b] Regenerated POTW loads to the Puget Sound basin included 10 model regions with a total flow of 116,136 MGY and *excluded* loads to the Straits. Regenerated loads for all contaminants were derived using the same non-detect substitution and summation rules that were used by the Phase 3 study.

Table A-7. Regenerated direct groundwater discharge loads to the 10 model regions.

Contaminant	Statistic	Units	Admiralty Inlet	Hood North	Hood South	Main Basin	The Narrows	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sincl./Dyes Inlet	Puget Sound Total
Copper	Lowest	kg/yr	0.648	25.8	7.24	6.30	0.00	17.5	3.96	1.42	0.345	4.62	67.8
	Midpoint	kg/yr	34.3	271	456	130	0.00	794	188	27.1	8.17	142	2051
	Highest	kg/yr	67.9	516	905	254	0.00	1570	372	52.8	16.0	280	4034
Lead	Lowest	kg/yr	0.529	10.2	3.62	5.49	0.00	12.7	2.75	0.845	0.154	4.20	40.5
	Midpoint	kg/yr	12.7	134	125	118	0.00	364	80.3	21.5	4.53	110	970
	Highest	kg/yr	24.9	258	246	231	0.00	715	158	42.3	8.90	216	1900
Zinc	Lowest	kg/yr	28.7	230	380	132	0.00	673	158	22.5	5.30	124	1755
	Midpoint	kg/yr	158	1263	2091	729	0.00	3704	872	126	32.0	685	9659
	Highest	kg/yr	287	2296	3802	1326	0.00	6735	1585	230	58.6	1245	17562
Total PCBs	Lowest	g/yr	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
	Midpoint	g/yr	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
	Highest	g/yr	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total PBDEs	Lowest	g/yr	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
	Midpoint	g/yr	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
	Highest	g/yr	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Total PAHs	Lowest	kg/yr	0.158	1.51	1.80	1.57	0.00	4.37	1.00	0.256	0.0564	1.16	11.9
	Midpoint	kg/yr	1.39	33.3	15.2	13.0	0.00	40.3	17.2	135	4.63	11.5	272
	Highest	kg/yr	2.61	65.1	28.6	24.4	0.00	76.2	33.4	270	9.20	21.9	532
Total LPAHs	Lowest	kg/yr	0.0554	1.12	0.348	1.08	0.00	2.22	0.482	0.193	0.0439	0.893	6.44
	Midpoint	kg/yr	0.942	31.6	10.2	8.54	0.00	27.9	9.12	51.7	2.82	8.17	151
	Highest	kg/yr	1.83	62.1	20.0	16.0	0.00	53.6	17.8	103	5.60	15.5	296
Total HPAHs	Lowest	kg/yr	0.0785	0.298	0.860	0.487	0.00	2.15	0.523	0.0630	0.0125	0.267	4.74
	Midpoint	kg/yr	0.550	2.08	7.69	4.42	0.00	12.4	8.10	83.6	1.81	3.34	124
	Highest	kg/yr	1.02	3.86	14.5	8.35	0.00	22.6	15.7	167	3.60	6.41	243
Total cPAHs	Lowest	kg/yr	0.0543	0.205	0.716	0.351	0.00	1.27	0.415	0.0379	0.00864	0.198	3.25
	Midpoint	kg/yr	0.442	1.67	6.31	2.05	0.00	9.17	5.29	57.9	0.691	1.26	84.8
	Highest	kg/yr	0.830	3.14	11.9	3.75	0.00	17.1	10.2	116	1.37	2.32	166

Table A-8. Comparison of the Phase 3 published loads to the regenerated loads for the direct groundwater discharge pathway. Loading estimates shown are for the entire Puget Sound Basin.

Contaminant	Statistic [a]	Direct Groundwater		Units
		Phase 3 [b]	PSRTM [c]	
Copper	Lowest	0.1	0.1	t/yr
	Midpoint	2.2	2.1	
	Highest	4.3	4.0	
Lead	Lowest	0.1	0.1	t/yr
	Midpoint	1.1	1.0	
	Highest	2.1	1.9	
Zinc	Lowest	2	2	t/yr
	Midpoint	11	10	
	Highest	20	18	
Total PCBs	Lowest	NC	NC	kg/yr
	Midpoint	NC	NC	
	Highest	NC	NC	
Total PBDEs	Lowest	NC	NC	kg/yr
	Midpoint	NC	NC	
	Highest	NC	NC	
Total PAHs	Lowest	13	12	kg/yr
	Midpoint	284	272	
	Highest	555	532	
Total LPAHs	Lowest	7	6	kg/yr
	Midpoint	159	151	
	Highest	311	296	
Total HPAHs	Lowest	6	5	kg/yr
	Midpoint	125	124	
	Highest	244	243	
Total cPAHs	Lowest	5	4	kg/yr
	Midpoint	83	80	
	Highest	161	155	

NC = Not calculated due to insufficient data.
PSRTM = Puget Sound Regional Toxics Model.
t = metric ton (i.e., 1000 kg).

[a] Following Ecology (2011), the table presents the lowest, highest, and mid-point of the loads derived using Method 1 and Method 2 substitutions and low- and high-flow scenarios (instead of the 25th percentile, median, and 75th percentile estimates given for other loading pathways).

[b] Phase 3 estimates of direct groundwater loads for the entire Puget Sound basin are from Table 5 of Pitz (2011). That study used 14 regions (*including* areas discharging to the Straits of Juan de Fuca and Georgia and the San Juan Islands) with a total shoreline length of 3,524 km, total recharge rate of 32,345 L/s, total low-flow discharge of 2,832 L/s, and total high-flow discharge of 28,320 L/s.

[c] Regenerated direct groundwater discharge loads to the Puget Sound basin included 10 model regions (loads to the Straits were excluded) with a total shoreline length of 2,353 km, total recharge rate of 28,736 L/s, total low-flow discharge of 2,515 L/s, and total high-flow discharge of 25,160 L/s. Aside from these changes, load re-calculation followed the same procedures and rules used by the Phase 3 study.

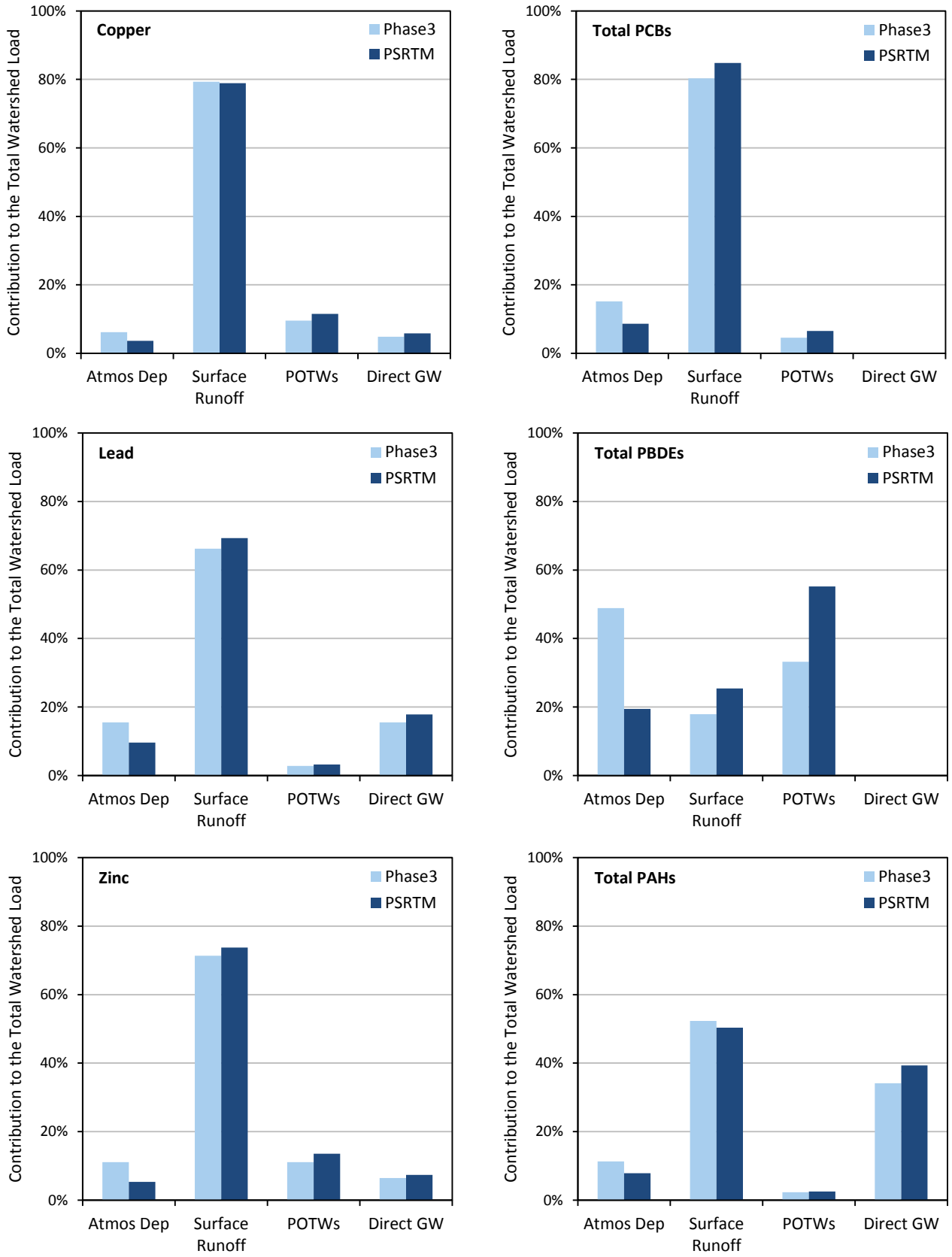


Figure A-1. Pathway contributions to the total watershed load: Comparison of the Phase 3 published values to the regenerated loads from the present study (labeled "PSRTM" in each plot). All loads used in this analysis were median estimates.

Table A-9. Summary of regenerated Phase 3 loadings to the model regions.

Contaminant	Region	Units	Atmospheric Deposition			Surface Runoff (baseflow + storm)			Publicly-Owned Treatment Works			Direct Groundwater Discharge		
			25th	median	75th	25th	median	75th	25th	median	75th	Lowest	Midpoint	Highest
Copper	Admiralty Inlet	kg/year	85.6	126	205	232	303	557	6.69	11.6	14.7	0.648	34.3	67.9
	Hood Canal North	kg/year	24.8	33.5	51.6	254	325	595	1.48	2.56	3.26	25.8	271	516
	Hood Canal South	kg/year	43.5	58.7	90.6	1807	2285	4271	0.118	0.205	0.261	7.24	456	905
	Main Basin	kg/year	191	250	421	1529	2039	3405	1462	2532	3220	6.30	130	254
	The Narrows	kg/year	39.1	56.0	91.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	South Sound	kg/year	194	276	335	3300	4294	7788	238	413	525	17.5	794	1570
	Whidbey Basin	kg/year	173	298	324	11016	14095	26304	314	543	691	3.96	188	372
	Comm. Bay	kg/year	53.9	77.3	126	2062	2664	4839	245	425	540	1.42	27.1	52.8
	Elliott Bay	kg/year	59.4	85.1	138	1054	1375	2400	0.00	0.00	0.00	0.345	8.17	16.0
	Sinclair/Dyes Inlet	kg/year	23.7	37.0	52.8	274	363	621	73.0	126	161	4.62	142	280
	Puget Sound Total	kg/year	888	1299	1835	21528	27744	50779	2340	4053	5155	67.8	2051	4034
Lead	Admiralty Inlet	kg/year	25.2	51.3	73.1	24.0	39.5	64.4	0.374	0.496	0.679	0.529	12.7	24.9
	Hood Canal North	kg/year	7.80	16.0	19.3	26.8	44.5	71.7	0.0827	0.110	0.150	10.2	134	258
	Hood Canal South	kg/year	13.7	28.2	33.8	166	289	455	0.00661	0.00878	0.0120	3.62	125	246
	Main Basin	kg/year	63.3	93.7	137	248	376	627	81.7	108	148	5.49	118	231
	The Narrows	kg/year	20.3	27.7	41.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	South Sound	kg/year	75.9	117	175	367	598	973	13.3	17.7	24.2	12.7	364	715
	Whidbey Basin	kg/year	47.3	97.2	116	1025	1762	2801	17.5	23.3	31.8	2.75	80.3	158
	Comm. Bay	kg/year	28.0	38.3	56.6	227	374	604	13.7	18.2	24.9	0.845	21.5	42.3
	Elliott Bay	kg/year	30.8	42.2	62.4	143	227	370	0.00	0.00	0.00	0.154	4.53	8.90
	Sinclair/Dyes Inlet	kg/year	6.58	12.9	14.9	40.4	62.1	103	4.08	5.42	7.41	4.20	110	216
	Puget Sound Total	kg/year	319	524	729	2267	3772	6069	131	174	237	40.5	970	1900
Zinc	Admiralty Inlet	kg/year	520	1024	1473	883	1001	1130	42.9	50.8	63.7	28.7	158	287
	Hood Canal North	kg/year	167	244	426	1046	1122	1174	9.48	11.2	14.1	230	1263	2296
	Hood Canal South	kg/year	292	428	747	7744	7897	8008	0.758	0.898	1.13	380	2091	3802
	Main Basin	kg/year	961	1268	2009	6280	7846	9317	9371	11094	13909	132	729	1326
	The Narrows	kg/year	143	230	249	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	South Sound	kg/year	976	1363	1850	13207	14799	16427	1528	1809	2268	673	3704	6735
	Whidbey Basin	kg/year	877	1549	2301	45501	47823	50593	2010	2380	2984	158	872	1585
	Comm. Bay	kg/year	197	318	343	8571	9405	10306	1572	1861	2333	22.5	126	230
	Elliott Bay	kg/year	217	350	378	4642	5369	6307	0.00	0.00	0.00	5.30	32.0	58.6
	Sinclair/Dyes Inlet	kg/year	82.2	166	281	1088	1326	1527	468	554	695	124	685	1245
	Puget Sound Total	kg/year	4432	6942	10056	88963	96588	104788	15002	17761	22267	1755	9659	17562

Table A-9 (continued). Summary of regenerated Phase 3 loadings to the model regions.

Contaminant	Region	Units	Atmospheric Deposition			Surface Runoff (baseflow + storm)			Publicly-Owned Treatment Works			Direct Groundwater Discharge		
			25th	median	75th	25th	median	75th	25th	median	75th	Lowest	Midpoint	Highest
Total PCBs	Admiralty Inlet	g/year	29.9	46.5	240	19.4	41.5	122	0.339	0.917	4.69	NC	NC	NC
	Hood Canal North	g/year	7.92	12.1	50.1	23.4	48.5	145	0.0749	0.203	1.04	NC	NC	NC
	Hood Canal South	g/year	13.9	21.2	87.9	174	353	1050	0.00599	0.0162	0.0829	NC	NC	NC
	Main Basin	g/year	44.9	111	219	138	321	1062	74.0	200	1024	NC	NC	NC
	The Narrows	g/year	5.74	8.51	13.3	0.00	0.00	0.00	0.00	0.00	0.00	NC	NC	NC
	South Sound	g/year	42.9	99.5	226	292	625	1890	12.1	32.7	167	NC	NC	NC
	Whidbey Basin	g/year	54.2	89.9	387	1016	2091	6193	15.9	43.0	220	NC	NC	NC
	Comm. Bay	g/year	7.92	11.7	18.3	191	405	1244	12.4	33.6	172	NC	NC	NC
	Elliott Bay	g/year	8.72	12.9	20.2	103	231	769	0.00	0.00	0.00	NC	NC	NC
	Sinclair/Dyes Inlet	g/year	9.22	13.1	31.3	23.9	54.1	172	3.70	10.0	51.2	NC	NC	NC
	Puget Sound Total	g/year	225	426	1294	1980	4170	12646	118	321	1640	NC	NC	NC
Total PBDEs	Admiralty Inlet	g/year	274	425	736	38.9	43.2	66.0	18.8	28.3	55.4	NC	NC	NC
	Hood Canal North	g/year	92.6	134	223	49.8	52.4	72.9	4.15	6.26	12.3	NC	NC	NC
	Hood Canal South	g/year	163	236	391	382	386	510	0.332	0.501	0.980	NC	NC	NC
	Main Basin	g/year	613	943	1459	253	368	1098	4101	6190	12108	NC	NC	NC
	The Narrows	g/year	54.2	101	119	0.00	0.00	0.00	0.00	0.00	0.00	NC	NC	NC
	South Sound	g/year	408	590	920	594	674	1203	669	1009	1974	NC	NC	NC
	Whidbey Basin	g/year	432	641	1229	2165	2256	3199	880	1328	2597	NC	NC	NC
	Comm. Bay	g/year	74.8	140	164	393	447	859	688	1038	2031	NC	NC	NC
	Elliott Bay	g/year	82.3	154	181	197	274	840	0.00	0.00	0.00	NC	NC	NC
	Sinclair/Dyes Inlet	g/year	77.2	127	208	45.7	59.7	142	205	309	605	NC	NC	NC
	Puget Sound Total	g/year	2270	3492	5630	4118	4561	7989	6566	9909	19384	NC	NC	NC
Total PAHs	Admiralty Inlet	kg/year	2.16	4.72	8.28	2.56	3.35	3.46	0.0202	0.0496	0.123	0.158	1.39	2.61
	Hood Canal North	kg/year	0.482	1.64	2.05	3.15	4.11	4.21	0.00447	0.0110	0.0271	1.51	33.3	65.1
	Hood Canal South	kg/year	0.845	2.88	3.61	23.4	30.3	31.0	0.000357	0.000878	0.00217	1.80	15.2	28.6
	Main Basin	kg/year	8.12	16.2	24.0	18.8	25.8	28.7	4.41	10.8	26.8	1.57	13.0	24.4
	The Narrows	kg/year	1.76	3.50	4.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	South Sound	kg/year	3.15	5.49	12.1	39.0	51.4	53.7	0.720	1.77	4.37	4.37	40.3	76.2
	Whidbey Basin	kg/year	3.54	6.86	16.1	135	176	181	0.947	2.33	5.75	1.00	17.2	33.4
	Comm. Bay	kg/year	2.43	4.83	5.93	25.5	33.7	35.5	0.740	1.82	4.50	0.256	135	270
	Elliott Bay	kg/year	2.68	5.32	6.53	13.8	18.8	21.1	0.00	0.00	0.00	0.0564	4.63	9.20
	Sinclair/Dyes Inlet	kg/year	1.07	2.60	3.47	3.26	4.38	4.73	0.221	0.542	1.34	1.16	11.5	21.9
	Puget Sound Total	kg/year	26.2	54.0	86.3	264	348	363	7.07	17.4	42.9	11.9	272	532

NC = Not calculated due to insufficient data.

Table A-9 (continued). Summary of regenerated Phase 3 loadings to the model regions.

Contaminant	Region	Units	Atmospheric Deposition			Surface Runoff (baseflow + storm)			Publicly-Owned Treatment Works			Direct Groundwater Discharge		
			25th	median	75th	25th	median	75th	25th	median	75th	Lowest	Midpoint	Highest
Total LPAHs	Admiralty Inlet	kg/year	0.198	0.838	1.64	1.64	1.66	2.30	0.00876	0.0216	0.0933	0.0554	0.942	1.83
	Hood Canal North	kg/year	0.0872	0.421	0.536	2.05	2.06	2.86	0.00194	0.00477	0.0206	1.12	31.6	62.1
	Hood Canal South	kg/year	0.153	0.739	0.941	15.2	15.3	21.2	0.000155	0.000381	0.00165	0.348	10.2	20.0
	Main Basin	kg/year	0.878	8.11	11.7	9.88	10.2	14.6	1.91	4.71	20.4	1.08	8.54	16.0
	The Narrows	kg/year	0.433	0.886	1.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	South Sound	kg/year	0.420	1.20	3.55	24.3	24.5	34.2	0.312	0.768	3.32	2.22	27.9	53.6
	Whidbey Basin	kg/year	0.304	0.562	5.67	87.2	87.9	121	0.410	1.01	4.37	0.482	9.12	17.8
	Comm. Bay	kg/year	0.598	1.22	2.01	15.6	15.8	22.0	0.321	0.790	3.42	0.193	51.7	103
	Elliott Bay	kg/year	0.659	1.35	2.22	7.02	7.23	10.3	0.00	0.00	0.00	0.0439	2.82	5.60
	Sinclair/Dyes Inlet	kg/year	0.194	1.30	1.89	1.89	1.93	2.74	0.0956	0.235	1.02	0.893	8.17	15.5
	Puget Sound Total	kg/year	3.92	16.6	31.6	165	167	232	3.06	7.54	32.6	6.44	151	296
Total HPAHs	Admiralty Inlet	kg/year	2.13	4.31	6.63	3.26	3.33	3.43	0.00993	0.0132	0.0200	0.0785	0.550	1.02
	Hood Canal North	kg/year	0.633	1.25	1.95	4.08	4.14	4.19	0.00220	0.00292	0.00442	0.298	2.08	3.86
	Hood Canal South	kg/year	1.11	2.20	3.42	30.7	30.8	30.9	0.000176	0.000233	0.000353	0.860	7.69	14.5
	Main Basin	kg/year	5.83	11.5	15.4	21.9	24.6	27.7	2.17	2.88	4.37	0.487	4.42	8.35
	The Narrows	kg/year	1.47	2.63	3.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	South Sound	kg/year	2.77	5.63	9.24	49.3	51.0	53.1	0.354	0.470	0.712	2.15	12.4	22.6
	Whidbey Basin	kg/year	3.47	7.94	11.1	176	177	180	0.466	0.618	0.937	0.523	8.10	15.7
	Comm. Bay	kg/year	2.02	3.62	4.27	32.2	33.5	35.0	0.364	0.484	0.732	0.0630	83.6	167
	Elliott Bay	kg/year	2.23	3.99	4.70	16.3	18.1	20.4	0.00	0.00	0.00	0.0125	1.81	3.60
	Sinclair/Dyes Inlet	kg/year	0.797	1.45	2.19	3.93	4.26	4.61	0.108	0.144	0.218	0.267	3.34	6.41
	Puget Sound Total	kg/year	22.5	44.5	61.9	337	347	359	3.47	4.62	6.99	4.74	124	243
Total cPAHs	Admiralty Inlet	kg/year	0.903	2.03	3.18	2.39	2.45	2.53	NC	NC	NC	0.0543	0.442	0.830
	Hood Canal North	kg/year	0.268	0.589	1.01	3.01	3.05	3.10	NC	NC	NC	0.205	1.67	3.14
	Hood Canal South	kg/year	0.471	1.03	1.77	22.7	22.8	22.8	NC	NC	NC	0.716	6.31	11.9
	Main Basin	kg/year	2.37	4.70	6.79	15.4	17.1	18.8	NC	NC	NC	0.351	2.05	3.75
	The Narrows	kg/year	0.564	1.09	1.28	0.00	0.00	0.00	NC	NC	NC	0.00	0.00	0.00
	South Sound	kg/year	1.09	2.48	3.98	36.0	37.1	38.5	NC	NC	NC	1.27	9.17	17.1
	Whidbey Basin	kg/year	1.51	3.62	5.61	129	131	132	NC	NC	NC	0.415	5.29	10.2
	Comm. Bay	kg/year	0.779	1.51	1.77	23.5	24.2	25.1	NC	NC	NC	0.0379	57.9	116
	Elliott Bay	kg/year	0.857	1.66	1.95	11.4	12.5	13.6	NC	NC	NC	0.00864	0.691	1.37
	Sinclair/Dyes Inlet	kg/year	0.328	0.421	0.957	2.82	3.03	3.25	NC	NC	NC	0.198	1.26	2.32
	Puget Sound Total	kg/year	9.14	19.1	28.3	247	253	260	NC	NC	NC	3.25	84.8	166

NC = Not calculated due to insufficient data.

Table A-9 (continued). Summary of regenerated Phase 3 loadings to the model regions.

Contaminant	Region	Units	Atmospheric Deposition			Surface Runoff (baseflow + storm)			Publicly-Owned Treatment Works			Direct Groundwater Discharge		
			25th	median	75th	25th	median	75th	25th	median	75th	Lowest	Midpoint	Highest
Acenaphthene	Admiralty Inlet	kg/year	0.00	0.00	0.00	1.66	1.66	1.66	NC	NC	NC	0.00359	0.0452	0.0867
	Hood Canal North	kg/year	0.00	0.00	0.00	2.07	2.07	2.07	NC	NC	NC	0.0135	0.174	0.335
	Hood Canal South	kg/year	0.00	0.00	0.00	15.4	15.4	15.4	NC	NC	NC	0.0240	0.229	0.434
	Main Basin	kg/year	0.00	0.00	0.00	9.89	9.89	9.89	NC	NC	NC	0.0311	1.15	2.27
	The Narrows	kg/year	0.00	0.0620	0.157	0.00	0.00	0.00	NC	NC	NC	0.00	0.00	0.00
	South Sound	kg/year	0.00	0.00	0.00	24.5	24.5	24.5	NC	NC	NC	0.0940	2.15	4.22
	Whidbey Basin	kg/year	0.00	0.00	0.00	88.0	88.0	88.0	NC	NC	NC	0.0233	1.02	2.01
	Comm. Bay	kg/year	0.00	0.0856	0.217	15.7	15.7	15.7	NC	NC	NC	0.0102	2.98	5.95
	Elliott Bay	kg/year	0.00	0.0942	0.239	7.01	7.02	7.02	NC	NC	NC	0.00158	0.507	1.01
	Sinclair/Dyes Inlet	kg/year	0.00	0.00	0.00	1.90	1.90	1.90	NC	NC	NC	0.0218	0.985	1.95
	Puget Sound Total	kg/year	0.00	0.242	0.612	166	166	166	NC	NC	NC	0.223	9.24	18.3
Acenaphthylene	Admiralty Inlet	kg/year	0.150	0.253	0.485	1.66	1.66	1.66	NC	NC	NC	0.00635	0.0524	0.0984
	Hood Canal North	kg/year	0.0532	0.123	0.175	2.07	2.07	2.07	NC	NC	NC	0.0240	0.201	0.379
	Hood Canal South	kg/year	0.0933	0.216	0.307	15.4	15.4	15.4	NC	NC	NC	0.0480	0.458	0.869
	Main Basin	kg/year	0.430	0.680	0.873	9.89	9.89	9.89	NC	NC	NC	0.0365	1.10	2.17
	The Narrows	kg/year	0.0398	0.0648	0.0961	0.00	0.00	0.00	NC	NC	NC	0.00	0.00	0.00
	South Sound	kg/year	0.181	0.290	0.509	24.5	24.5	24.5	NC	NC	NC	0.140	2.21	4.28
	Whidbey Basin	kg/year	0.209	0.326	0.416	88.0	88.0	88.0	NC	NC	NC	0.0356	0.575	1.11
	Comm. Bay	kg/year	0.0549	0.0894	0.133	15.7	15.7	15.7	NC	NC	NC	0.00592	8.62	17.2
	Elliott Bay	kg/year	0.0605	0.0984	0.146	7.01	7.01	7.01	NC	NC	NC	0.00122	0.226	0.451
	Sinclair/Dyes Inlet	kg/year	0.0804	0.127	0.185	1.90	1.90	1.90	NC	NC	NC	0.0219	0.936	1.85
	Puget Sound Total	kg/year	1.35	2.27	3.32	166	166	166	NC	NC	NC	0.319	14.4	28.4
Anthracene	Admiralty Inlet	kg/year	0.00	0.0263	0.0771	1.65	1.66	1.66	NC	NC	NC	0.00638	0.0538	0.101
	Hood Canal North	kg/year	0.00	0.00	0.0230	2.06	2.06	2.07	NC	NC	NC	0.0241	0.207	0.390
	Hood Canal South	kg/year	0.00	0.00	0.0404	15.4	15.4	15.4	NC	NC	NC	0.0480	0.458	0.869
	Main Basin	kg/year	0.110	0.167	0.223	9.80	9.83	9.85	NC	NC	NC	0.0374	1.15	2.26
	The Narrows	kg/year	0.0203	0.0324	0.0784	0.00	0.00	0.00	NC	NC	NC	0.00	0.00	0.00
	South Sound	kg/year	0.0153	0.0828	0.212	24.4	24.4	24.4	NC	NC	NC	0.144	2.29	4.44
	Whidbey Basin	kg/year	0.00	0.0668	0.120	87.9	88.0	88.0	NC	NC	NC	0.0359	1.05	2.06
	Comm. Bay	kg/year	0.0280	0.0447	0.108	15.6	15.6	15.7	NC	NC	NC	0.0104	9.99	20.0
	Elliott Bay	kg/year	0.0308	0.0492	0.119	6.96	6.97	6.98	NC	NC	NC	0.00129	0.506	1.01
	Sinclair/Dyes Inlet	kg/year	0.00351	0.0214	0.0262	1.89	1.89	1.90	NC	NC	NC	0.0227	0.976	1.93
	Puget Sound Total	kg/year	0.207	0.491	1.03	166	166	166	NC	NC	NC	0.330	16.7	33.0

NC = Not calculated due to insufficient data.

Table A-9 (continued). Summary of regenerated Phase 3 loadings to the model regions.

Contaminant	Region	Units	Atmospheric Deposition			Surface Runoff (baseflow + storm)			Publicly-Owned Treatment Works			Direct Groundwater Discharge		
			25th	median	75th	25th	median	75th	25th	median	75th	Lowest	Midpoint	Highest
B(a)anthracene	Admiralty Inlet	kg/year	0.0632	0.154	0.227	1.66	1.66	1.66	NC	NC	NC	0.00902	0.0793	0.150
	Hood Canal North	kg/year	0.0179	0.0443	0.0634	2.06	2.07	2.07	NC	NC	NC	0.0341	0.300	0.566
	Hood Canal South	kg/year	0.0314	0.0777	0.111	15.4	15.4	15.4	NC	NC	NC	0.122	1.15	2.17
	Main Basin	kg/year	0.150	0.332	0.458	9.95	10.1	10.3	NC	NC	NC	0.0527	0.342	0.631
	The Narrows	kg/year	0.0450	0.0916	0.110	0.00	0.00	0.00	NC	NC	NC	0.00	0.00	0.00
	South Sound	kg/year	0.0651	0.194	0.294	24.5	24.6	24.7	NC	NC	NC	0.203	1.61	3.03
	Whidbey Basin	kg/year	0.103	0.309	0.487	88.0	88.1	88.2	NC	NC	NC	0.0738	0.857	1.64
	Comm. Bay	kg/year	0.0622	0.126	0.151	15.7	15.8	15.9	NC	NC	NC	0.00519	8.46	16.9
	Elliott Bay	kg/year	0.0684	0.139	0.167	7.08	7.19	7.37	NC	NC	NC	0.000935	0.0981	0.195
	Sinclair/Dyes Inlet	kg/year	0.0203	0.0351	0.0623	1.90	1.92	1.95	NC	NC	NC	0.0305	0.183	0.336
	Puget Sound Total	kg/year	0.626	1.50	2.13	166	167	168	NC	NC	NC	0.532	13.1	25.6
B(a)pyrene	Admiralty Inlet	kg/year	0.00	0.197	0.379	2.40	2.40	2.47	NC	NC	NC	0.00463	0.0347	0.0648
	Hood Canal North	kg/year	0.00	0.0500	0.0815	2.99	3.00	3.06	NC	NC	NC	0.0175	0.131	0.245
	Hood Canal South	kg/year	0.00	0.0877	0.143	22.7	22.7	22.8	NC	NC	NC	0.0480	0.458	0.869
	Main Basin	kg/year	0.248	0.427	0.750	13.3	13.5	14.7	NC	NC	NC	0.0406	0.292	0.544
	The Narrows	kg/year	0.0660	0.120	0.175	0.00	0.00	0.00	NC	NC	NC	0.00	0.00	0.00
	South Sound	kg/year	0.0798	0.195	0.435	35.2	35.3	36.4	NC	NC	NC	0.138	0.807	1.48
	Whidbey Basin	kg/year	0.171	0.502	0.734	130	130	131	NC	NC	NC	0.0350	0.751	1.47
	Comm. Bay	kg/year	0.0910	0.166	0.242	22.7	22.7	23.3	NC	NC	NC	0.00651	8.23	16.5
	Elliott Bay	kg/year	0.100	0.183	0.267	9.91	10.0	10.5	NC	NC	NC	0.00155	0.102	0.202
	Sinclair/Dyes Inlet	kg/year	0.0169	0.0434	0.0703	2.61	2.62	2.82	NC	NC	NC	0.0253	0.223	0.421
	Puget Sound Total	kg/year	0.773	1.97	3.28	241	242	247	NC	NC	NC	0.318	11.0	21.7
B(b)fluoranthene	Admiralty Inlet	kg/year	0.218	0.524	1.07	1.66	1.67	1.67	NC	NC	NC	0.00410	0.0333	0.0624
	Hood Canal North	kg/year	0.0710	0.178	0.361	2.06	2.07	2.07	NC	NC	NC	0.0153	0.124	0.234
	Hood Canal South	kg/year	0.125	0.312	0.633	15.4	15.4	15.4	NC	NC	NC	0.0480	0.458	0.869
	Main Basin	kg/year	0.698	1.26	2.06	10.1	10.5	11.0	NC	NC	NC	0.0315	0.195	0.359
	The Narrows	kg/year	0.154	0.296	0.374	0.00	0.00	0.00	NC	NC	NC	0.00	0.00	0.00
	South Sound	kg/year	0.323	0.561	1.18	24.5	24.8	25.0	NC	NC	NC	0.108	0.714	1.32
	Whidbey Basin	kg/year	0.341	0.780	1.63	88.1	88.3	88.5	NC	NC	NC	0.0319	0.718	1.40
	Comm. Bay	kg/year	0.212	0.408	0.516	15.8	16.0	16.2	NC	NC	NC	0.00496	8.22	16.4
	Elliott Bay	kg/year	0.233	0.449	0.568	7.17	7.54	7.87	NC	NC	NC	0.000827	0.0981	0.195
	Sinclair/Dyes Inlet	kg/year	0.102	0.119	0.295	1.92	1.97	2.01	NC	NC	NC	0.0242	0.145	0.265
	Puget Sound Total	kg/year	2.48	4.88	8.69	167	168	170	NC	NC	NC	0.269	10.7	21.1

NC = Not calculated due to insufficient data.

Table A-9 (continued). Summary of regenerated Phase 3 loadings to the model regions.

Contaminant	Region	Units	Atmospheric Deposition			Surface Runoff (baseflow + storm)			Publicly-Owned Treatment Works			Direct Groundwater Discharge		
			25th	median	75th	25th	median	75th	25th	median	75th	Lowest	Midpoint	Highest
B(g,h,i)perylene	Admiralty Inlet	kg/year	0.164	0.340	0.533	1.66	1.66	1.67	NC	NC	NC	0.00405	0.0334	0.0628
	Hood Canal North	kg/year	0.0465	0.0954	0.130	2.06	2.07	2.07	NC	NC	NC	0.0153	0.126	0.237
	Hood Canal South	kg/year	0.0817	0.168	0.229	15.4	15.4	15.4	NC	NC	NC	0.0480	0.458	0.869
	Main Basin	kg/year	0.388	0.857	1.35	10.0	10.3	10.9	NC	NC	NC	0.0342	0.196	0.359
	The Narrows	kg/year	0.159	0.258	0.357	0.00	0.00	0.00	NC	NC	NC	0.00	0.00	0.00
	South Sound	kg/year	0.220	0.442	0.646	24.5	24.7	25.0	NC	NC	NC	0.108	0.806	1.50
	Whidbey Basin	kg/year	0.290	0.689	1.10	88.1	88.2	88.4	NC	NC	NC	0.0347	0.713	1.39
	Comm. Bay	kg/year	0.219	0.357	0.492	15.7	15.9	16.1	NC	NC	NC	0.00543	8.46	16.9
	Elliott Bay	kg/year	0.241	0.393	0.542	7.15	7.35	7.78	NC	NC	NC	0.00104	0.103	0.205
	Sinclair/Dyes Inlet	kg/year	0.0500	0.0880	0.136	1.91	1.94	2.00	NC	NC	NC	0.0199	0.142	0.265
	Puget Sound Total	kg/year	1.86	3.69	5.52	167	167	169	NC	NC	NC	0.270	11.0	21.8
B(k)fluoranthene	Admiralty Inlet	kg/year	0.124	0.185	0.348	1.66	1.66	1.66	NC	NC	NC	0.00398	0.0331	0.0622
	Hood Canal North	kg/year	0.0456	0.0627	0.130	2.06	2.06	2.07	NC	NC	NC	0.0150	0.125	0.235
	Hood Canal South	kg/year	0.0800	0.110	0.228	15.4	15.4	15.4	NC	NC	NC	0.0480	0.458	0.869
	Main Basin	kg/year	0.281	0.397	0.624	9.8	9.9	10.2	NC	NC	NC	0.0324	0.184	0.336
	The Narrows	kg/year	0.0494	0.0857	0.102	0.00	0.00	0.00	NC	NC	NC	0.00	0.00	0.00
	South Sound	kg/year	0.175	0.240	0.421	24.4	24.5	24.6	NC	NC	NC	0.102	0.719	1.33
	Whidbey Basin	kg/year	0.177	0.276	0.394	88.0	88.0	88.2	NC	NC	NC	0.0321	0.714	1.40
	Comm. Bay	kg/year	0.0682	0.118	0.141	15.6	15.7	15.8	NC	NC	NC	0.00511	8.21	16.4
	Elliott Bay	kg/year	0.0751	0.130	0.155	6.97	7.07	7.26	NC	NC	NC	0.000899	0.0977	0.194
	Sinclair/Dyes Inlet	kg/year	0.0394	0.0517	0.0874	1.89	1.90	1.93	NC	NC	NC	0.0183	0.130	0.242
	Puget Sound Total	kg/year	1.12	1.66	2.63	166	166	167	NC	NC	NC	0.258	10.7	21.1
Chrysene	Admiralty Inlet	kg/year	0.254	0.497	0.805	1.66	1.67	1.67	NC	NC	NC	0.00466	0.0363	0.0679
	Hood Canal North	kg/year	0.0755	0.144	0.257	2.06	2.07	2.07	NC	NC	NC	0.0175	0.137	0.257
	Hood Canal South	kg/year	0.132	0.253	0.451	15.4	15.4	15.4	NC	NC	NC	0.0616	0.470	0.878
	Main Basin	kg/year	0.733	1.26	2.06	10.0	10.4	10.8	NC	NC	NC	0.0306	0.255	0.480
	The Narrows	kg/year	0.162	0.293	0.361	0.00	0.00	0.00	NC	NC	NC	0.00	0.00	0.00
	South Sound	kg/year	0.294	0.689	1.00	24.5	24.7	24.9	NC	NC	NC	0.108	0.865	1.62
	Whidbey Basin	kg/year	0.398	0.821	1.39	88.1	88.2	88.4	NC	NC	NC	0.0256	0.782	1.54
	Comm. Bay	kg/year	0.224	0.404	0.499	15.7	15.9	16.1	NC	NC	NC	0.00581	8.34	16.7
	Elliott Bay	kg/year	0.246	0.445	0.549	7.13	7.44	7.72	NC	NC	NC	0.00122	0.0987	0.196
	Sinclair/Dyes Inlet	kg/year	0.0903	0.139	0.293	1.91	1.95	1.99	NC	NC	NC	0.0195	0.170	0.321
	Puget Sound Total	kg/year	2.61	4.94	7.67	166	168	169	NC	NC	NC	0.274	11.2	22.0

NC = Not calculated due to insufficient data.

Table A-9 (continued). Summary of regenerated Phase 3 loadings to the model regions.

Contaminant	Region	Units	Atmospheric Deposition			Surface Runoff (baseflow + storm)			Publicly-Owned Treatment Works			Direct Groundwater Discharge		
			25th	median	75th	25th	median	75th	25th	median	75th	Lowest	Midpoint	Highest
D(a,h)anthracene	Admiralty Inlet	kg/year	0.00	0.00440	0.201	2.47	2.47	2.48	NC	NC	NC	0.0168	0.156	0.295
	Hood Canal North	kg/year	0.00	0.00	0.0268	3.07	3.07	3.07	NC	NC	NC	0.0637	0.591	1.12
	Hood Canal South	kg/year	0.00	0.00	0.0470	22.8	22.8	22.8	NC	NC	NC	0.240	2.29	4.34
	Main Basin	kg/year	0.00	0.0772	0.213	14.6	14.6	14.8	NC	NC	NC	0.0756	0.603	1.13
	The Narrows	kg/year	0.00994	0.0249	0.0414	0.00	0.00	0.00	NC	NC	NC	0.00	0.00	0.00
	South Sound	kg/year	0.00	0.0727	0.361	36.4	36.4	36.5	NC	NC	NC	0.351	3.09	5.82
	Whidbey Basin	kg/year	0.00	0.130	0.431	131	131	131	NC	NC	NC	0.109	0.768	1.43
	Comm. Bay	kg/year	0.0137	0.0343	0.0571	23.3	23.3	23.3	NC	NC	NC	0.00511	8.21	16.4
	Elliott Bay	kg/year	0.0151	0.0378	0.0629	10.3	10.3	10.4	NC	NC	NC	0.000899	0.0977	0.194
	Sinclair/Dyes Inlet	kg/year	0.00	0.00	0.0160	2.83	2.83	2.84	NC	NC	NC	0.0419	0.270	0.498
	Puget Sound Total	kg/year	0.0387	0.381	1.46	247	247	247	NC	NC	NC	0.904	16.1	31.3
Fluoranthene	Admiralty Inlet	kg/year	0.718	1.21	1.91	1.66	1.67	1.68	0.00531	0.00597	0.0106	0.00650	0.0536	0.101
	Hood Canal North	kg/year	0.193	0.326	0.573	2.06	2.07	2.08	0.00117	0.00132	0.00234	0.0245	0.206	0.388
	Hood Canal South	kg/year	0.339	0.572	1.01	15.4	15.4	15.4	0.0000939	0.000106	0.000187	0.0480	0.458	0.869
	Main Basin	kg/year	2.01	3.15	4.44	10.1	10.9	11.4	1.16	1.30	2.31	0.0410	1.14	2.24
	The Narrows	kg/year	0.380	0.663	0.760	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	South Sound	kg/year	1.08	1.61	2.65	24.6	24.9	25.3	0.189	0.213	0.377	0.150	2.28	4.41
	Whidbey Basin	kg/year	1.11	1.87	2.95	88.1	88.4	88.6	0.249	0.280	0.496	0.0371	1.05	2.05
	Comm. Bay	kg/year	0.524	0.914	1.05	15.8	16.1	16.4	0.195	0.219	0.388	0.0102	8.62	17.2
	Elliott Bay	kg/year	0.577	1.01	1.15	7.23	7.78	8.22	0.00	0.00	0.00	0.00158	0.506	1.01
	Sinclair/Dyes Inlet	kg/year	0.313	0.577	0.679	1.92	2.00	2.06	0.0580	0.0652	0.116	0.0257	0.970	1.92
	Puget Sound Total	kg/year	7.24	11.9	17.2	167	169	171	1.86	2.09	3.70	0.345	15.3	30.2
Fluorene	Admiralty Inlet	kg/year	0.00	0.357	1.01	1.66	1.66	1.66	0.00180	0.00999	0.0239	0.00350	0.0444	0.0853
	Hood Canal North	kg/year	0.00	0.260	0.338	2.07	2.07	2.07	0.000397	0.00221	0.00528	0.0132	0.171	0.329
	Hood Canal South	kg/year	0.00	0.456	0.594	15.4	15.4	15.4	0.0000318	0.000177	0.000422	0.0240	0.229	0.434
	Main Basin	kg/year	0.00	1.27	1.98	9.85	9.85	9.85	0.392	2.18	5.22	0.0282	1.13	2.23
	The Narrows	kg/year	0.0657	0.102	0.141	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	South Sound	kg/year	0.00	0.825	1.58	24.4	24.4	24.4	0.0640	0.356	0.851	0.0893	2.11	4.14
	Whidbey Basin	kg/year	0.00	0.00	1.47	88.0	88.0	88.0	0.0842	0.468	1.12	0.0223	1.01	2.00
	Comm. Bay	kg/year	0.0907	0.141	0.195	15.7	15.7	15.7	0.0658	0.366	0.875	0.00655	9.98	20.0
	Elliott Bay	kg/year	0.0999	0.155	0.215	6.98	6.98	6.98	0.00	0.00	0.00	0.00137	0.506	1.01
	Sinclair/Dyes Inlet	kg/year	0.0841	0.218	0.322	1.90	1.90	1.90	0.0196	0.109	0.261	0.0195	0.965	1.91
	Puget Sound Total	kg/year	0.340	3.78	7.85	166	166	166	0.628	3.49	8.35	0.208	16.2	32.1

NC = Not calculated due to insufficient data.

Table A-9 (continued). Summary of regenerated Phase 3 loadings to the model regions.

Contaminant	Region	Units	Atmospheric Deposition			Surface Runoff (baseflow + storm)			Publicly-Owned Treatment Works			Direct Groundwater Discharge		
			25th	median	75th	25th	median	75th	25th	median	75th	Lowest	Midpoint	Highest
I(1,2,3-cd)pyrene	Admiralty Inlet	kg/year	0.118	0.252	0.419	2.40	2.40	2.41	NC	NC	NC	0.00895	0.0793	0.150
	Hood Canal North	kg/year	0.0346	0.0683	0.132	2.99	3.00	3.00	NC	NC	NC	0.0338	0.300	0.566
	Hood Canal South	kg/year	0.0607	0.120	0.233	22.7	22.7	22.7	NC	NC	NC	0.122	1.15	2.17
	Main Basin	kg/year	0.277	0.600	0.889	13.4	13.6	13.9	NC	NC	NC	0.0504	0.341	0.631
	The Narrows	kg/year	0.0792	0.151	0.213	0.00	0.00	0.00	NC	NC	NC	0.00	0.00	0.00
	South Sound	kg/year	0.113	0.253	0.435	35.2	35.4	35.6	NC	NC	NC	0.200	1.61	3.03
	Whidbey Basin	kg/year	0.218	0.416	0.679	130	130	130	NC	NC	NC	0.0738	0.853	1.63
	Comm. Bay	kg/year	0.109	0.208	0.294	22.7	22.8	23.0	NC	NC	NC	0.00519	8.21	16.4
	Elliott Bay	kg/year	0.120	0.229	0.323	9.98	10.1	10.4	NC	NC	NC	0.00231	0.0984	0.194
	Sinclair/Dyes Inlet	kg/year	0.0342	0.0614	0.123	2.61	2.64	2.67	NC	NC	NC	0.0305	0.172	0.313
	Puget Sound Total	kg/year	1.16	2.36	3.74	242	242	243	NC	NC	NC	0.527	12.8	25.1
Naphthalene	Admiralty Inlet	kg/year	NC	NC	NC	1.64	1.65	2.28	NC	NC	NC	0.0319	0.694	1.36
	Hood Canal North	kg/year	NC	NC	NC	2.05	2.06	2.84	NC	NC	NC	1.03	30.7	60.3
	Hood Canal South	kg/year	NC	NC	NC	15.2	15.3	21.1	NC	NC	NC	0.0434	9.07	18.1
	Main Basin	kg/year	NC	NC	NC	9.76	9.83	13.6	NC	NC	NC	0.483	4.82	9.15
	The Narrows	kg/year	NC	NC	NC	0.00	0.00	0.00	NC	NC	NC	0.00	0.00	0.00
	South Sound	kg/year	NC	NC	NC	24.2	24.4	33.6	NC	NC	NC	1.65	16.9	32.1
	Whidbey Basin	kg/year	NC	NC	NC	87.2	87.7	121	NC	NC	NC	0.341	4.42	8.51
	Comm. Bay	kg/year	NC	NC	NC	15.5	15.6	21.5	NC	NC	NC	0.149	10.2	20.2
	Elliott Bay	kg/year	NC	NC	NC	6.92	6.97	9.59	NC	NC	NC	0.0366	0.570	1.10
	Sinclair/Dyes Inlet	kg/year	NC	NC	NC	1.88	1.89	2.62	NC	NC	NC	0.590	4.21	7.83
	Puget Sound Total	kg/year	NC	NC	NC	164	165	228	NC	NC	NC	4.36	81.5	159
Phenanthrene	Admiralty Inlet	kg/year	0.00	0.00	0.00	1.66	1.66	1.67	0.00614	0.00716	0.0182	0.00368	0.0522	0.101
	Hood Canal North	kg/year	0.00	0.00	0.00	2.06	2.07	2.07	0.00136	0.00158	0.00403	0.0139	0.201	0.388
	Hood Canal South	kg/year	0.00	0.00	0.00	15.4	15.4	15.4	0.000109	0.000127	0.000322	0.0434	0.262	0.480
	Main Basin	kg/year	0.00	5.96	8.11	9.94	10.2	10.4	1.34	1.57	3.98	0.0337	1.14	2.25
	The Narrows	kg/year	0.310	0.591	0.973	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	South Sound	kg/year	0.00	0.00	2.18	24.5	24.6	24.8	0.219	0.255	0.649	0.0988	2.26	4.41
	Whidbey Basin	kg/year	0.00	0.00	3.36	88.0	88.1	88.3	0.288	0.336	0.854	0.0242	1.04	2.06
	Comm. Bay	kg/year	0.427	0.815	1.34	15.7	15.8	15.9	0.225	0.263	0.668	0.0115	9.98	20.0
	Elliott Bay	kg/year	0.470	0.898	1.48	7.07	7.23	7.45	0.00	0.00	0.00	0.00180	0.506	1.01
	Sinclair/Dyes Inlet	kg/year	0.00	0.930	1.30	1.90	1.93	1.96	0.0671	0.0782	0.199	0.0241	0.970	1.92
	Puget Sound Total	kg/year	1.21	9.19	18.7	166	167	168	2.15	2.51	6.37	0.255	16.4	32.6

NC = Not calculated due to insufficient data.

Table A-9 (continued). Summary of regenerated Phase 3 loadings to the model regions.

Contaminant	Region	Units	Atmospheric Deposition			Surface Runoff (baseflow + storm)			Publicly-Owned Treatment Works			Direct Groundwater Discharge		
			25th	median	75th	25th	median	75th	25th	median	75th	Lowest	Midpoint	Highest
Pyrene	Admiralty Inlet	kg/year	0.387	0.720	1.24	2.50	2.51	2.52	0.00588	0.00773	0.0108	0.00637	0.0536	0.101
	Hood Canal North	kg/year	0.104	0.231	0.295	3.13	3.13	3.14	0.00130	0.00171	0.00239	0.0240	0.206	0.388
	Hood Canal South	kg/year	0.183	0.405	0.518	23.4	23.4	23.4	0.000104	0.000137	0.000191	0.0480	0.458	0.869
	Main Basin	kg/year	0.974	2.39	2.66	14.8	15.5	16.0	1.28	1.69	2.36	0.0370	1.14	2.25
	The Narrows	kg/year	0.303	0.524	0.615	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	South Sound	kg/year	0.478	1.14	1.89	36.9	37.3	37.6	0.209	0.275	0.385	0.143	2.28	4.41
	Whidbey Basin	kg/year	0.619	1.59	1.94	134	134	134	0.276	0.362	0.507	0.0357	1.04	2.05
	Comm. Bay	kg/year	0.418	0.723	0.848	23.8	24.0	24.3	0.216	0.283	0.396	0.00947	8.62	17.2
	Elliott Bay	kg/year	0.460	0.796	0.934	10.7	11.2	11.5	0.00	0.00	0.00	0.00126	0.506	1.01
	Sinclair/Dyes Inlet	kg/year	0.138	0.360	0.405	2.85	2.92	2.97	0.0642	0.0844	0.118	0.0230	0.969	1.92
	Puget Sound Total	kg/year	4.06	8.87	11.3	252	254	256	2.06	2.70	3.78	0.328	15.3	30.2

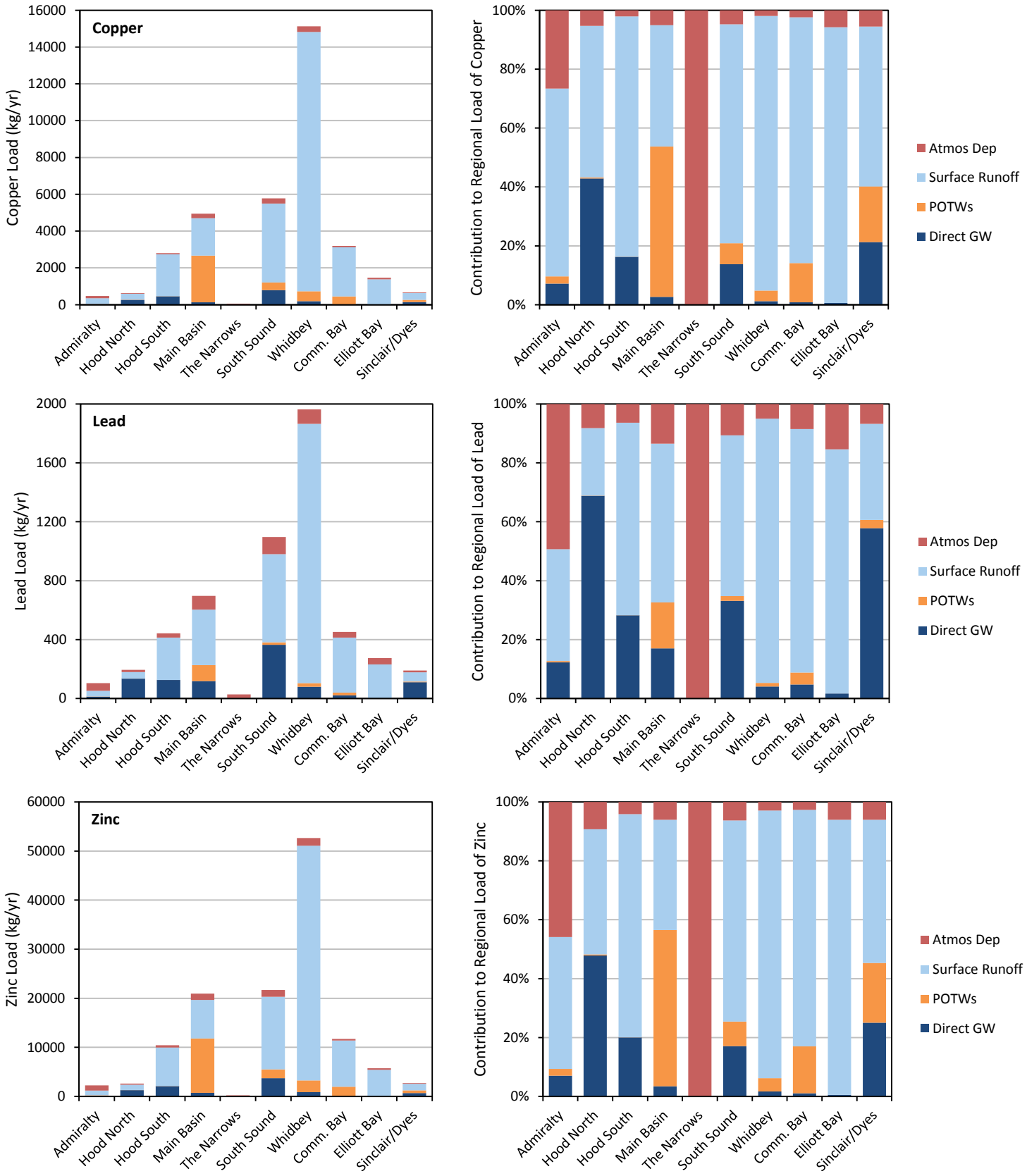


Figure A-2. Magnitude of the four major pathways of watershed loads to each model region (left plots) and the relative contribution of each pathway to the total watershed load in each region (right plots). All loads are median regenerated Phase 3 loads.

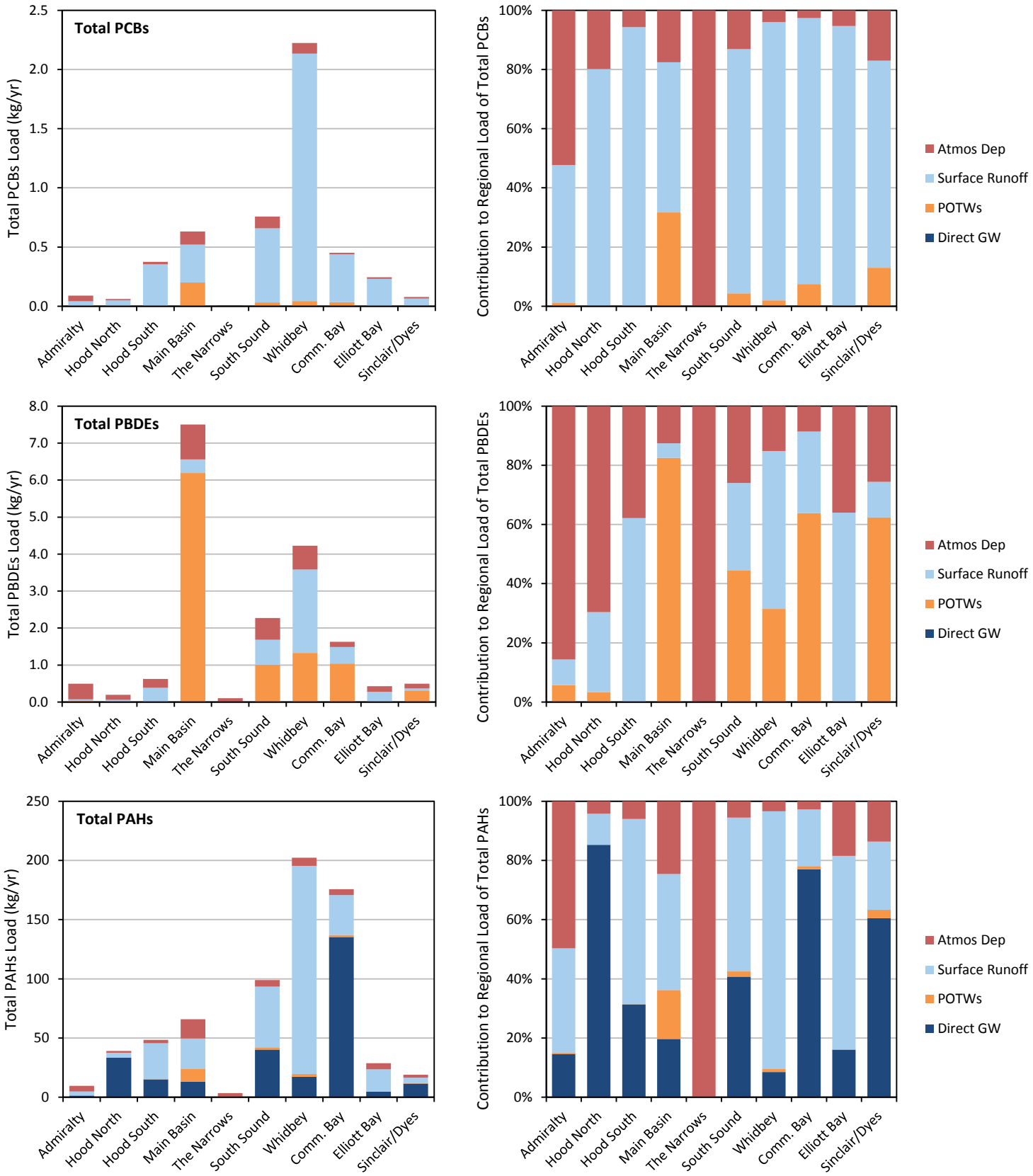


Figure A-2 (continued). Magnitude of the four major pathways of watershed loads to each model region (left plots) and the relative contribution of each pathway to the total watershed load in each region (right plots). All loads shown are median regenerated Phase 3 loads.

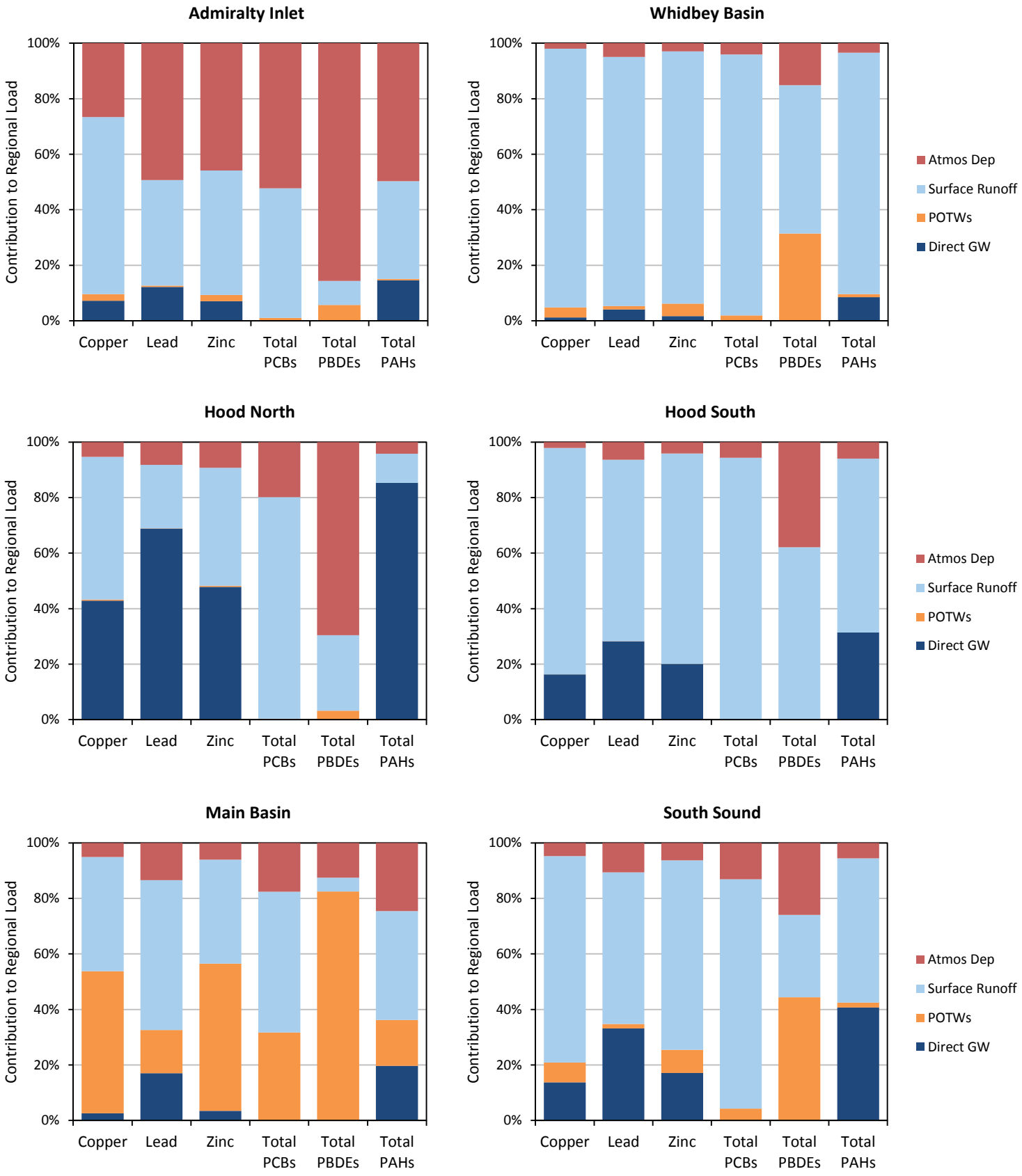


Figure A-3. Relative contribution of the four major watershed loading pathways for individual contaminants in each region.

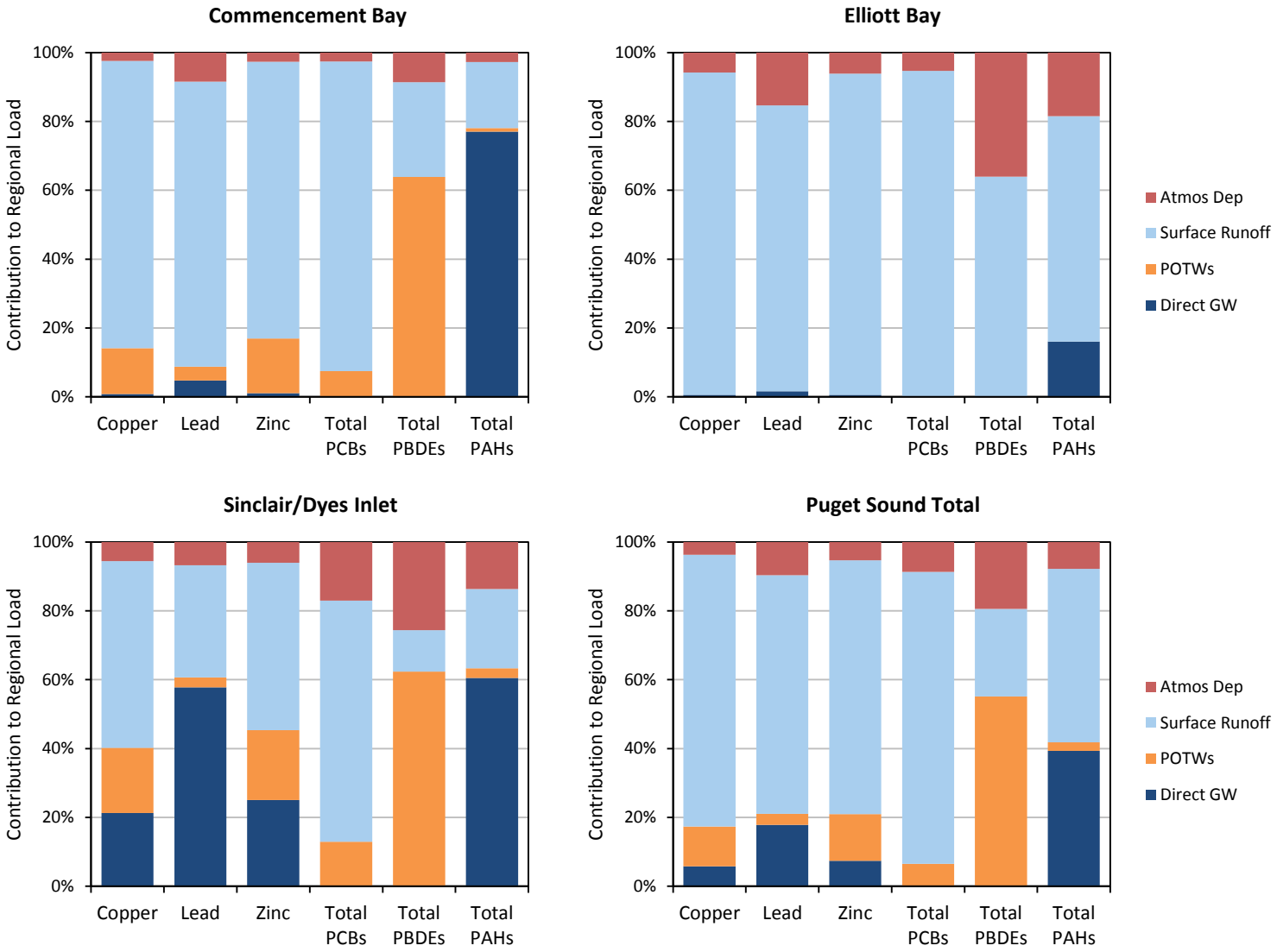


Figure A-3 (continued). Relative contribution of the four major watershed loading pathways for individual contaminants in each region

Table A-10. Overview of the major limitations and uncertainties of the regenerated Phase 3 loading estimates.

Loading Pathway	Limitation or Uncertainty
Atmospheric Deposition	• Loads are minimum or near-minimum estimates. • Loads for Total LPAHs have an additional downward bias due to substitution of zero for non-detects (instead of 1/2 the maximum Detection Limit) and the absence of Naphthalene data. • Low spike recoveries for PCBs and PBDEs in field extraction QA tests suggest that loads may be underestimated compared to the true values (recoveries of 18-45% and 44-82%, respectively). • Large uncertainties are inherent in extrapolating across a large area using fluxes measured at a small network of sites. It is likely that strong localized signals (e.g., around high-density urban areas) were under-represented in regional loading estimates.
Surface Runoff	• Loads are minimum or near-minimum estimates. • Loading estimates for PAH groups were determined largely by reporting limit values due to low frequencies of detection, and as such are highly uncertain. • Flow regimes (i.e., baseflow and storm events) were defined based on precipitation and gauged measurements from 2009-2010, which was a wetter-than-average year; the unit area load (UAL) and loading calculations may therefore be biased low or high compared to a typical year. • Loading estimates may be biased low due to the use of unit area load methods, which assume that individual land cover types deliver the same load regardless of the runoff volume. Compared to runoff volume methods, the UAL methods effectively dampen the load signal from forested areas (Ecology, 2011).
Publicly-Owned Treatment Works	• Loads are minimum or near-minimum estimates. • Study data rules may impart an additional downward bias compared to, e.g., rules used for the surface runoff loading estimates. • Large uncertainties are inherent in extrapolating from a very limited number of samples ($n \leq 20$) to the scale of model regions and the entire Puget Sound Basin. • Due to the very limited number of samples, measured concentrations from all regions were pooled for calculations of regional loadings; as such, inter-regional differences in loadings are not well characterized.
Direct Groundwater Discharge	• Loads are maximum, upper-bound estimates. • Loading estimates for PCBs and PBDEs were not calculated due to insufficient data. • Loading estimates were determined largely by reporting limit values due to low frequencies of detection (80-90% of the organics data and approximately 70% of the inorganic contaminant data), and as such are highly uncertain and biased upward. For example, non-detect substitution rules yielded representative concentrations in ambient areas that exceeded those of impacted areas for some naturally occurring contaminants. • Loading estimates for PAH groups had a strong upward bias due to the study-specific summation rules, which were different than the rules applied for other loading studies. • Simplifying assumptions used in the study do not account for attenuation processes that could significantly decrease the contaminant mass transported to the marine boundary (e.g., restricted dissolved-phase mobility, biodegradation), and so the loads represent upper-bound estimates.

Appendix B. Sample Location Maps and Summary Data Statistics for Contaminants in Sediment

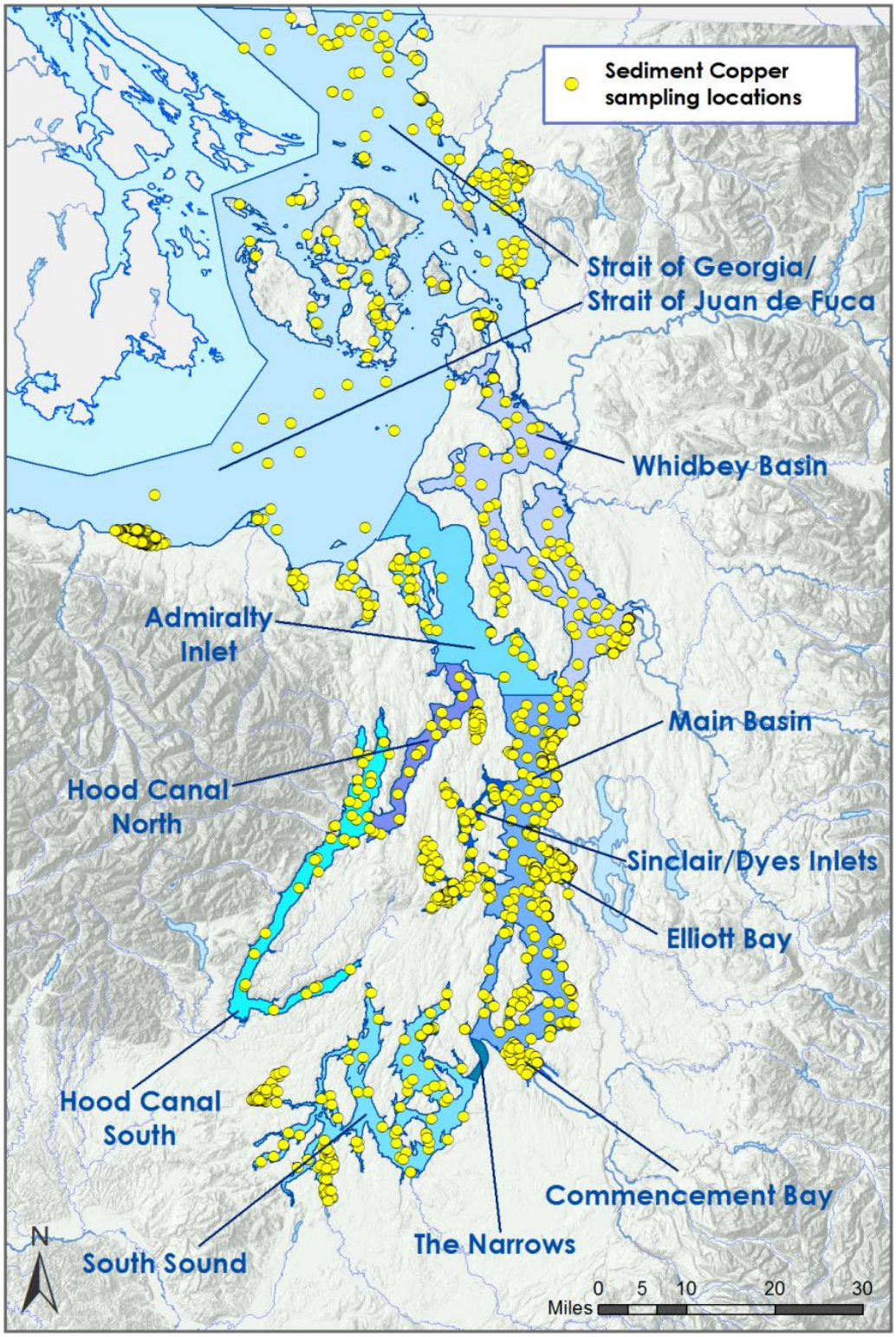


Figure B-1. Sampling locations for copper in sediment.

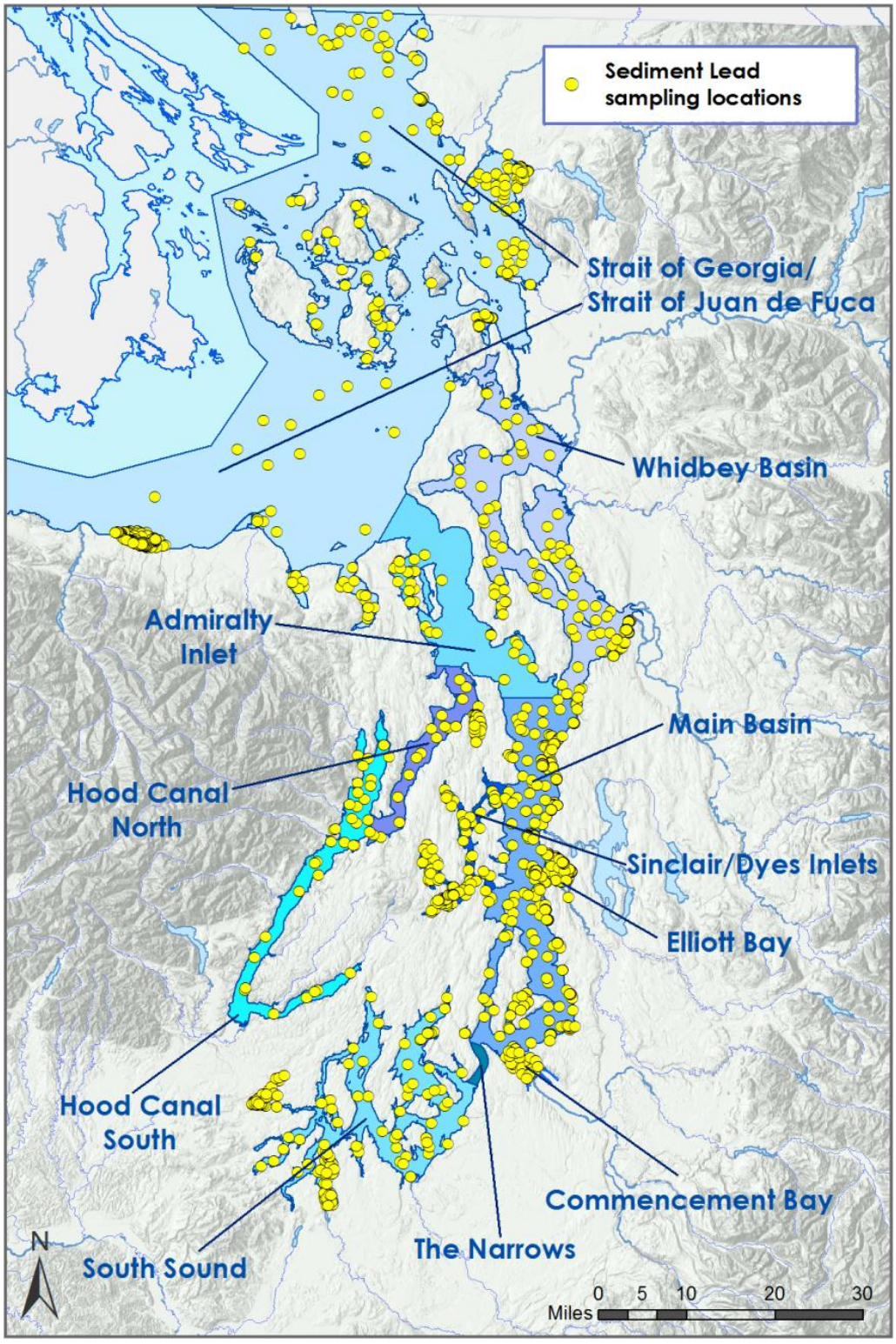


Figure B-2. Sampling locations for lead in sediment.

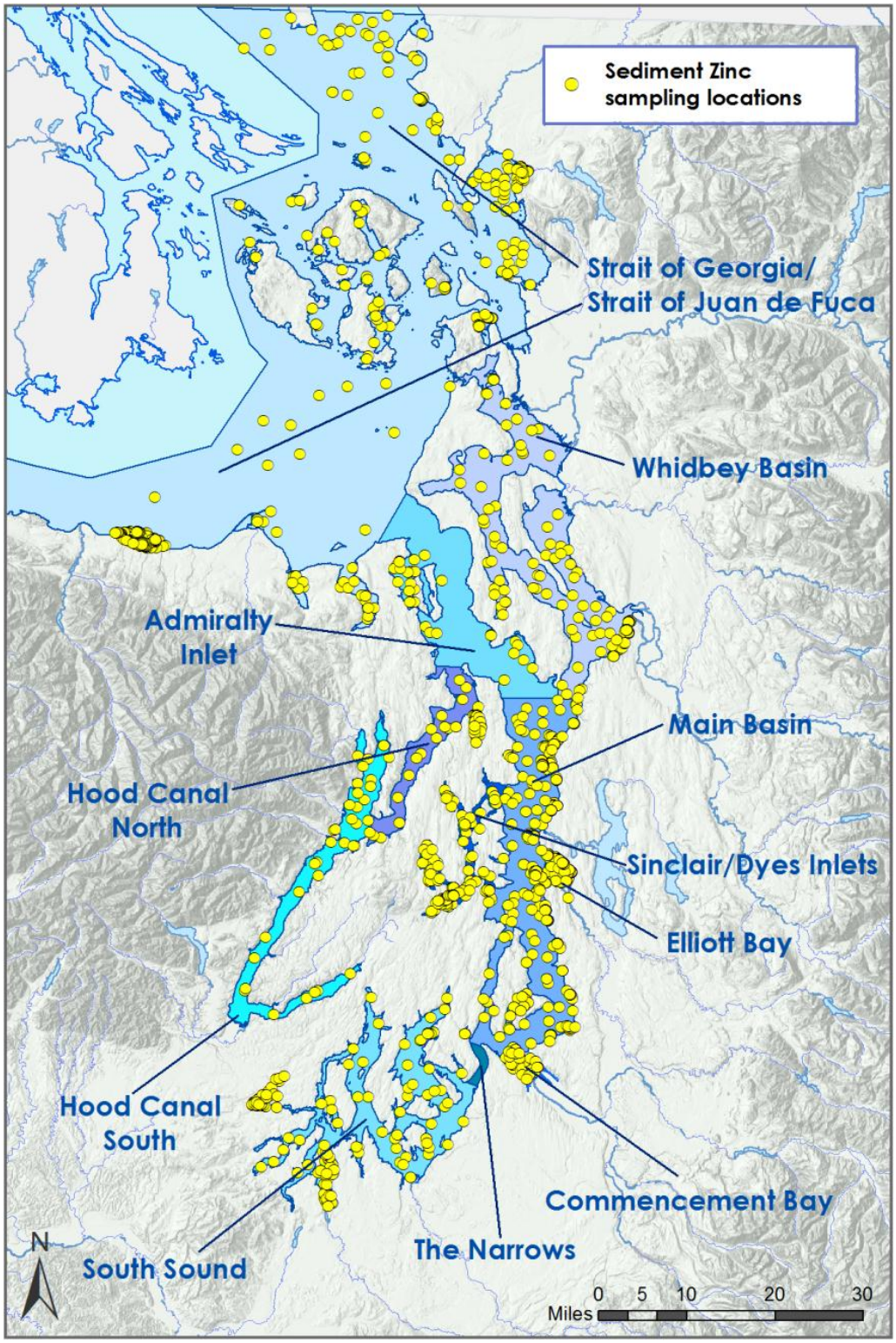


Figure B-3. Sampling locations for zinc in sediment.

Table B-1. Statistical summary of copper, lead, and zinc data in the 0-10 cm sediment layer for the model regions.

Contaminant	Region	Sediment Depth Strata	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Copper	Admiralty Inlet	0-10 cm	28	0	0	4.00	7.76	12.3	20.0	240	mg/kg dw	
	Hood Canal (North)	0-10 cm	131	0	0	3.40	10.0	16.0	31.0	120	mg/kg dw	
	Hood Canal (South)	0-10 cm	37	0	0	6.07	25.2	33.8	51.3	98.9	mg/kg dw	
	Main Basin	0-10 cm	547	0	0	2.59	6.35	9.80	27.6	516	mg/kg dw	
	The Narrows	0-10 cm	1088	0	0	2.59	7.80	18.0	36.2	3280	mg/kg dw	Basins
	South Sound	0-10 cm	167	0	0	3.10	14.6	33.0	43.7	120	mg/kg dw	
	Whidbey Basin	0-10 cm	178	0	0	3.30	19.2	35.6	62.7	3280	mg/kg dw	
	Comm. Bay	0-10 cm	64	0	0	16.3	26.8	32.1	39.4	634	mg/kg dw	
	Elliott Bay	0-10 cm	332	0	0	4.83	27.2	44.6	58.0	352	mg/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	172	0	0	2.08	16.7	58.6	135	1390	mg/kg dw	
	All Regions	0-10 cm	1656	0	0	2.08	10.0	27.5	46.0	3280	mg/kg dw	
	Basins	0-10 cm	1088	0	0	2.59	7.80	18.0	36.2	3280	mg/kg dw	
	Urban Bays	0-10 cm	568	0	0	2.08	25.7	44.6	63.7	1390	mg/kg dw	
	SJF/SOG	0-10 cm	504	0	0	4.70	12.8	21.1	33.6	111	mg/kg dw	
Lead	Admiralty Inlet	0-10 cm	28	0	0	1.60	4.42	7.14	13.5	47.7	mg/kg dw	
	Hood Canal (North)	0-10 cm	132	16	12	0.08	4.00	8.00	13.0	54.4	mg/kg dw	
	Hood Canal (South)	0-10 cm	37	0	0	1.66	6.30	10.5	13.8	17.2	mg/kg dw	
	Main Basin	0-10 cm	542	10	2	0.87	5.35	8.10	14.3	99.0	mg/kg dw	
	The Narrows	0-10 cm	1085	29	3	0.08	5.30	9.00	14.5	1210	mg/kg dw	Basins
	South Sound	0-10 cm	182	0	0	1.20	5.61	12.0	17.6	93.8	mg/kg dw	
	Whidbey Basin	0-10 cm	164	3	2	0.12	6.36	11.7	14.4	1210	mg/kg dw	
	Comm. Bay	0-10 cm	57	0	0	3.37	7.54	11.6	16.1	400	mg/kg dw	
	Elliott Bay	0-10 cm	331	0	0	1.97	24.0	39.9	67.9	188	mg/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	163	0	0	3.73	14.9	42.9	73.2	439	mg/kg dw	
	All Regions	0-10 cm	1636	29	2	0.08	6.45	12.8	27.0	1210	mg/kg dw	
	Basins	0-10 cm	1085	29	3	0.08	5.30	9.00	14.5	1210	mg/kg dw	
	Urban Bays	0-10 cm	551	0	0	1.97	16.0	35.5	67.1	439	mg/kg dw	
	SJF/SOG	0-10 cm	423	3	1	0.67	4.70	8.59	12.3	265	mg/kg dw	
Zinc	Admiralty Inlet	0-10 cm	28	0	0	19.5	32.2	40.7	77.8	353	mg/kg dw	
	Hood Canal (North)	0-10 cm	131	0	0	16.0	36.5	49.5	72.5	139	mg/kg dw	
	Hood Canal (South)	0-10 cm	37	0	0	20.4	69.4	79.6	88.3	150	mg/kg dw	
	Main Basin	0-10 cm	547	0	0	14.6	26.0	32.6	77.8	170	mg/kg dw	
	The Narrows	0-10 cm	1088	0	0	13.9	29.2	49.3	82.9	1980	mg/kg dw	Basins
	South Sound	0-10 cm	167	0	0	13.9	39.0	65.0	81.9	166	mg/kg dw	
	Whidbey Basin	0-10 cm	178	0	0	13.9	52.1	76.3	99.8	1980	mg/kg dw	
	Comm. Bay	0-10 cm	64	0	0	21.8	37.4	47.0	54.2	407	mg/kg dw	
	Elliott Bay	0-10 cm	332	0	0	23.5	58.8	84.8	108	577	mg/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	172	0	0	21.3	49.3	114	214	2860	mg/kg dw	
	All Regions	0-10 cm	1656	0	0	13.9	32.2	60.7	91.0	2860	mg/kg dw	
	Basins	0-10 cm	1088	0	0	13.9	29.2	49.3	82.9	1980	mg/kg dw	
	Urban Bays	0-10 cm	568	0	0	21.3	50.5	83.9	114	2860	mg/kg dw	
	SJF/SOG	0-10 cm	510	0	0	15.1	39.5	60.7	83.0	1660	mg/kg dw	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

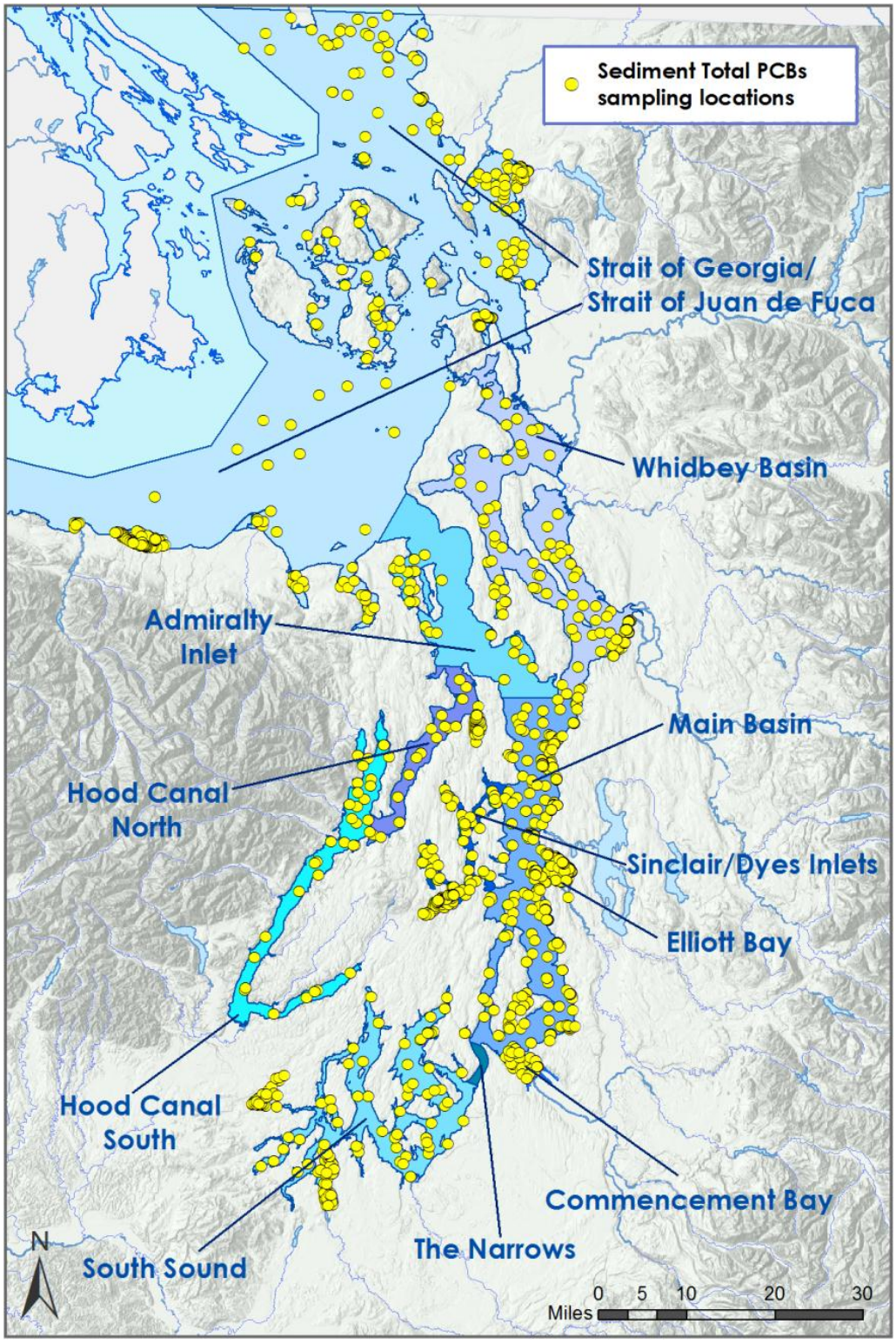


Figure B-4. Sampling locations for Total PCBs in sediment.

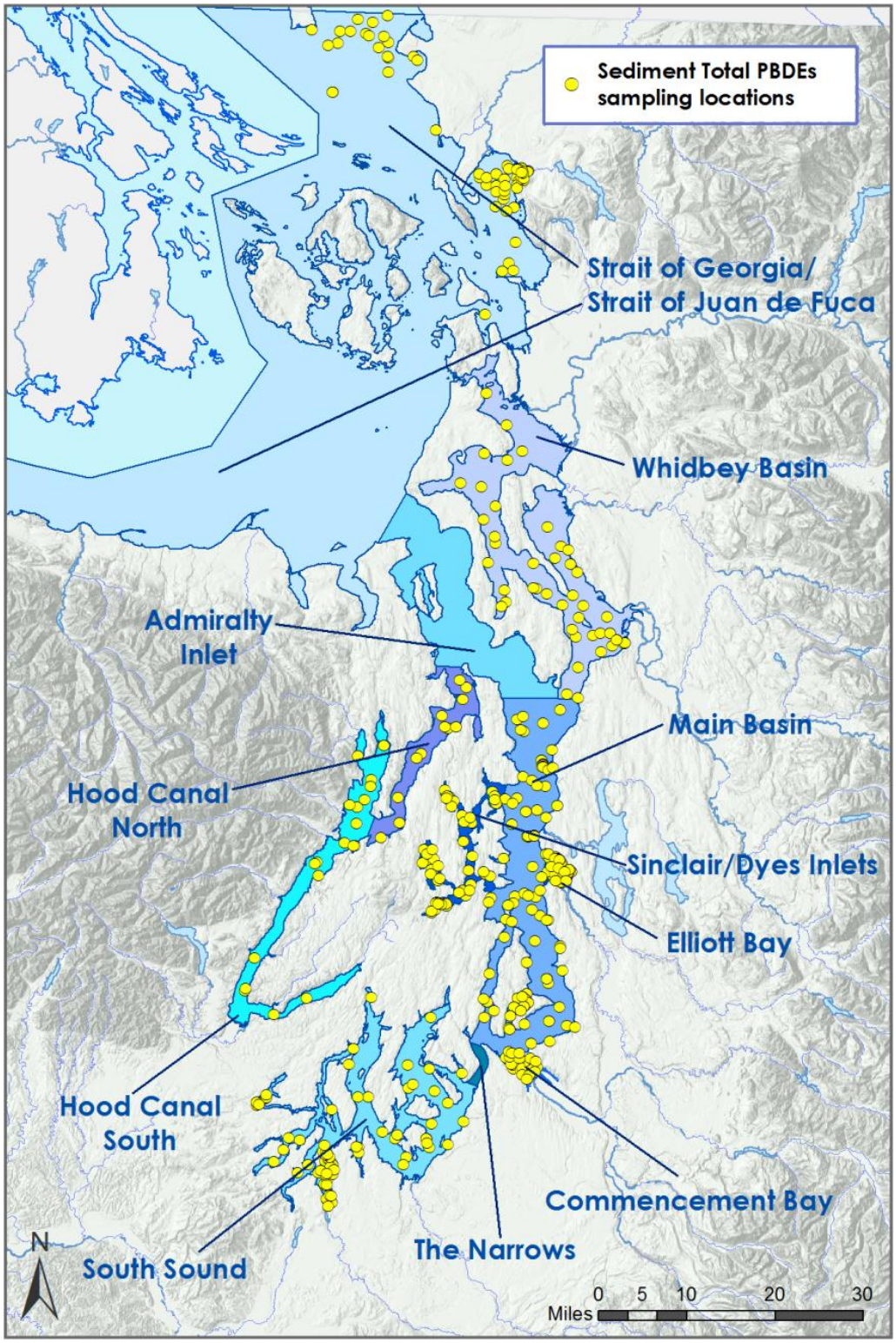


Figure B-5. Sampling locations for Total PBDEs in sediment.

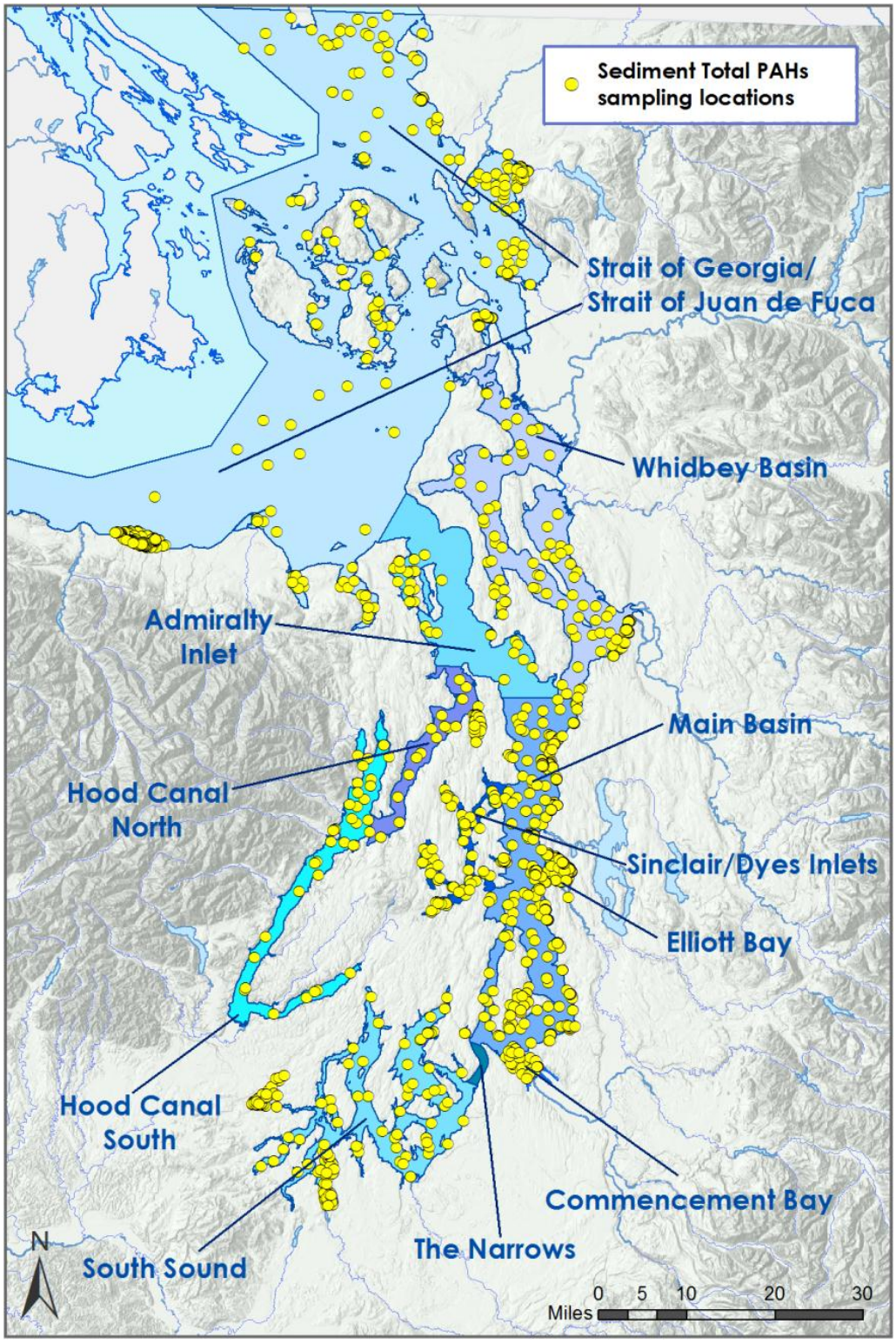


Figure B-6. Sampling locations for Total PAHs in sediment.

Table B-2. Statistical summary of Total PCBs, Total PBDEs, and Total PAHs data in the 0-10 cm sediment layer for the model regions.

Contaminant	Region	Sediment Depth Strata	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Total PCBs	Admiralty Inlet	0-10 cm	29	6	21	0.0250	0.640	1.11	1.60	12.9	ug/kg dw	
	Hood Canal (North)	0-10 cm	88	56	64	0.0105	0.288	0.466	1.27	86.5	ug/kg dw	
	Hood Canal (South)	0-10 cm	46	17	37	0.0250	0.628	1.26	3.54	7.41	ug/kg dw	
	Main Basin	0-10 cm	479	283	59	0.0250	0.758	1.39	3.46	169	ug/kg dw	
	The Narrows	0-10 cm	1048	593	57	0.0100	0.620	1.20	3.37	1056	ug/kg dw	Basins
	South Sound	0-10 cm	265	155	58	0.0100	0.500	0.910	4.39	488	ug/kg dw	
	Whidbey Basin	0-10 cm	141	76	54	0.0250	0.466	1.11	2.78	1056	ug/kg dw	
	Comm. Bay	0-10 cm	46	11	24	0.445	2.31	4.44	35.2	140	ug/kg dw	
	Elliott Bay	0-10 cm	353	24	7	0.450	19.1	43.5	96.5	415	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	507	56	11	0.0250	13.1	31.3	51.5	3239	ug/kg dw	
	All Regions	0-10 cm	1954	684	35	0.0100	0.865	3.95	33.7	3239	ug/kg dw	
	Basins	0-10 cm	1048	593	57	0.0100	0.620	1.20	3.37	1056	ug/kg dw	
	Urban Bays	0-10 cm	906	91	10	0.0250	13.1	34.2	67.0	3239	ug/kg dw	
	SJF/SOG	0-10 cm	415	174	42	0.0250	0.600	1.55	11.5	1544	ug/kg dw	
Total PBDEs	Admiralty Inlet	0-10 cm	264	47	18	0.0100	0.180	0.420	0.994	104	ug/kg dw	Basins
	Hood Canal (North)	0-10 cm	9	0	0	0.140	0.140	0.200	0.270	0.490	ug/kg dw	
	Hood Canal (South)	0-10 cm	14	1	7	0.134	0.203	0.333	0.385	0.570	ug/kg dw	
	Main Basin	0-10 cm	130	21	16	0.0100	0.181	0.677	1.33	10.8	ug/kg dw	
	The Narrows	0-10 cm	264	47	18	0.0100	0.180	0.420	0.994	104	ug/kg dw	Basins
	South Sound	0-10 cm	80	23	29	0.0700	0.175	0.285	0.808	104	ug/kg dw	
	Whidbey Basin	0-10 cm	31	2	6	0.100	0.193	0.330	0.755	5.77	ug/kg dw	
	Comm. Bay	0-10 cm	24	0	0	0.320	2.10	4.19	6.11	19.6	ug/kg dw	
	Elliott Bay	0-10 cm	49	2	4	0.0206	3.62	4.93	6.44	29.7	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	51	20	39	0.170	0.180	0.520	3.34	14.6	ug/kg dw	
	All Regions	0-10 cm	388	69	18	0.0100	0.185	0.570	2.68	104	ug/kg dw	
	Basins	0-10 cm	264	47	18	0.0100	0.180	0.420	0.994	104	ug/kg dw	
	Urban Bays	0-10 cm	124	22	18	0.0206	0.440	3.616	5.91	29.7	ug/kg dw	
	SJF/SOG	0-10 cm	67	2	3	0.130	0.325	0.735	2.63	19.3	ug/kg dw	
Total PAHs	Admiralty Inlet	0-10 cm	28	1	4	1.00	45.9	268	800	6954	ug/kg dw	
	Hood Canal (North)	0-10 cm	133	21	16	0.550	42.0	200	573	4615	ug/kg dw	
	Hood Canal (South)	0-10 cm	39	2	5	1.00	18.4	118	490	83673	ug/kg dw	
	Main Basin	0-10 cm	521	59	11	0.650	39.1	242	660	451180	ug/kg dw	
	The Narrows	0-10 cm	1070	125	12	0.550	38.7	236	683	451180	ug/kg dw	Basins
	South Sound	0-10 cm	182	24	13	0.650	44.3	303	717	9991	ug/kg dw	
	Whidbey Basin	0-10 cm	167	18	11	1.00	34.3	231	876	354020	ug/kg dw	
	Comm. Bay	0-10 cm	55	0	0	78.0	316	555	1732	21830	ug/kg dw	
	Elliott Bay	0-10 cm	339	5	1	3.61	841	2264	4110	91360	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	66	1	2	1.00	153	1010	2028	4845	ug/kg dw	
	All Regions	0-10 cm	1530	131	9	0.550	76.5	402	1632	451180	ug/kg dw	
	Basins	0-10 cm	1070	125	12	0.550	38.7	236	683	451180	ug/kg dw	
	Urban Bays	0-10 cm	460	6	1	1.00	632	1806	3498	91360	ug/kg dw	
	SJF/SOG	0-10 cm	443	46	10	0.650	71.6	354	1124	262700	ug/kg dw	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

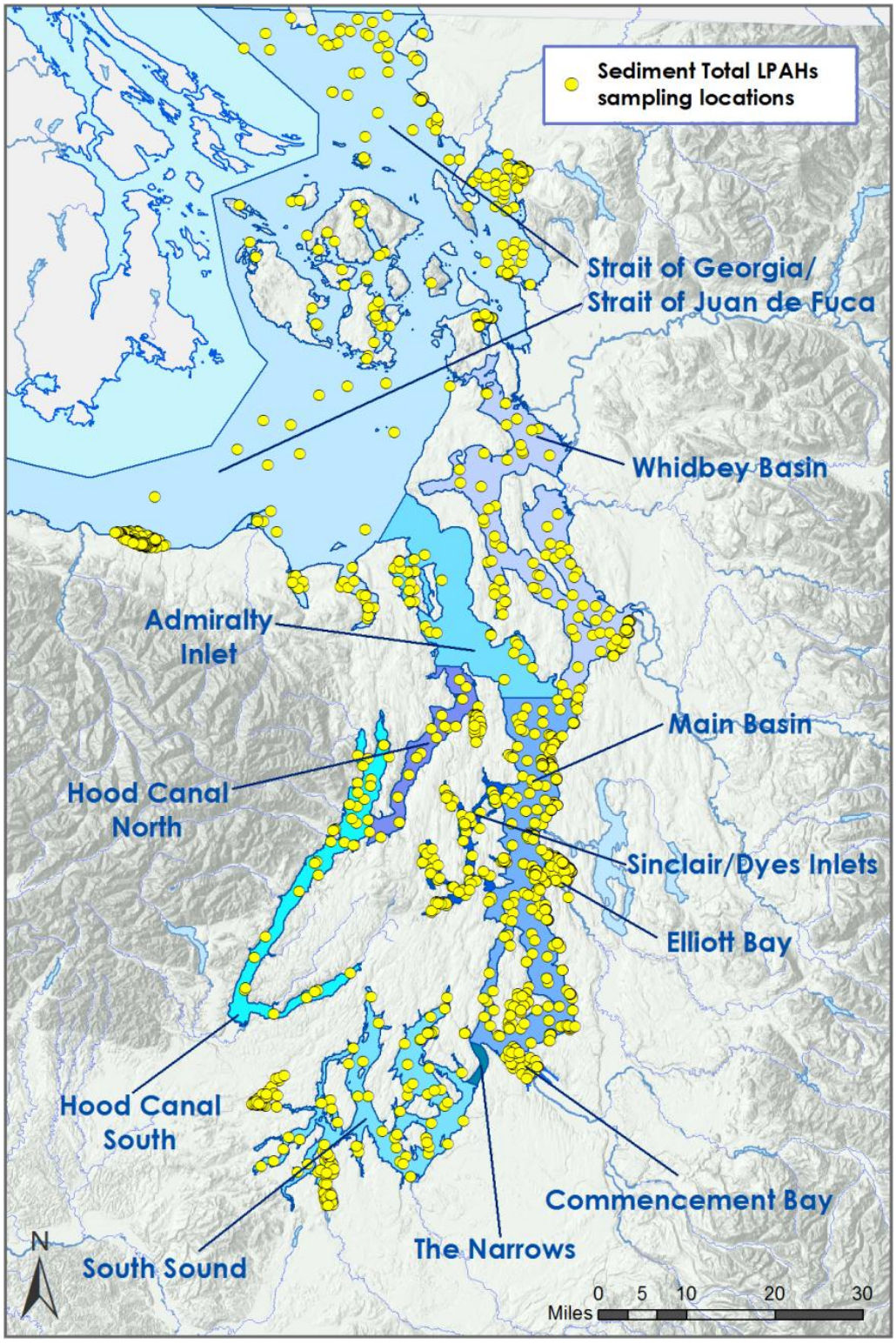


Figure B-7. Sampling locations for Total LPAHs in sediment.

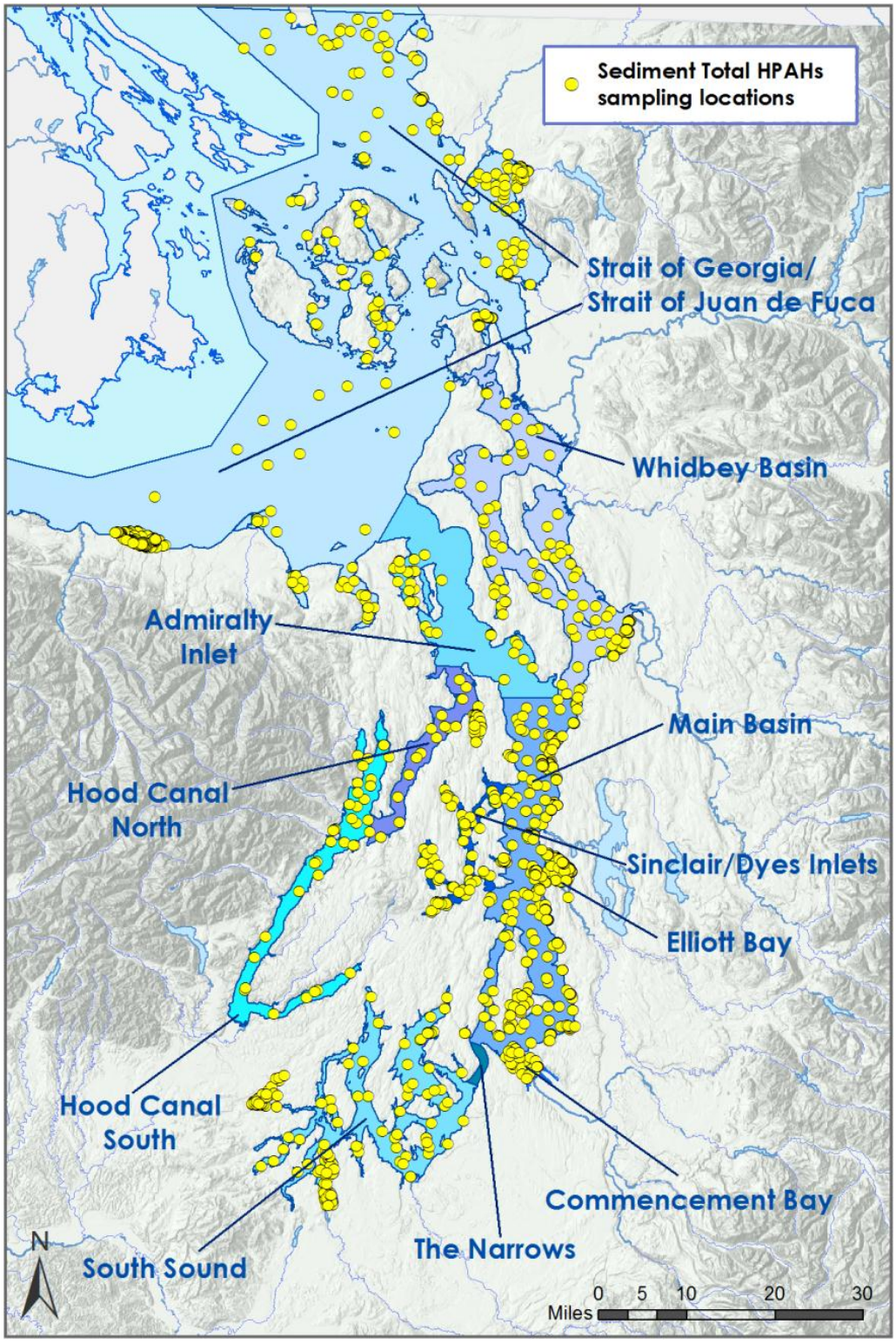


Figure B-8. Sampling locations for Total HPAHs in sediment.

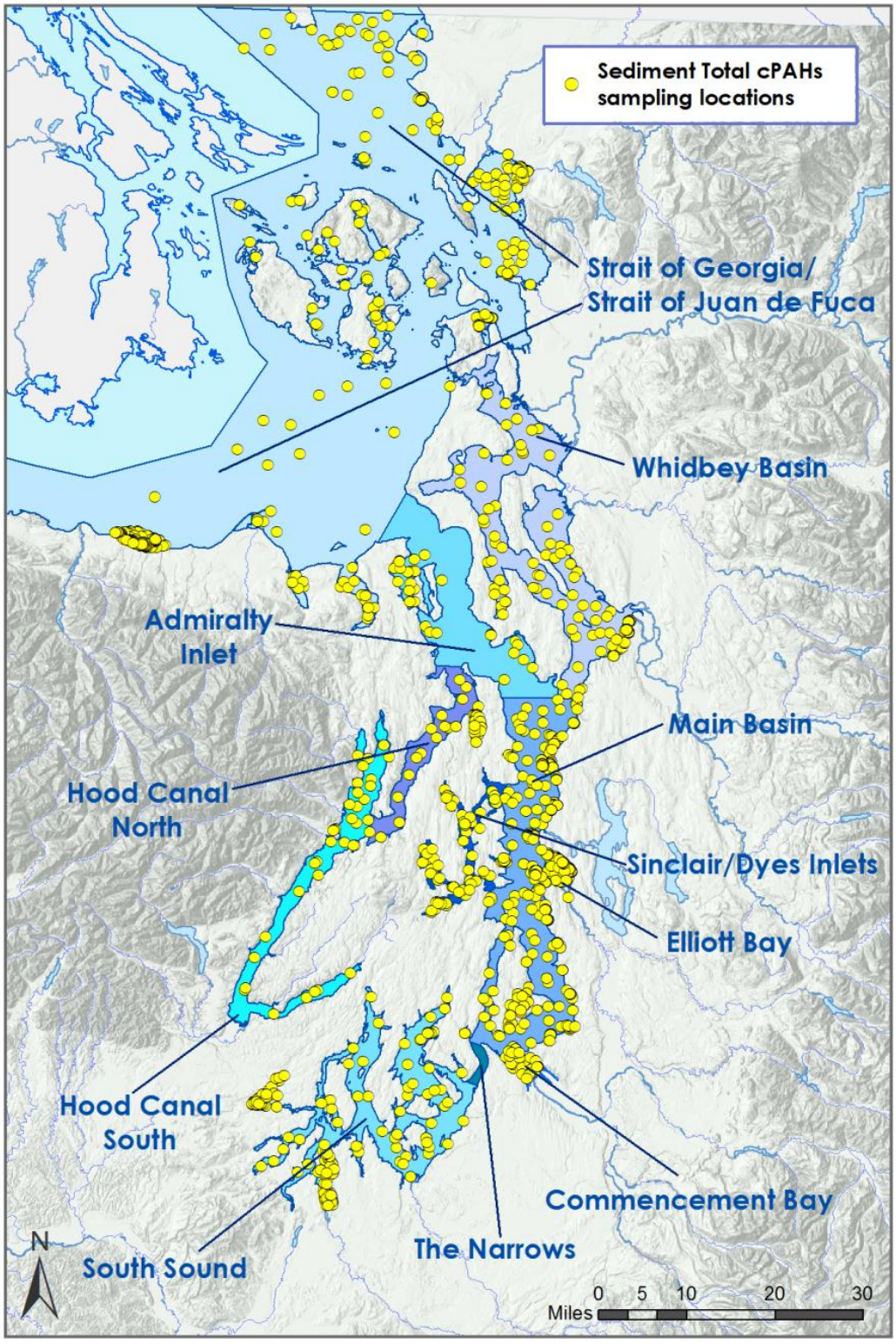


Figure B-9. Sampling locations for Total cPAHs in sediment.

Table B-3. Statistical summary of Total LPAHs, Total HPAHs, and Total cPAHs data in the 0-10 cm sediment layer for the model regions.

Contaminant	Region	Sediment Depth Strata	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Total LPAHs	Admiralty Inlet	0-10 cm	28	2	7	0.650	11.7	93.5	287	1063	ug/kg dw	
	Hood Canal (North)	0-10 cm	129	32	25	2.00	4.45	50.1	179	2121	ug/kg dw	
	Hood Canal (South)	0-10 cm	38	4	11	0.495	3.92	33.0	150	12230	ug/kg dw	
	Main Basin	0-10 cm	501	111	22	0.650	10.0	28.3	90.0	104510	ug/kg dw	
	The Narrows	0-10 cm	1038	225	22	0.358	8.86	33.3	140	111350	ug/kg dw	Basins
	South Sound	0-10 cm	179	44	25	0.358	4.45	49.0	156	1770	ug/kg dw	
	Whidbey Basin	0-10 cm	163	32	20	0.495	6.35	48.6	184	111350	ug/kg dw	
	Comm. Bay	0-10 cm	52	0	0	53.2	126	223	530	7290	ug/kg dw	
	Elliott Bay	0-10 cm	337	24	7	1.03	76.6	279	655	8686	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	66	4	6	0.750	20.3	160	285	598	ug/kg dw	
	All Regions	0-10 cm	1493	253	17	0.358	13.8	62.0	265	111350	ug/kg dw	
	Basins	0-10 cm	1038	225	22	0.358	8.86	33.3	140	111350	ug/kg dw	
	Urban Bays	0-10 cm	455	28	6	0.750	76.0	253	568	8686	ug/kg dw	
	SJF/SOG	0-10 cm	433	58	13	0.648	19.4	98.3	285	120000	ug/kg dw	
Total HPAHs	Admiralty Inlet	0-10 cm	28	1	4	1.00	32.9	164	464	5891	ug/kg dw	
	Hood Canal (North)	0-10 cm	133	22	17	0.550	36.9	143	331	3453	ug/kg dw	
	Hood Canal (South)	0-10 cm	39	2	5	1.00	15.9	86.8	344	77520	ug/kg dw	
	Main Basin	0-10 cm	518	62	12	0.650	33.8	217	555	387380	ug/kg dw	
	The Narrows	0-10 cm	1066	128	12	0.550	33.0	196	508	387380	ug/kg dw	Basins
	South Sound	0-10 cm	182	24	13	0.590	36.6	247	533	8630	ug/kg dw	
	Whidbey Basin	0-10 cm	166	17	10	1.00	27.1	183	714	242670	ug/kg dw	
	Comm. Bay	0-10 cm	55	0	0	78.0	198	374	1228	14540	ug/kg dw	
	Elliott Bay	0-10 cm	334	5	1	3.61	795	1909	3446	82674	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	66	1	2	1.00	126	858	1715	4267	ug/kg dw	
	All Regions	0-10 cm	1521	134	9	0.550	62.5	332	1357	387380	ug/kg dw	
	Basins	0-10 cm	1066	128	12	0.550	33.0	196	508	387380	ug/kg dw	
	Urban Bays	0-10 cm	455	6	1	1.00	558	1586	3048	82674	ug/kg dw	
	SJF/SOG	0-10 cm	442	50	11	0.650	54.2	249	803	142700	ug/kg dw	
Total cPAHs	Admiralty Inlet	0-10 cm	27	1	4	1.00	18.0	82.8	205	3445	ug/kg dw	
	Hood Canal (North)	0-10 cm	131	29	22	0.550	15.8	69.8	149	2626	ug/kg dw	
	Hood Canal (South)	0-10 cm	38	4	11	0.650	9.62	55.8	184	31320	ug/kg dw	
	Main Basin	0-10 cm	509	70	14	0.650	23.8	118	322	96460	ug/kg dw	
	The Narrows	0-10 cm	1051	160	15	0.550	18.7	104	270	96460	ug/kg dw	Basins
	South Sound	0-10 cm	182	32	18	0.650	15.3	121	296	4890	ug/kg dw	
	Whidbey Basin	0-10 cm	164	24	15	0.650	16.9	98.5	364	44670	ug/kg dw	
	Comm. Bay	0-10 cm	51	0	0	48.7	109	228	588	5510	ug/kg dw	
	Elliott Bay	0-10 cm	333	4	1	3.61	561	1257	2115	53933	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	66	1	2	1.00	70.5	497	1067	2619	ug/kg dw	
	All Regions	0-10 cm	1501	165	11	0.550	36.7	180	781	96460	ug/kg dw	
	Basins	0-10 cm	1051	160	15	0.550	18.7	104	270	96460	ug/kg dw	
	Urban Bays	0-10 cm	450	5	1	1.00	351	983	1850	53933	ug/kg dw	
	SJF/SOG	0-10 cm	436	61	14	0.626	25.9	132	380	65700	ug/kg dw	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

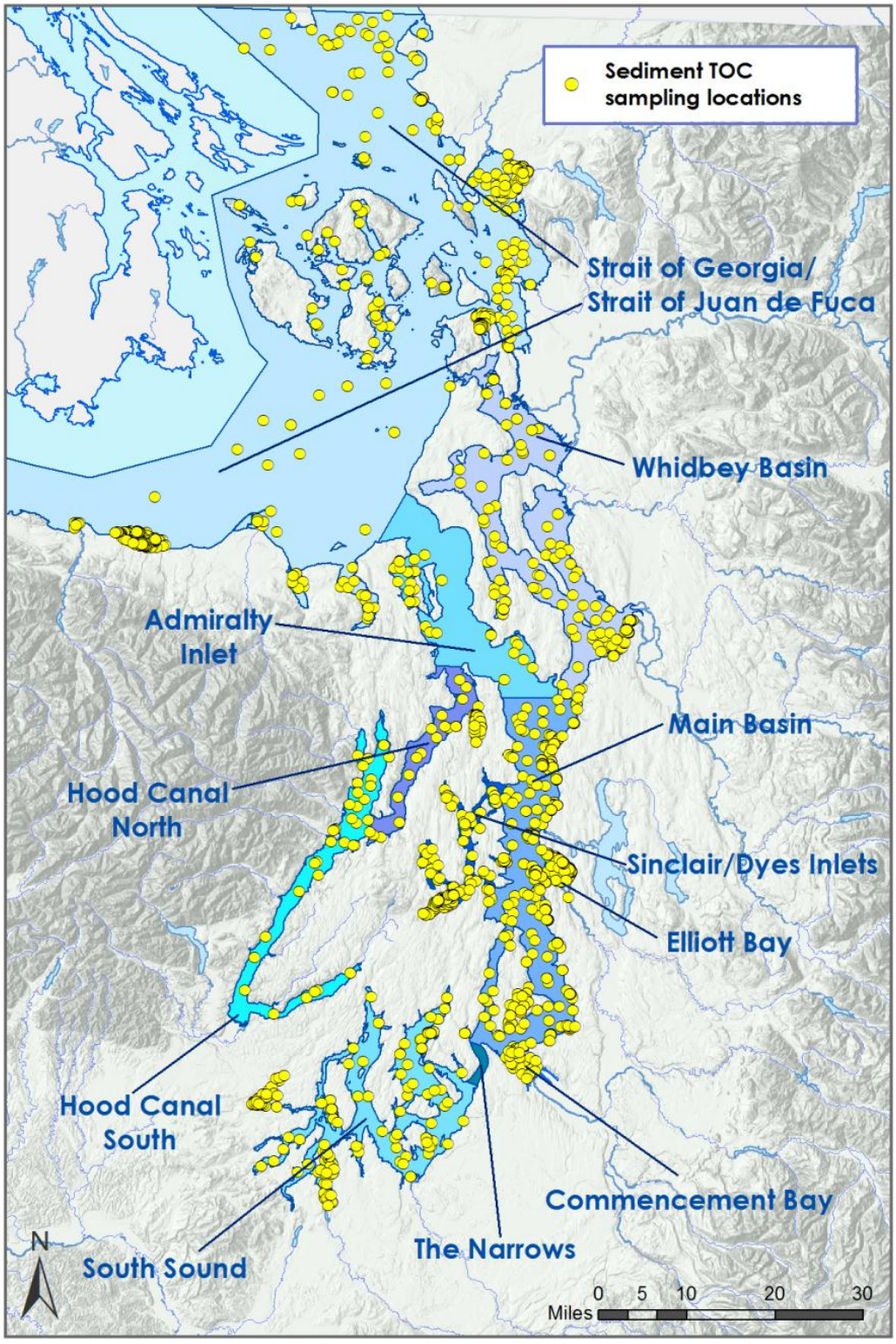


Figure B-10. Sampling locations for TOC content of sediment.

Table B-4. Statistical summary of TOC data in the 0-10 cm sediment layer for the model regions.

Contaminant	Region	Sediment Depth Strata	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Total Organic Carbon	Admiralty Inlet	0-10 cm	27	0	0	0.19	0.63	1.15	2.04	3.01	%	
	Hood Canal (North)	0-10 cm	262	0	0	0.07	0.95	2.46	4.33	29.7	%	
	Hood Canal (South)	0-10 cm	42	0	0	0.11	0.35	2.12	2.44	12.0	%	
	Main Basin	0-10 cm	669	34	5	0.00	0.19	0.41	1.49	4.51	%	
	The Narrows	0-10 cm	1477	41	3	0.00	0.31	1.30	2.23	29.7	%	Basins
	South Sound	0-10 cm	232	5	2	0.01	0.57	1.81	2.79	11.9	%	
	Whidbey Basin	0-10 cm	245	2	1	0.01	0.94	1.74	2.10	9.62	%	
	Comm. Bay	0-10 cm	57	0	0	0.53	1.02	1.26	1.51	4.60	%	
	Elliott Bay	0-10 cm	410	3	1	0.02	1.01	1.78	2.29	6.59	%	
	Sinclair/Dyes Inlet	0-10 cm	468	0	0	0.13	1.67	2.60	3.04	7.20	%	
	All Regions	0-10 cm	2412	44	2	0.00	0.50	1.63	2.50	29.7	%	
	Basins	0-10 cm	1477	41	3	0.00	0.31	1.30	2.23	29.7	%	
	Urban Bays	0-10 cm	935	3	0	0.02	1.20	2.07	2.82	7.20	%	
	SJF/SOG	0-10 cm	794	3	0	0.00	0.65	1.41	2.20	49.3	%	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table B-5. Statistical summary of Acenaphthene, Acenaphthylene, and Anthracene data in the 0-10 cm sediment layer.

Contaminant	Region	Sediment Depth Strata	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Acenaphthene	Admiralty Inlet	0-10 cm	27	6	22	0.60	0.77	2.80	6.23	51.0	ug/kg dw	
	Hood Canal (North)	0-10 cm	107	51	48	0.37	3.70	4.05	10.5	220	ug/kg dw	
	Hood Canal (South)	0-10 cm	36	14	39	0.07	0.60	0.68	3.13	370	ug/kg dw	
	Main Basin	0-10 cm	418	325	78	0.06	2.55	4.61	6.92	17000	ug/kg dw	
	The Narrows	0-10 cm	883	549	62	0.06	2.25	4.05	7.23	17000	ug/kg dw	Basins
	South Sound	0-10 cm	169	89	53	0.07	2.94	4.05	7.08	365	ug/kg dw	
	Whidbey Basin	0-10 cm	126	64	51	0.07	0.68	4.01	16.8	323	ug/kg dw	
	Comm. Bay	0-10 cm	51	2	4	0.65	7.65	17.0	34.0	1000	ug/kg dw	
	Elliott Bay	0-10 cm	310	74	24	0.88	8.25	17.6	35.5	530	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	58	20	34	0.07	0.82	6.90	10.7	51.1	ug/kg dw	
	All Regions	0-10 cm	1302	645	50	0.06	3.39	5.37	15.9	17000	ug/kg dw	
	Basins	0-10 cm	883	549	62	0.06	2.25	4.05	7.23	17000	ug/kg dw	
	Urban Bays	0-10 cm	419	96	23	0.07	7.04	14.6	29.8	1000	ug/kg dw	
	SJF/SOG	0-10 cm	355	138	39	0.07	2.00	4.05	9.80	16000	ug/kg dw	
Acenaphthylene	Admiralty Inlet	0-10 cm	27	6	22	0.30	1.19	4.60	15.3	136	ug/kg dw	
	Hood Canal (North)	0-10 cm	112	52	46	0.49	4.24	4.30	17.3	142	ug/kg dw	
	Hood Canal (South)	0-10 cm	36	13	36	0.06	0.65	2.30	9.40	250	ug/kg dw	
	Main Basin	0-10 cm	436	308	71	0.25	3.63	7.83	11.2	1000	ug/kg dw	
	The Narrows	0-10 cm	919	523	57	0.06	3.20	6.26	13.0	1000	ug/kg dw	Basins
	South Sound	0-10 cm	165	81	49	0.06	3.96	4.30	11.4	365	ug/kg dw	
	Whidbey Basin	0-10 cm	143	63	44	0.06	0.74	4.30	24.0	860	ug/kg dw	
	Comm. Bay	0-10 cm	51	9	18	0.23	4.35	10.5	18.0	110	ug/kg dw	
	Elliott Bay	0-10 cm	311	126	41	1.03	10.6	17.6	39.1	1240	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	61	9	15	0.06	2.60	12.9	24.9	142	ug/kg dw	
	All Regions	0-10 cm	1342	667	50	0.06	4.12	9.28	20.0	1240	ug/kg dw	
	Basins	0-10 cm	919	523	57	0.06	3.20	6.26	13.0	1000	ug/kg dw	
	Urban Bays	0-10 cm	423	144	34	0.06	9.99	15.8	35.5	1240	ug/kg dw	
	SJF/SOG	0-10 cm	343	127	37	0.06	1.98	4.30	14.2	200	ug/kg dw	
Anthracene	Admiralty Inlet	0-10 cm	27	6	22	0.30	2.33	8.60	22.0	329	ug/kg dw	
	Hood Canal (North)	0-10 cm	112	40	36	0.50	3.80	7.50	23.3	150	ug/kg dw	
	Hood Canal (South)	0-10 cm	36	13	36	0.22	0.65	3.15	11.0	870	ug/kg dw	
	Main Basin	0-10 cm	376	137	36	0.21	3.25	7.38	26.0	10000	ug/kg dw	
	The Narrows	0-10 cm	874	317	36	0.20	3.39	7.39	25.2	10000	ug/kg dw	Basins
	South Sound	0-10 cm	172	69	40	0.22	3.75	6.53	21.3	365	ug/kg dw	
	Whidbey Basin	0-10 cm	151	52	34	0.20	1.75	9.69	38.0	1400	ug/kg dw	
	Comm. Bay	0-10 cm	51	1	2	3.60	12.50	29.0	91.0	590	ug/kg dw	
	Elliott Bay	0-10 cm	246	10	4	1.03	44.8	96.0	212	1974	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	63	6	10	0.30	10.0	30.4	56.7	114	ug/kg dw	
	All Regions	0-10 cm	1234	334	27	0.20	3.80	14.3	58.7	10000	ug/kg dw	
	Basins	0-10 cm	874	317	36	0.20	3.39	7.39	25.2	10000	ug/kg dw	
	Urban Bays	0-10 cm	360	17	5	0.30	27.8	73.0	165	1974	ug/kg dw	
	SJF/SOG	0-10 cm	396	97	24	0.30	3.80	10.5	42.3	20000	ug/kg dw	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table B-6. Statistical summary of Benzo(a)anthracene, Benzo(a)pyrene, and Benzo(b)fluoranthene data in the 0-10 cm sediment layer.

Contaminant	Region	Sediment Depth Strata	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Benzo(a)anthracene	Admiralty Inlet	0-10 cm	27	5	19	0.55	3.48	13.0	34.5	368	ug/kg dw	
	Hood Canal (North)	0-10 cm	110	23	21	0.65	4.00	13.5	32.5	730	ug/kg dw	
	Hood Canal (South)	0-10 cm	38	10	26	0.49	0.69	5.80	22.0	5500	ug/kg dw	
	Main Basin	0-10 cm	465	84	18	0.42	7.10	20.6	58.4	29000	ug/kg dw	
	The Narrows	0-10 cm	971	206	21	0.20	3.90	18.1	42.6	29000	ug/kg dw	Basins
	South Sound	0-10 cm	175	43	25	0.20	2.90	16.9	38.2	840	ug/kg dw	
	Whidbey Basin	0-10 cm	156	41	26	0.49	2.90	17.0	46.9	2600	ug/kg dw	
	Comm. Bay	0-10 cm	51	1	2	11.0	18.5	32.0	130	1300	ug/kg dw	
	Elliott Bay	0-10 cm	307	6	2	1.08	97.4	206	364	6247	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	66	4	6	0.49	10.0	65.5	129	340	ug/kg dw	
	All Regions	0-10 cm	1395	217	16	0.20	7.71	28.0	130	29000	ug/kg dw	
	Basins	0-10 cm	971	206	21	0.20	3.90	18.1	42.6	29000	ug/kg dw	
	Urban Bays	0-10 cm	424	11	3	0.49	56.3	152	296	6247	ug/kg dw	
	SJF/SOG	0-10 cm	405	75	19	0.26	4.40	20.3	67.0	16000	ug/kg dw	
Benzo(a)pyrene	Admiralty Inlet	0-10 cm	27	5	19	0.30	3.10	12	30	414	ug/kg dw	
	Hood Canal (North)	0-10 cm	113	25	22	0.65	4.05	15	37	280	ug/kg dw	
	Hood Canal (South)	0-10 cm	38	7	18	0.25	0.91	8.00	29	4400	ug/kg dw	
	Main Basin	0-10 cm	430	100	23	0.27	5.20	26	70	9600	ug/kg dw	
	The Narrows	0-10 cm	942	218	23	0.25	4.05	20	50	9600	ug/kg dw	Basins
	South Sound	0-10 cm	176	49	28	0.25	4.00	20	49	860	ug/kg dw	
	Whidbey Basin	0-10 cm	158	32	20	0.25	3.96	20	46	2900	ug/kg dw	
	Comm. Bay	0-10 cm	51	1	2	11.00	20	36	115	1500	ug/kg dw	
	Elliott Bay	0-10 cm	280	10	4	1.78	107	208	391	9501	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	66	3	5	0.30	11	78	177	440	ug/kg dw	
	All Regions	0-10 cm	1339	232	17	0.25	6.81	33	136	9600	ug/kg dw	
	Basins	0-10 cm	942	218	23	0.25	4.05	20	50	9600	ug/kg dw	
	Urban Bays	0-10 cm	397	14	4	0.30	57	172	331	9501	ug/kg dw	
	SJF/SOG	0-10 cm	403	82	20	0.30	4.20	21	56	9900	ug/kg dw	
Benzo(b)fluoranthene	Admiralty Inlet	0-10 cm	27	2	7	0.65	3.10	15.0	42.5	904	ug/kg dw	
	Hood Canal (North)	0-10 cm	108	21	19	0.95	4.86	17.5	30.5	600	ug/kg dw	
	Hood Canal (South)	0-10 cm	36	7	19	0.65	1.43	9.75	29.0	7800	ug/kg dw	
	Main Basin	0-10 cm	355	68	19	0.65	6.56	22.0	63.2	13000	ug/kg dw	
	The Narrows	0-10 cm	862	178	21	0.28	4.75	22.0	56.3	13000	ug/kg dw	Basins
	South Sound	0-10 cm	174	42	24	0.28	4.70	30.0	63.9	1000	ug/kg dw	
	Whidbey Basin	0-10 cm	162	38	23	0.50	4.70	27.0	82.8	10000	ug/kg dw	
	Comm. Bay	0-10 cm	34	0	0	8.50	26.2	48.5	111	607	ug/kg dw	
	Elliott Bay	0-10 cm	266	3	1	1.78	176	295	483	11367	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	66	3	5	0.70	17.0	125	245	593	ug/kg dw	
	All Regions	0-10 cm	1228	184	15	0.28	9.02	39.3	170	13000	ug/kg dw	
	Basins	0-10 cm	862	178	21	0.28	4.75	22.0	56.3	13000	ug/kg dw	
	Urban Bays	0-10 cm	366	6	2	0.70	89.2	237	403	11367	ug/kg dw	
	SJF/SOG	0-10 cm	391	66	17	0.60	6.30	26.0	79.0	13000	ug/kg dw	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table B-7. Statistical summary of Benzo(g,h,i)perylene, Benzo(k)fluoranthene, and Chrysene data in the 0-10 cm sediment layer.

Contaminant	Region	Sediment Depth Strata	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Benzo(g,h,i)perylene	Admiralty Inlet	0-10 cm	27	5	19	0.60	2.90	15.0	32.0	243	ug/kg dw	
	Hood Canal (North)	0-10 cm	113	37	33	0.65	3.35	6.50	22.0	180	ug/kg dw	
	Hood Canal (South)	0-10 cm	38	6	16	0.24	1.36	13.5	34.5	2200	ug/kg dw	
	Main Basin	0-10 cm	446	147	33	0.50	5.18	15.2	46.6	7792	ug/kg dw	
	The Narrows	0-10 cm	946	295	31	0.24	3.60	13.5	39.6	7792	ug/kg dw	Basins
	South Sound	0-10 cm	174	56	32	0.24	3.35	19.8	46.8	540	ug/kg dw	
	Whidbey Basin	0-10 cm	148	44	30	0.24	3.25	14.0	40.0	1100	ug/kg dw	
	Comm. Bay	0-10 cm	51	1	2	7.10	13.0	27.0	64.5	530	ug/kg dw	
	Elliott Bay	0-10 cm	299	40	13	1.03	45.2	117	211	4338	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	65	3	5	0.60	11.0	79.6	155	301	ug/kg dw	
	All Regions	0-10 cm	1361	339	25	0.24	5.28	23.7	80.5	7792	ug/kg dw	
	Basins	0-10 cm	946	295	31	0.24	3.60	13.5	39.6	7792	ug/kg dw	
	Urban Bays	0-10 cm	415	44	11	0.60	25.4	93.2	182	4338	ug/kg dw	
	SJF/SOG	0-10 cm	375	81	22	0.40	3.35	16.0	37.5	4000	ug/kg dw	
Benzo(k)fluoranthene	Admiralty Inlet	0-10 cm	27	2	7	0.65	3.02	14.0	34.8	570	ug/kg dw	
	Hood Canal (North)	0-10 cm	99	21	21	1.05	4.50	8.60	22.0	310	ug/kg dw	
	Hood Canal (South)	0-10 cm	36	7	19	0.65	1.38	8.20	28.3	4600	ug/kg dw	
	Main Basin	0-10 cm	355	84	24	0.34	4.29	21.0	49.1	13000	ug/kg dw	
	The Narrows	0-10 cm	825	199	24	0.34	4.45	14.9	38.0	13000	ug/kg dw	Basins
	South Sound	0-10 cm	157	47	30	0.58	4.50	11.1	29.0	430	ug/kg dw	
	Whidbey Basin	0-10 cm	151	38	25	0.50	4.45	15.0	45.0	3200	ug/kg dw	
	Comm. Bay	0-10 cm	34	0	0	2.10	12.5	25.5	54.5	280	ug/kg dw	
	Elliott Bay	0-10 cm	286	6	2	1.78	109	240	418	10716	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	66	4	6	0.75	10.0	48.2	107.25	490	ug/kg dw	
	All Regions	0-10 cm	1211	209	17	0.34	5.75	27.0	118	13000	ug/kg dw	
	Basins	0-10 cm	825	199	24	0.34	4.45	14.9	38.00	13000	ug/kg dw	
	Urban Bays	0-10 cm	386	10	3	0.75	57.3	166	348	10716	ug/kg dw	
	SJF/SOG	0-10 cm	381	67	18	0.40	4.60	20.0	55.5	4600	ug/kg dw	
Chrysene	Admiralty Inlet	0-10 cm	27	5	19	0.30	3.03	17.0	35.2	798	ug/kg dw	
	Hood Canal (North)	0-10 cm	112	14	13	0.65	9.60	27.0	50.3	570	ug/kg dw	
	Hood Canal (South)	0-10 cm	38	6	16	0.30	1.45	9.75	35.8	12000	ug/kg dw	
	Main Basin	0-10 cm	498	89	18	0.30	7.86	26.4	67.3	30000	ug/kg dw	
	The Narrows	0-10 cm	1015	178	18	0.30	6.23	26.1	62.9	30000	ug/kg dw	Basins
	South Sound	0-10 cm	177	33	19	0.30	4.40	27.0	65.0	1100	ug/kg dw	
	Whidbey Basin	0-10 cm	163	31	19	0.30	4.90	29.0	110	30000	ug/kg dw	
	Comm. Bay	0-10 cm	51	0	0	15.00	31.5	60.1	185	2000	ug/kg dw	
	Elliott Bay	0-10 cm	314	5	2	1.08	127	280	501	9675	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	66	2	3	0.30	15.0	92.3	164	647	ug/kg dw	
	All Regions	0-10 cm	1446	185	13	0.30	11.0	42.0	175	30000	ug/kg dw	
	Basins	0-10 cm	1015	178	18	0.30	6.23	26.1	62.9	30000	ug/kg dw	
	Urban Bays	0-10 cm	431	7	2	0.30	70.8	200	411	9675	ug/kg dw	
	SJF/SOG	0-10 cm	412	58	14	0.30	9.31	31.0	103	15000	ug/kg dw	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table B-8. Statistical summary of Dibenzo(a,h)anthracene, Fluoranthene, and Fluorene data in the 0-10 cm sediment layer.

Contaminant	Region	Sediment Depth Strata	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Dibenzo(a,h)anthracene	Admiralty Inlet	0-10 cm	26	6	23	0.65	1.23	3.45	8.15	133	ug/kg dw	
	Hood Canal (North)	0-10 cm	110	65	59	0.49	1.85	4.20	4.25	37.0	ug/kg dw	
	Hood Canal (South)	0-10 cm	36	13	36	0.26	0.65	2.80	8.13	430	ug/kg dw	
	Main Basin	0-10 cm	437	269	62	0.13	3.72	5.90	11.7	2792	ug/kg dw	
	The Narrows	0-10 cm	910	505	55	0.13	2.51	4.25	9.81	2792	ug/kg dw	Basins
	South Sound	0-10 cm	173	93	54	0.26	2.99	4.25	7.00	365	ug/kg dw	
	Whidbey Basin	0-10 cm	128	59	46	0.24	0.95	4.20	13.6	470	ug/kg dw	
	Comm. Bay	0-10 cm	51	3	6	0.30	3.45	7.76	20.0	230	ug/kg dw	
	Elliott Bay	0-10 cm	284	40	14	1.00	22.9	47.0	83.1	2046	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	64	7	11	0.26	3.69	12.7	30.7	77.0	ug/kg dw	
	All Regions	0-10 cm	1309	555	42	0.13	3.67	6.76	25.9	2792	ug/kg dw	
	Basins	0-10 cm	910	505	55	0.13	2.51	4.25	9.81	2792	ug/kg dw	
	Urban Bays	0-10 cm	399	50	13	0.26	11.1	33.4	71.4	2046	ug/kg dw	
	SJF/SOG	0-10 cm	327	114	35	0.10	2.11	4.25	9.50	1700	ug/kg dw	
Fluoranthene	Admiralty Inlet	0-10 cm	27	2	7	0.43	5.25	46.0	119	1104	ug/kg dw	
	Hood Canal (North)	0-10 cm	115	7	6	1.50	21.0	41.0	109	615	ug/kg dw	
	Hood Canal (South)	0-10 cm	38	2	5	0.43	4.65	15.0	68.0	27000	ug/kg dw	
	Main Basin	0-10 cm	472	76	16	0.43	11.4	45.8	106	160000	ug/kg dw	
	The Narrows	0-10 cm	993	139	14	0.31	10.2	45.0	110	160000	ug/kg dw	Basins
	South Sound	0-10 cm	179	28	16	0.31	7.57	51.1	103	2095	ug/kg dw	
	Whidbey Basin	0-10 cm	162	24	15	0.43	6.60	46.0	138	120000	ug/kg dw	
	Comm. Bay	0-10 cm	53	0	0	20.0	44.7	91.0	250	5000	ug/kg dw	
	Elliott Bay	0-10 cm	279	5	2	1.08	167	365	628	40500	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	66	1	2	0.43	20.9	136	228	875	ug/kg dw	
	All Regions	0-10 cm	1391	145	10	0.31	17.0	68.5	239	160000	ug/kg dw	
	Basins	0-10 cm	993	139	14	0.31	10.2	45.0	110	160000	ug/kg dw	
	Urban Bays	0-10 cm	398	6	2	0.43	101	255	530	40500	ug/kg dw	
	SJF/SOG	0-10 cm	423	46	11	0.29	16.0	61.0	205	42000	ug/kg dw	
Fluorene	Admiralty Inlet	0-10 cm	27	6	22	0.65	1.42	5.90	20.0	80.5	ug/kg dw	
	Hood Canal (North)	0-10 cm	109	50	46	0.50	4.35	4.45	13.0	230	ug/kg dw	
	Hood Canal (South)	0-10 cm	36	13	36	0.22	0.65	2.95	13.0	1100	ug/kg dw	
	Main Basin	0-10 cm	454	312	69	0.15	3.64	7.56	11.7	7900	ug/kg dw	
	The Narrows	0-10 cm	937	514	55	0.15	3.57	6.80	14.3	7900	ug/kg dw	Basins
	South Sound	0-10 cm	170	79	46	0.22	4.35	4.45	10.8	365	ug/kg dw	
	Whidbey Basin	0-10 cm	141	54	38	0.22	1.20	5.30	20.0	401	ug/kg dw	
	Comm. Bay	0-10 cm	51	2	4	0.28	10.2	21.0	40.3	750	ug/kg dw	
	Elliott Bay	0-10 cm	316	63	20	1.03	14.5	29.4	59.3	970	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	60	7	12	0.22	3.37	10.7	18.6	31.5	ug/kg dw	
	All Regions	0-10 cm	1364	586	43	0.15	4.35	9.00	22.3	7900	ug/kg dw	
	Basins	0-10 cm	937	514	55	0.15	3.57	6.80	14.3	7900	ug/kg dw	
	Urban Bays	0-10 cm	427	72	17	0.22	11.3	23.4	50.7	970	ug/kg dw	
	SJF/SOG	0-10 cm	378	111	29	0.28	4.40	11.0	24.4	17000	ug/kg dw	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table B-9. Statistical summary of Indeno(1,2,3-cd)pyrene, Naphthalene, and Phenanthrene data in the 0-10 cm sediment layer.

Contaminant	Region	Sediment Depth Strata	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Indeno(1,2,3-cd)pyrene	Admiralty Inlet	0-10 cm	27	5	19	0.65	2.25	11.0	24.5	260	ug/kg dw	
	Hood Canal (North)	0-10 cm	116	42	36	0.50	4.20	5.60	18.3	160	ug/kg dw	
	Hood Canal (South)	0-10 cm	38	10	26	0.24	0.85	9.32	26.5	2200	ug/kg dw	
	Main Basin	0-10 cm	470	152	32	0.50	5.90	15.7	47.5	5899	ug/kg dw	
	The Narrows	0-10 cm	971	317	33	0.23	4.25	13.0	38.0	5899	ug/kg dw	Basins
	South Sound	0-10 cm	173	59	34	0.23	4.20	18.0	39.4	540	ug/kg dw	
	Whidbey Basin	0-10 cm	147	49	33	0.24	3.45	15.0	39.0	1300	ug/kg dw	
	Comm. Bay	0-10 cm	47	1	2	6.10	12.5	19.0	50.0	480	ug/kg dw	
	Elliott Bay	0-10 cm	298	20	7	1.03	65.1	120	212	4382	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	65	3	5	0.81	10.2	76.9	130	271	ug/kg dw	
	All Regions	0-10 cm	1381	341	25	0.23	5.56	23.0	80.0	5899	ug/kg dw	
	Basins	0-10 cm	971	317	33	0.23	4.25	13.0	38.0	5899	ug/kg dw	
	Urban Bays	0-10 cm	410	24	6	0.81	34.5	102	184	4382	ug/kg dw	
	SJF/SOG	0-10 cm	373	90	24	0.23	4.20	13.0	34.0	5500	ug/kg dw	
Naphthalene	Admiralty Inlet	0-10 cm	27	6	22	0.30	4.45	25.5	76.5	180	ug/kg dw	
	Hood Canal (North)	0-10 cm	114	40	35	0.50	4.30	11.3	62.5	890	ug/kg dw	
	Hood Canal (South)	0-10 cm	36	12	33	0.30	0.67	7.70	38.0	188	ug/kg dw	
	Main Basin	0-10 cm	351	233	66	0.30	2.64	5.93	9.52	55000	ug/kg dw	
	The Narrows	0-10 cm	845	425	50	0.30	3.69	6.83	28.0	55000	ug/kg dw	Basins
	South Sound	0-10 cm	172	72	42	0.30	4.25	11.1	41.9	955	ug/kg dw	
	Whidbey Basin	0-10 cm	145	62	43	0.30	3.80	9.00	28.0	1167	ug/kg dw	
	Comm. Bay	0-10 cm	51	1	2	7.60	27.7	62.0	141	2200	ug/kg dw	
	Elliott Bay	0-10 cm	231	57	25	1.03	7.63	15.1	38.5	961	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	62	9	15	0.30	7.99	22.4	43.6	180	ug/kg dw	
	All Regions	0-10 cm	1189	492	41	0.30	4.20	9.50	36.0	55000	ug/kg dw	
	Basins	0-10 cm	845	425	50	0.30	3.69	6.83	28.0	55000	ug/kg dw	
	Urban Bays	0-10 cm	344	67	19	0.30	8.91	18.6	59.3	2200	ug/kg dw	
	SJF/SOG	0-10 cm	374	100	27	0.19	4.26	20.0	47.0	4800	ug/kg dw	
Phenanthrene	Admiralty Inlet	0-10 cm	27	2	7	0.38	5.05	52.0	126	380	ug/kg dw	
	Hood Canal (North)	0-10 cm	115	22	19	0.95	7.50	32.0	75.0	570	ug/kg dw	
	Hood Canal (South)	0-10 cm	37	4	11	0.34	3.10	15.0	70.0	9700	ug/kg dw	
	Main Basin	0-10 cm	466	85	18	0.26	7.01	26.0	64.2	48000	ug/kg dw	
	The Narrows	0-10 cm	977	187	19	0.26	4.90	26.7	71.0	110000	ug/kg dw	Basins
	South Sound	0-10 cm	175	42	24	0.27	4.15	28.0	64.2	910	ug/kg dw	
	Whidbey Basin	0-10 cm	157	32	20	0.38	4.20	28.0	85.0	110000	ug/kg dw	
	Comm. Bay	0-10 cm	52	0	0	8.60	57.3	99.5	207	2800	ug/kg dw	
	Elliott Bay	0-10 cm	281	9	3	1.03	88.0	187	360	4660	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	66	5	8	0.27	13.1	70.9	112	370	ug/kg dw	
	All Regions	0-10 cm	1376	201	15	0.26	9.72	41.9	131	110000	ug/kg dw	
	Basins	0-10 cm	977	187	19	0.26	4.90	26.7	71.0	110000	ug/kg dw	
	Urban Bays	0-10 cm	399	14	4	0.27	60.5	138	289	4660	ug/kg dw	
	SJF/SOG	0-10 cm	418	50	12	0.24	15.2	55.3	128	62000	ug/kg dw	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table B-10. Statistical summary of Pyrene data in the 0-10 cm sediment layer.

Contaminant	Region	Sediment Depth Strata	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Pyrene	Admiralty Inlet	0-10 cm	27	2	7	0.65	5.10	29.0	106	1100	ug/kg dw	
	Hood Canal (North)	0-10 cm	114	9	8	1.30	21.3	38.0	95.5	505	ug/kg dw	
	Hood Canal (South)	0-10 cm	38	2	5	0.85	3.59	14.5	56.8	17000	ug/kg dw	
	Main Basin	0-10 cm	472	61	13	0.65	12.7	49.0	125	130000	ug/kg dw	
	The Narrows	0-10 cm	994	126	13	0.20	10.0	45.0	116	130000	ug/kg dw	Basins
	South Sound	0-10 cm	180	28	16	0.20	7.62	52.0	110	1500	ug/kg dw	
	Whidbey Basin	0-10 cm	163	24	15	0.50	5.60	42.0	125	77000	ug/kg dw	
	Comm. Bay	0-10 cm	54	0	0	21.0	47.6	92.8	351	3500	ug/kg dw	
	Elliott Bay	0-10 cm	294	6	2	2.37	199	364	664	25500	ug/kg dw	
	Sinclair/Dyes Inlet	0-10 cm	66	1	2	0.85	23.4	155.8	293	853	ug/kg dw	
	All Regions	0-10 cm	1408	133	9	0.20	17.6	69.0	261	130000	ug/kg dw	
	Basins	0-10 cm	994	126	13	0.20	10.0	45.0	116	130000	ug/kg dw	
	Urban Bays	0-10 cm	414	7	2	0.85	107	293	551	25500	ug/kg dw	
	SJF/SOG	0-10 cm	423	54	13	0.65	12.8	52.0	190	31000	ug/kg dw	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Figure B-11. Relative contribution of the 20 most commonly measured congeners to the sum of PCB congeners in the active sediment layer (0-10 cm) of Puget Sound (all regions).

The "sum of congeners" here includes only the 20 most commonly measured congeners and their coeluters. Not all samples in the data set were analyzed for the same suite of congeners, and so the percent contribution values were normalized to the congener-specific number of results in the data set. The 20 most commonly measured congeners accounted for 94% of the total measured concentration (i.e., sum of 209 congeners) in Puget Sound sediments; however, after normalization to the congener-specific number of analyses those 20 congeners contributed 60% to the total measured concentration (i.e., sum of 209 congeners).

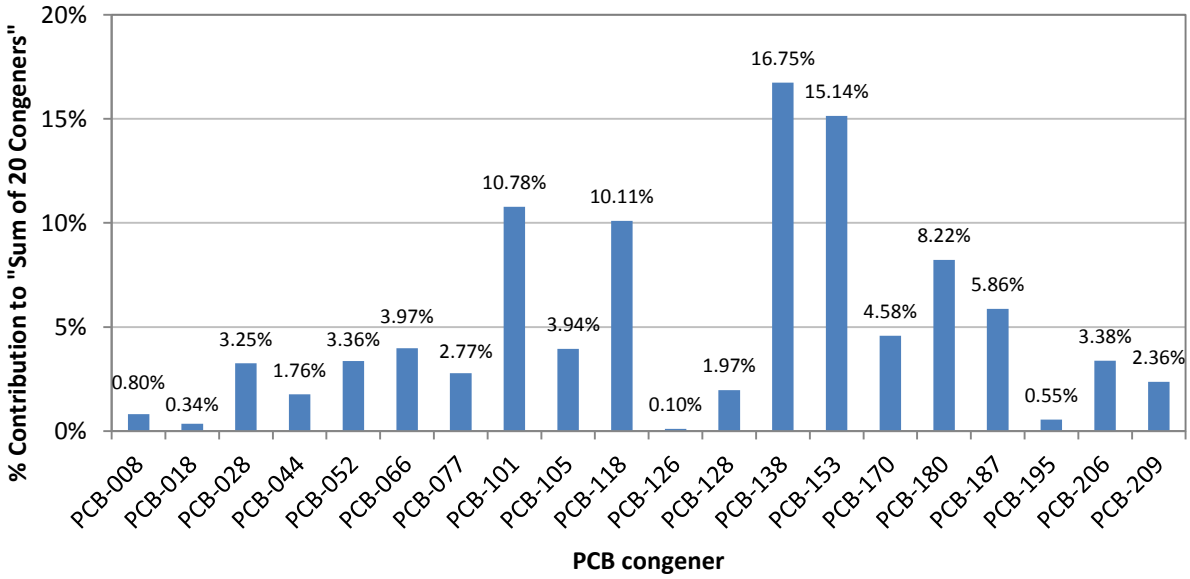


Figure B-12. Relative contribution of each measured congener to the sum of PBDE congeners in the active sediment layer (0-10 cm) of Puget Sound (all regions).

The "sum of congeners" here includes all 17 measured congeners. Not all samples in the data set were analyzed for the same suite of congeners, and so the percent contribution values were normalized to the congener-specific number of results in the data set.

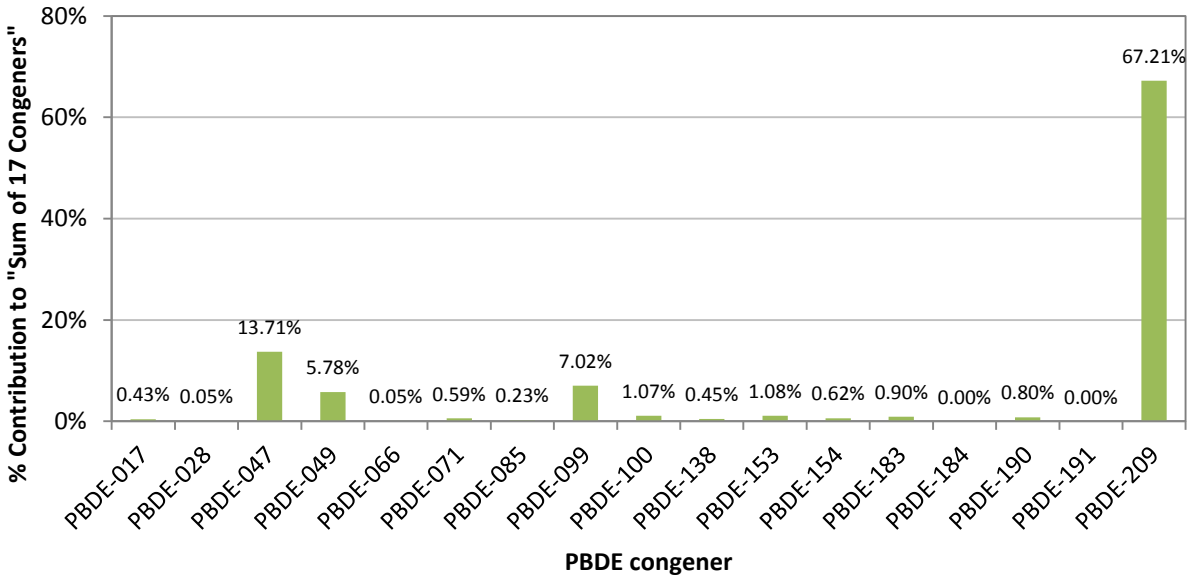
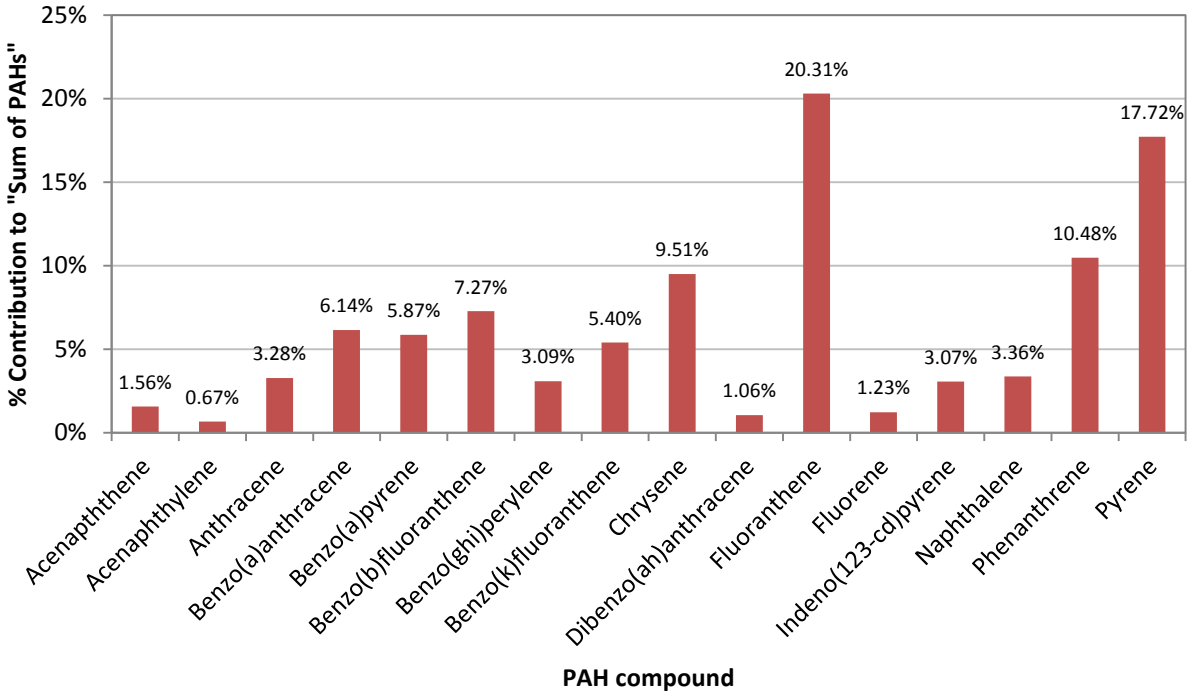


Figure B-13. Relative contribution of each of the 16 modeled compounds to the sum of PAH compounds in the active sediment layer (0-10 cm) of Puget Sound (all regions).

Not all samples in the data set were analyzed for the same suite of PAH compounds, and so the percent contribution values were normalized to the compound-specific number of results in the data set.



Appendix C. Sample Location Maps and Summary Data Statistics for Contaminants in Water

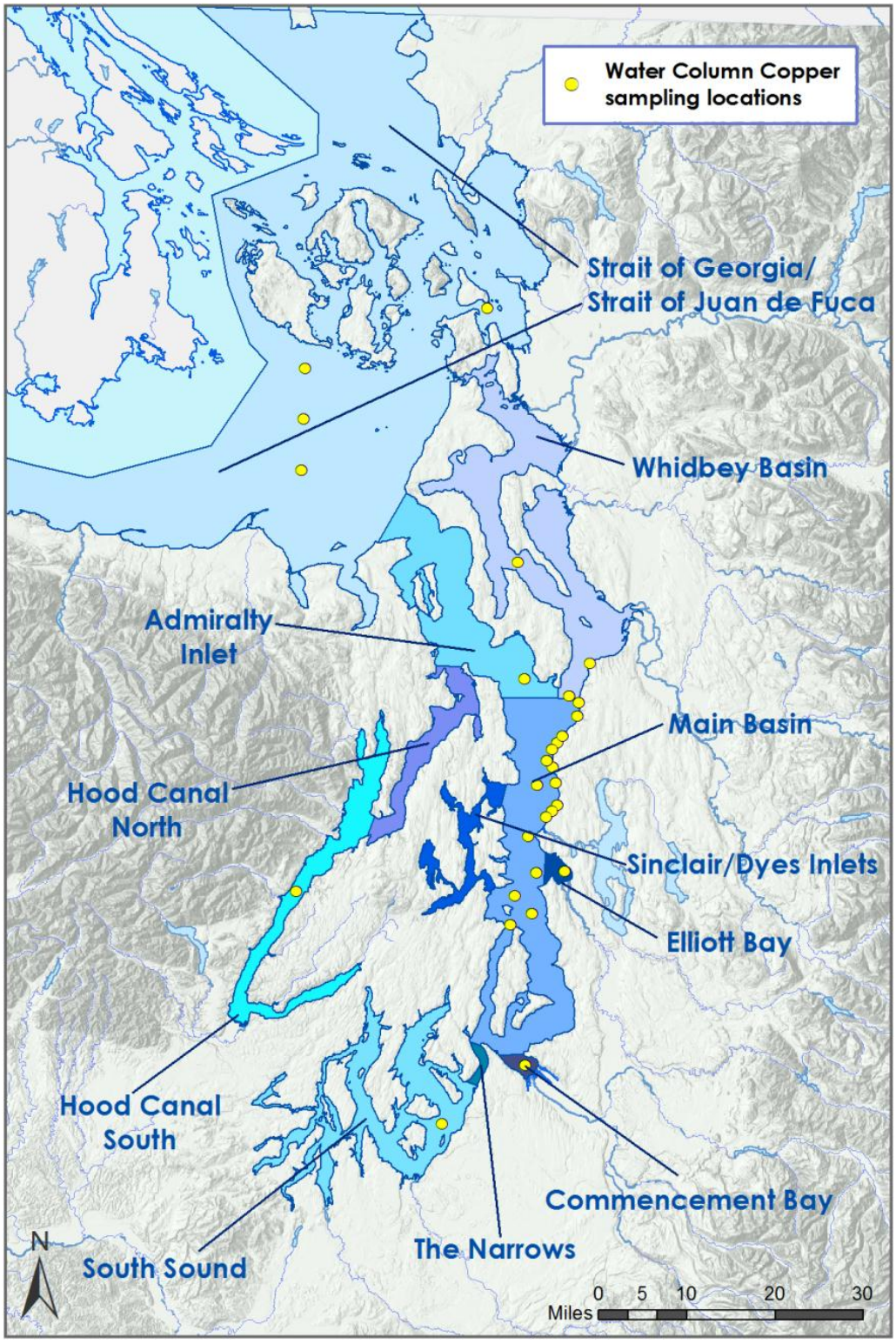


Figure C-1. Sampling locations for total copper in water.

Table C-1. Statistical summary of total copper data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Copper	Admiralty Inlet	Surface	6	0	0	0.35	0.42	0.43	0.44	0.98	ug/L	
	Hood Canal (North)	Surface	231	0	0	0.29	0.41	0.46	0.57	4.2	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	0	0	0.33	0.36	0.39	0.46	1.4	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	210	0	0	0.29	0.41	0.46	0.58	4.2	ug/L	
	The Narrows	Surface	231	0	0	0.29	0.41	0.46	0.57	4.2	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	0	0	0.38	0.40	0.42	0.43	0.44	ug/L	
	Whidbey Basin	Surface	10	0	0	0.42	0.43	0.49	0.64	0.84	ug/L	
	Comm. Bay	Surface	6	0	0	0.57	0.65	0.82	0.90	1.3	ug/L	
	Elliott Bay	Surface	3	0	0	0.52	0.56	0.60	0.71	0.82	ug/L	
	Sinclair/Dyes Inlet	Surface	9	0	0	0.52	0.59	0.81	0.82	1.3	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	240	0	0	0.29	0.41	0.46	0.58	4.2	ug/L	
	Basins	Surface	231	0	0	0.29	0.41	0.46	0.57	4.2	ug/L	
	Urban Bays	Surface	9	0	0	0.52	0.59	0.81	0.82	1.3	ug/L	
	SJF/SOG	Surface	15	0	0	0.20	0.27	0.38	0.44	0.72	ug/L	
Copper	Admiralty Inlet	Deep	12	0	0	0.29	0.34	0.36	0.37	0.40	ug/L	
	Hood Canal (North)	Deep	85	0	0	0.26	0.36	0.38	0.41	1.4	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	0	0	0.33	0.37	0.39	0.64	1.4	ug/L	
	Main Basin	Deep	48	0	0	0.26	0.37	0.38	0.41	1.0	ug/L	
	The Narrows	Deep	85	0	0	0.26	0.36	0.38	0.41	1.4	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	0	0	0.26	0.34	0.41	0.43	0.44	ug/L	
	Whidbey Basin	Deep	18	0	0	0.35	0.38	0.38	0.43	0.52	ug/L	
	Comm. Bay	Deep	6	0	0	0.57	0.65	0.82	0.90	1.3	ug/L	Comm. Bay (Full Water Column)
	Elliott Bay	Deep	6	0	0	0.30	0.35	0.43	0.49	0.71	ug/L	
	Sinclair/Dyes Inlet	Deep	6	0	0	0.30	0.35	0.43	0.49	0.71	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	91	0	0	0.26	0.36	0.38	0.41	1.4	ug/L	
	Basins	Deep	85	0	0	0.26	0.36	0.38	0.41	1.4	ug/L	
	Urban Bays	Deep	6	0	0	0.30	0.35	0.43	0.49	0.71	ug/L	
	SJF/SOG	Deep	9	0	0	0.19	0.24	0.28	0.41	0.63	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

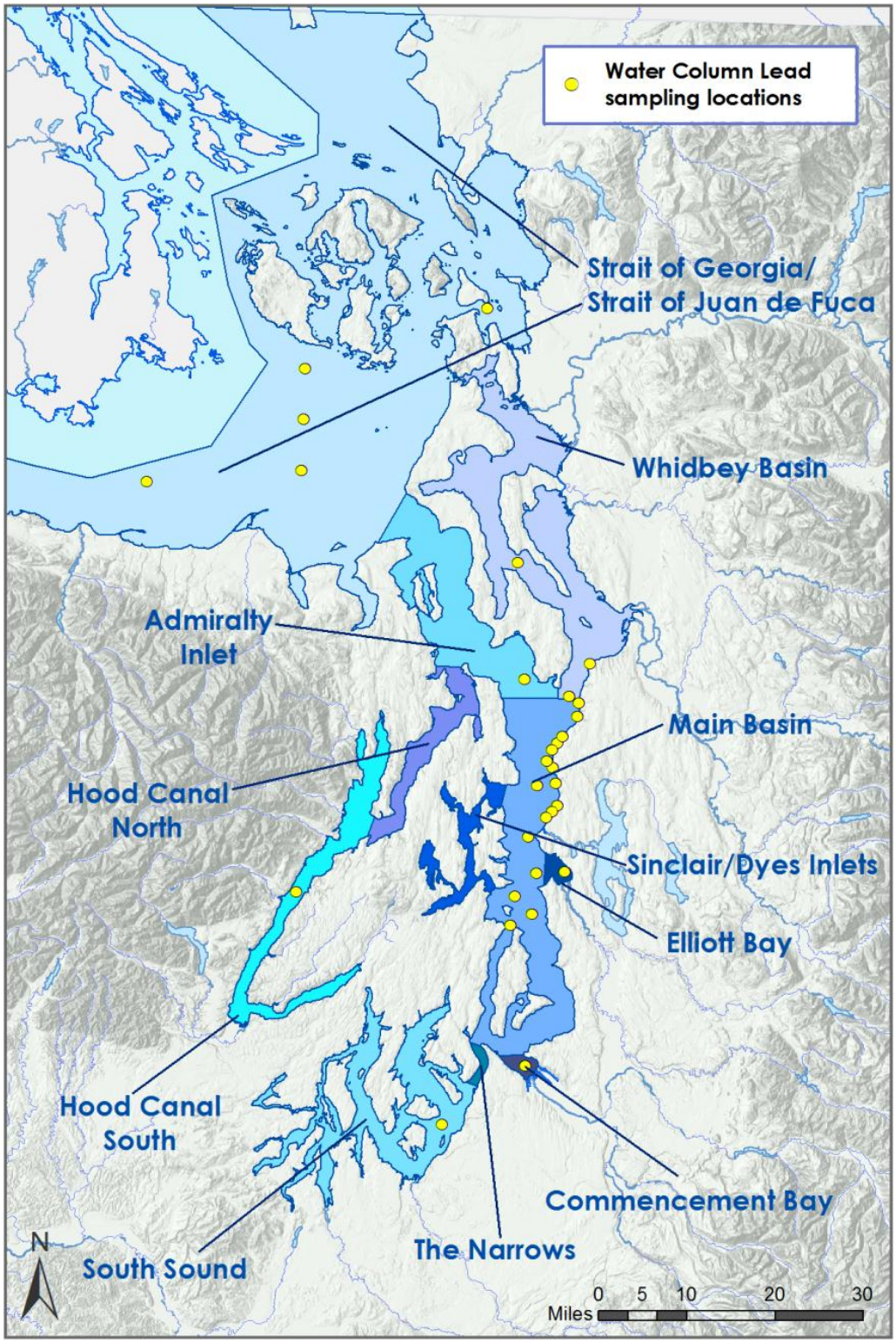


Figure C-2. Sampling locations for total lead in water.

Table C-2. Statistical summary of total lead data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Lead	Admiralty Inlet	Surface	6	0	0	0.0084	0.012	0.018	0.024	0.025	ug/L	
	Hood Canal (North)	Surface	231	2	1	0.0025	0.021	0.038	0.085	2.4	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	0	0	0.015	0.038	0.088	0.17	0.19	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	210	1	0	0.0025	0.021	0.040	0.092	2.4	ug/L	
	The Narrows	Surface	231	2	1	0.0025	0.021	0.038	0.085	2.4	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	1	33	0.0025	0.017	0.031	0.035	0.039	ug/L	
	Whidbey Basin	Surface	10	0	0	0.0084	0.015	0.021	0.058	0.098	ug/L	
	Comm. Bay	Surface	6	0	0	0.022	0.030	0.043	0.056	0.069	ug/L	
	Elliott Bay	Surface	3	1	33	0.0025	0.013	0.023	0.025	0.027	ug/L	
	Sinclair/Dyes Inlet	Surface	9	1	11	0.0025	0.023	0.029	0.052	0.069	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	240	3	1	0.0025	0.021	0.036	0.083	2.4	ug/L	
	Basins	Surface	231	2	1	0.0025	0.021	0.038	0.085	2.4	ug/L	
	Urban Bays	Surface	9	1	11	0.0025	0.023	0.029	0.052	0.069	ug/L	
	SJF/SOG	Surface	19	2	11	0.0025	0.011	0.043	0.048	0.091	ug/L	
Lead	Admiralty Inlet	Deep	12	0	0	0.014	0.015	0.017	0.027	0.051	ug/L	
	Hood Canal (North)	Deep	85	1	1	0.0025	0.026	0.037	0.046	0.21	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	0	0	0.035	0.043	0.11	0.18	0.19	ug/L	
	Main Basin	Deep	48	0	0	0.013	0.030	0.038	0.045	0.21	ug/L	
	The Narrows	Deep	85	1	1	0.0025	0.026	0.037	0.046	0.21	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	1	33	0.0025	0.022	0.042	0.046	0.050	ug/L	
	Whidbey Basin	Deep	18	0	0	0.011	0.026	0.040	0.058	0.11	ug/L	
	Comm. Bay	Deep	6	0	0	0.022	0.030	0.043	0.056	0.069	ug/L	Comm. Bay (Full Water Column)
	Elliott Bay	Deep	6	0	0	0.010	0.021	0.034	0.059	0.084	ug/L	
	Sinclair/Dyes Inlet	Deep	6	0	0	0.010	0.021	0.034	0.059	0.084	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	91	1	1	0.0025	0.025	0.037	0.046	0.21	ug/L	
	Basins	Deep	85	1	1	0.0025	0.026	0.037	0.046	0.21	ug/L	
	Urban Bays	Deep	6	0	0	0.010	0.021	0.034	0.059	0.084	ug/L	
	SJF/SOG	Deep	9	1	11	0.0025	0.070	0.11	0.12	0.23	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

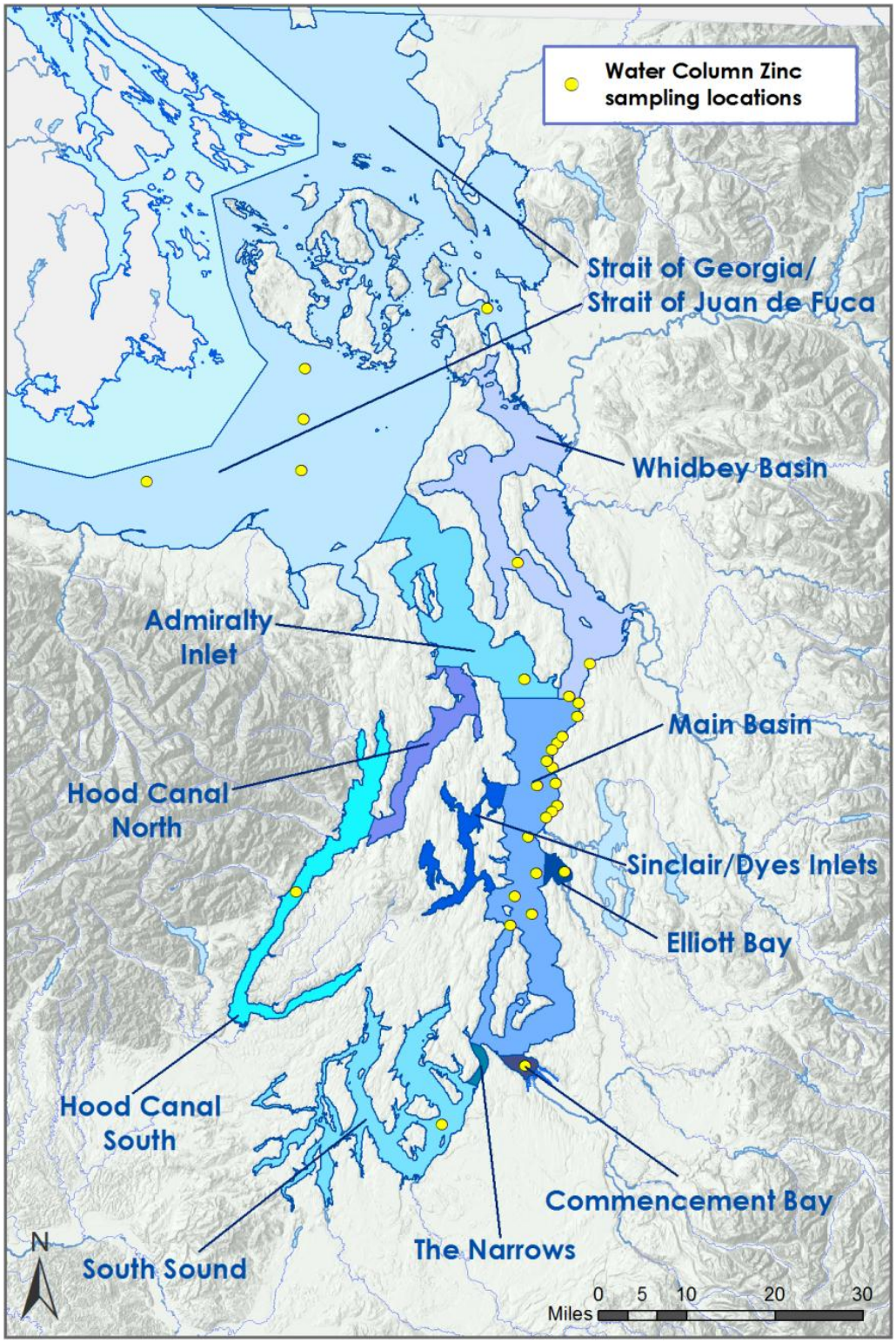


Figure C-3. Sampling locations for total zinc in water.

Table C-3. Statistical summary of total zinc data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Zinc	Admiralty Inlet	Surface	6	0	0	0.40	0.46	0.59	0.60	1.1	ug/L	
	Hood Canal (North)	Surface	225	0	0	0.37	0.58	0.70	1.0	9.7	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	0	0	0.52	0.57	0.66	0.69	7.4	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	205	0	0	0.41	0.58	0.73	1.1	9.7	ug/L	
	The Narrows	Surface	225	0	0	0.37	0.58	0.70	1.0	9.7	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	0	0	0.64	0.67	0.69	0.71	0.73	ug/L	
	Whidbey Basin	Surface	9	0	0	0.37	0.61	0.62	0.89	1.1	ug/L	
	Comm. Bay	Surface	6	0	0	1.0	1.1	1.3	1.5	2.9	ug/L	
	Elliott Bay	Surface	3	0	0	0.88	0.89	0.91	0.96	1.0	ug/L	
	Sinclair/Dyes Inlet	Surface	9	0	0	0.88	1.0	1.1	1.3	2.9	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	234	0	0	0.37	0.58	0.73	1.1	9.7	ug/L	
	Basins	Surface	225	0	0	0.37	0.58	0.70	1.0	9.7	ug/L	
	Urban Bays	Surface	9	0	0	0.88	1.0	1.1	1.3	2.9	ug/L	
	SJF/SOG	Surface	18	0	0	0.33	0.46	0.58	0.74	0.99	ug/L	
Zinc	Admiralty Inlet	Deep	12	0	0	0.38	0.42	0.53	0.59	0.67	ug/L	
	Hood Canal (North)	Deep	85	0	0	0.37	0.51	0.59	0.64	7.4	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	0	0	0.55	0.60	0.66	2.4	7.4	ug/L	
	Main Basin	Deep	48	0	0	0.37	0.51	0.58	0.63	1.0	ug/L	
	The Narrows	Deep	85	0	0	0.37	0.51	0.59	0.64	7.4	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	0	0	0.48	0.51	0.53	0.65	0.77	ug/L	
	Whidbey Basin	Deep	18	0	0	0.40	0.54	0.61	0.68	1.1	ug/L	
	Comm. Bay	Deep	6	0	0	1.0	1.1	1.3	1.5	2.9	ug/L	Comm. Bay (Full Water Column)
	Elliott Bay	Deep	6	0	0	0.43	0.52	0.54	0.60	0.73	ug/L	
	Sinclair/Dyes Inlet	Deep	6	0	0	0.43	0.52	0.54	0.60	0.73	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	91	0	0	0.37	0.51	0.59	0.64	7.4	ug/L	
	Basins	Deep	85	0	0	0.37	0.51	0.59	0.64	7.4	ug/L	
	Urban Bays	Deep	6	0	0	0.43	0.52	0.54	0.60	0.73	ug/L	
	SJF/SOG	Deep	9	0	0	0.45	0.53	0.68	0.88	1.4	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

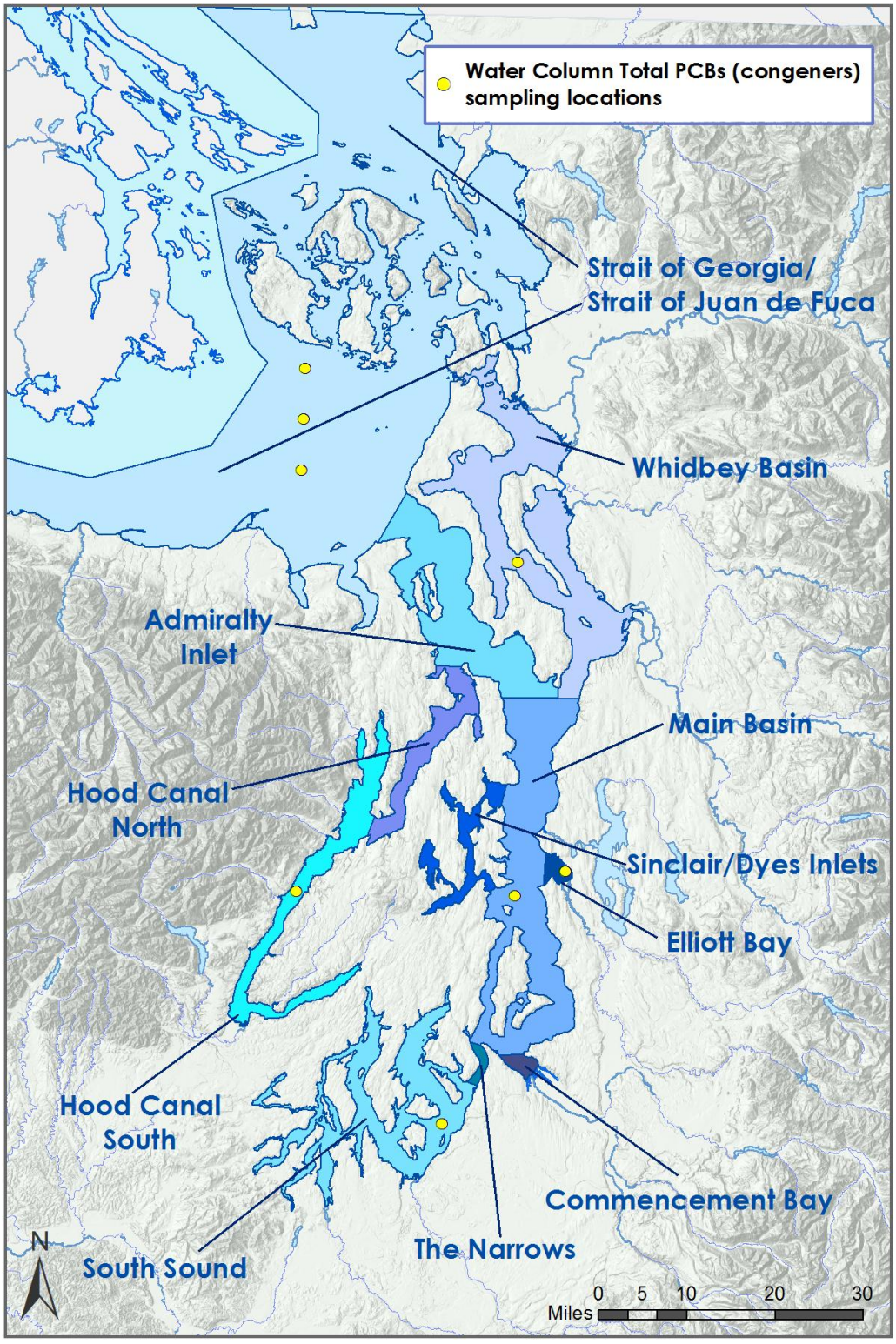


Figure C-4. Sampling locations for Total PCBs in water.

Table C-4. Statistical summary of Total PCBs data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Total PCBs	Admiralty Inlet	Surface	10	0	0	17.2	26.6	30.0	31.9	83.0	pg/L	Basins (Surface Layer)
	Hood Canal (North)	Surface	10	0	0	17.2	26.6	30.0	31.9	83.0	pg/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	0	0	14.8	17.9	26.1	33.6	64.7	pg/L	Hood South (Full Water Column)
	Main Basin	Surface	3	0	0	17.8	24.5	31.1	34.2	37.2	pg/L	
	The Narrows	Surface	10	0	0	17.2	26.6	30.0	31.9	83.0	pg/L	Basins (Surface Layer)
	South Sound	Surface	3	0	0	27.7	28.2	28.8	30.1	31.3	pg/L	
	Whidbey Basin	Surface	6	0	0	26.3	41.6	51.7	65.5	83.0	pg/L	Whidbey (Full Water Column)
	Comm. Bay	Surface	4	0	0	56.3	61.0	80.4	98.4	98.9	pg/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	4	0	0	56.3	61.0	80.4	98.4	98.9	pg/L	
	Sinclair/Dyes Inlet	Surface	4	0	0	56.3	61.0	80.4	98.4	98.9	pg/L	Urban Bays (Surface Layer)
	All Regions	Surface	14	0	0	17.2	28.0	31.7	61.0	98.9	pg/L	
	Basins	Surface	10	0	0	17.2	26.6	30.0	31.9	83.0	pg/L	
	Urban Bays	Surface	4	0	0	56.3	61.0	80.4	98.4	98.9	pg/L	
	SJF/SOG	Surface	10	0	0	8.29	13.4	18.2	19.5	21.7	pg/L	
Total PCBs	Admiralty Inlet	Deep	14	0	0	14.8	32.9	44.5	54.3	68.8	pg/L	Basins (Deep Layer)
	Hood Canal (North)	Deep	14	0	0	14.8	32.9	44.5	54.3	68.8	pg/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	0	0	14.8	18.8	27.1	41.7	64.7	pg/L	
	Main Basin	Deep	3	0	0	25.4	37.9	50.3	55.4	60.4	pg/L	
	The Narrows	Deep	14	0	0	14.8	32.9	44.5	54.3	68.8	pg/L	Basins (Deep Layer)
	South Sound	Deep	3	0	0	32.5	37.0	41.5	44.5	47.4	pg/L	
	Whidbey Basin	Deep	4	0	0	39.6	45.8	51.7	58.9	68.8	pg/L	
	Comm. Bay	Deep	4	0	0	56.3	61.0	80.4	98.4	98.9	pg/L	Urban Bays (Full Water Column)
	Elliott Bay	Deep	4	0	0	56.3	61.0	80.4	98.4	98.9	pg/L	Elliott Bay (Full Water Column)
	Sinclair/Dyes Inlet	Deep	4	0	0	56.3	61.0	80.4	98.4	98.9	pg/L	Urban Bays (Full Water Column)
	All Regions	Deep	14	0	0	14.8	32.9	44.5	54.3	68.8	pg/L	
	Basins	Deep	14	0	0	14.8	32.9	44.5	54.3	68.8	pg/L	
	Urban Bays	Deep	0	0	NA	NA	NA	NA	NA	NA	pg/L	
	SJF/SOG	Deep	8	0	0	16.1	23.4	32.3	38.0	43.3	pg/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

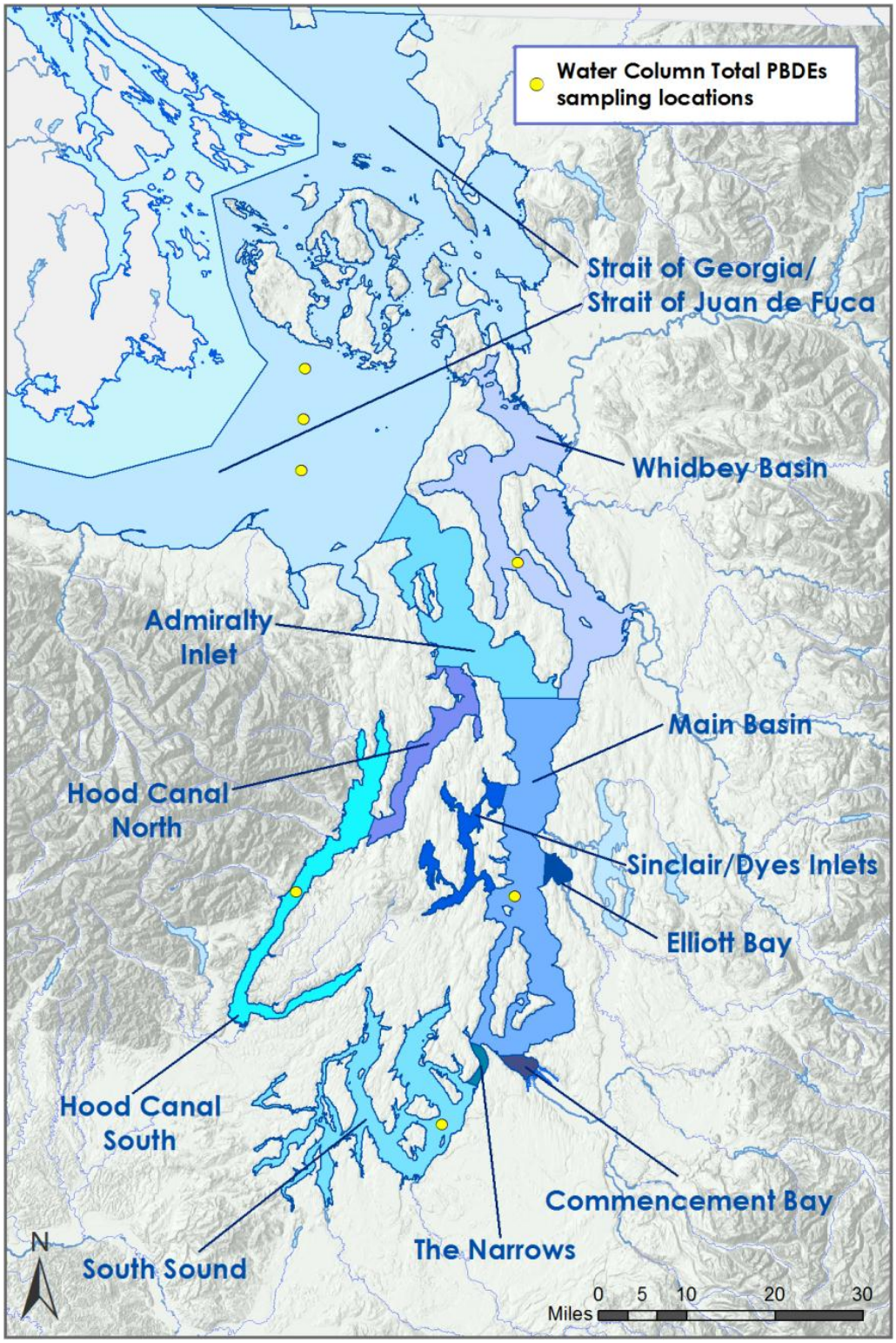


Figure C-5. Sampling locations for Total PBDEs in water.

Table C-5. Statistical summary of Total PBDEs data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Source
Total PBDEs	Admiralty Inlet	Surface	4	0	0	14.94	22.41	29.39	40.09	58.7	pg/L	Frouin et al. (2013)
	Hood Canal (North)	Surface	4	0	0	14.94	22.41	29.39	40.09	58.7	pg/L	Frouin et al. (2013)
	Hood Canal (South)	Surface	4	0	0	14.94	22.41	29.39	40.09	58.7	pg/L	Frouin et al. (2013)
	Main Basin	Surface	4	0	0	14.94	22.41	29.39	40.09	58.7	pg/L	Frouin et al. (2013)
	The Narrows	Surface	4	0	0	14.94	22.41	29.39	40.09	58.7	pg/L	Frouin et al. (2013)
	South Sound	Surface	4	0	0	14.94	22.41	29.39	40.09	58.7	pg/L	Frouin et al. (2013)
	Whidbey Basin	Surface	4	0	0	14.94	22.41	29.39	40.09	58.7	pg/L	Frouin et al. (2013)
	Comm. Bay	Surface	4	0	0	14.94	22.41	29.39	40.09	58.7	pg/L	Frouin et al. (2013)
	Elliott Bay	Surface	4	0	0	14.94	22.41	29.39	40.09	58.7	pg/L	Frouin et al. (2013)
	Sinclair/Dyes Inlet	Surface	4	0	0	14.94	22.41	29.39	40.09	58.7	pg/L	Frouin et al. (2013)
	All Regions	Surface	4	0	0	14.94	22.41	29.39	40.09	58.7	pg/L	Frouin et al. (2013)
	Basins	Surface	4	0	0	14.94	22.41	29.39	40.09	58.7	pg/L	Frouin et al. (2013)
	Urban Bays	Surface	4	0	0	14.94	22.41	29.39	40.09	58.7	pg/L	Frouin et al. (2013)
	SJF/SOG	Surface	4	0	0	14.94	22.41	29.39	40.09	58.7	pg/L	Frouin et al. (2013)
Total PBDEs	Admiralty Inlet	Deep	4	0	0	8.17	9.07	12.52	20.82	36.30	pg/L	Frouin et al. (2013)
	Hood Canal (North)	Deep	4	0	0	8.17	9.07	12.52	20.82	36.30	pg/L	Frouin et al. (2013)
	Hood Canal (South)	Deep	4	0	0	8.17	9.07	12.52	20.82	36.30	pg/L	Frouin et al. (2013)
	Main Basin	Deep	4	0	0	8.17	9.07	12.52	20.82	36.30	pg/L	Frouin et al. (2013)
	The Narrows	Deep	4	0	0	8.17	9.07	12.52	20.82	36.30	pg/L	Frouin et al. (2013)
	South Sound	Deep	4	0	0	8.17	9.07	12.52	20.82	36.30	pg/L	Frouin et al. (2013)
	Whidbey Basin	Deep	4	0	0	8.17	9.07	12.52	20.82	36.30	pg/L	Frouin et al. (2013)
	Comm. Bay	Deep	4	0	0	8.17	9.07	12.52	20.82	36.30	pg/L	Frouin et al. (2013)
	Elliott Bay	Deep	4	0	0	8.17	9.07	12.52	20.82	36.30	pg/L	Frouin et al. (2013)
	Sinclair/Dyes Inlet	Deep	4	0	0	8.17	9.07	12.52	20.82	36.30	pg/L	Frouin et al. (2013)
	All Regions	Deep	4	0	0	8.17	9.07	12.52	20.82	36.30	pg/L	Frouin et al. (2013)
	Basins	Deep	4	0	0	8.17	9.07	12.52	20.82	36.30	pg/L	Frouin et al. (2013)
	Urban Bays	Deep	4	0	0	8.17	9.07	12.52	20.82	36.30	pg/L	Frouin et al. (2013)
	SJF/SOG	Deep	4	0	0	8.17	9.07	12.52	20.82	36.30	pg/L	Frouin et al. (2013)

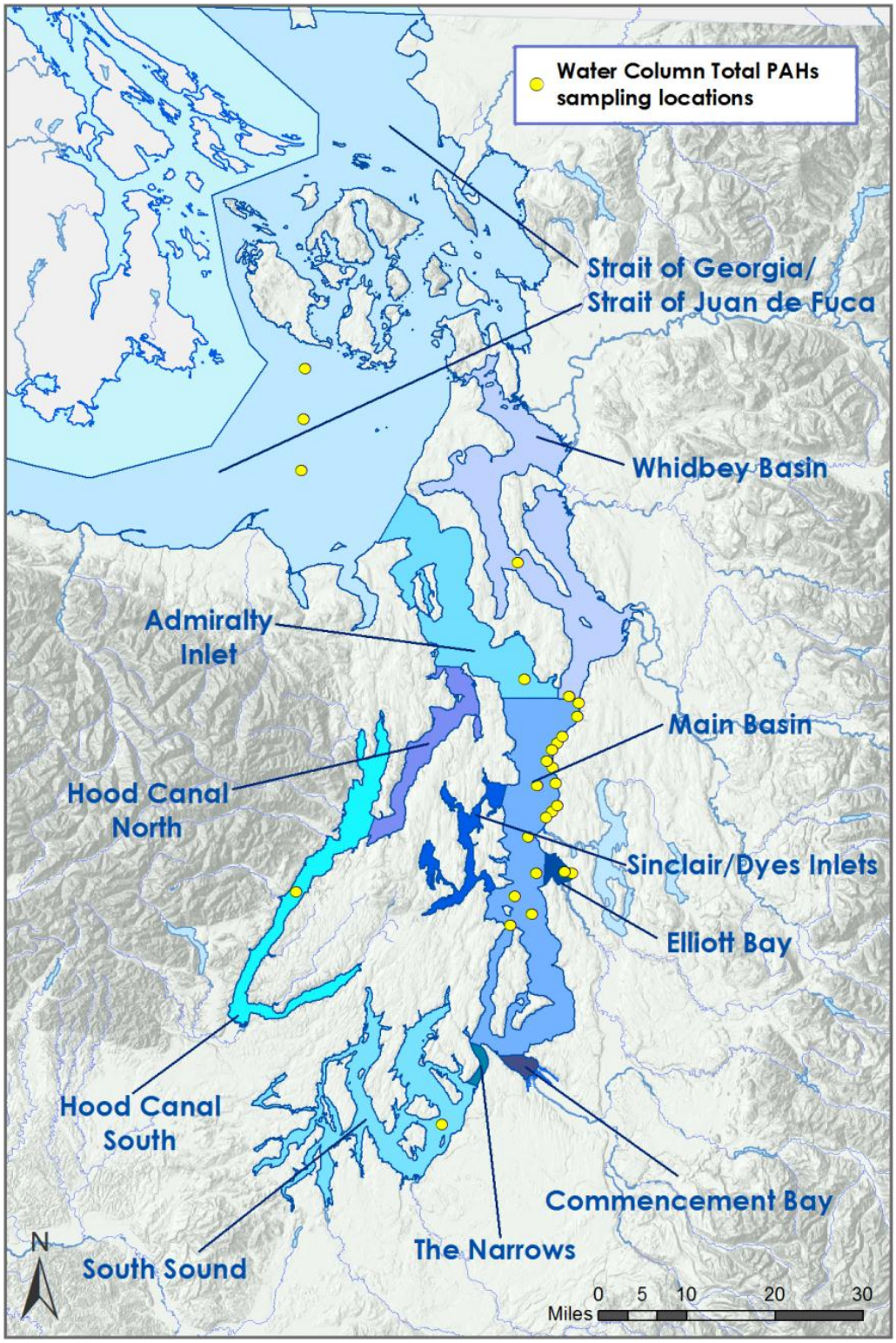


Figure C-6. Sampling locations for Total PAHs in water.

Table C-6. Statistical summary of Total PAHs data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Total PAHs	Admiralty Inlet	Surface	4	3	75	0.0052	0.010	0.012	0.012	0.012	ug/L	
	Hood Canal (North)	Surface	152	105	69	0.0012	0.012	0.013	0.023	0.22	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.0012	0.0020	0.0043	0.013	0.016	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	139	93	67	0.0012	0.012	0.013	0.028	0.22	ug/L	
	The Narrows	Surface	152	105	69	0.0012	0.012	0.013	0.023	0.22	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.0012	0.0028	0.0045	0.010	0.016	ug/L	
	Whidbey Basin	Surface	4	4	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Comm. Bay	Surface	8	0	0	0.010	0.033	0.052	0.10	0.61	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	0	0	0.010	0.033	0.052	0.10	0.61	ug/L	
	Sinclair/Dyes Inlet	Surface	8	0	0	0.010	0.033	0.052	0.10	0.61	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	160	105	66	0.0012	0.012	0.013	0.028	0.61	ug/L	
	Basins	Surface	152	105	69	0.0012	0.012	0.013	0.023	0.22	ug/L	
	Urban Bays	Surface	8	0	0	0.010	0.033	0.052	0.10	0.61	ug/L	
	SJF/SOG	Surface	9	9	100	0.0012	0.0012	0.0043	0.016	0.016	ug/L	
Total PAHs	Admiralty Inlet	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Hood Canal (North)	Deep	68	67	99	0.0012	0.012	0.012	0.016	0.048	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.0012	0.0012	0.0028	0.0071	0.016	ug/L	
	Main Basin	Deep	39	38	97	0.0012	0.012	0.012	0.047	0.048	ug/L	
	The Narrows	Deep	68	67	99	0.0012	0.012	0.012	0.016	0.048	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.0012	0.0028	0.0044	0.010	0.016	ug/L	
	Whidbey Basin	Deep	14	14	100	0.0012	0.006	0.012	0.012	0.016	ug/L	
	Comm. Bay	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	75	99	0.0012	0.012	0.012	0.047	0.048	ug/L	
	Basins	Deep	68	67	99	0.0012	0.012	0.012	0.016	0.048	ug/L	
	Urban Bays	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	
	SJF/SOG	Deep	9	9	100	0.0012	0.0013	0.0043	0.016	0.017	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

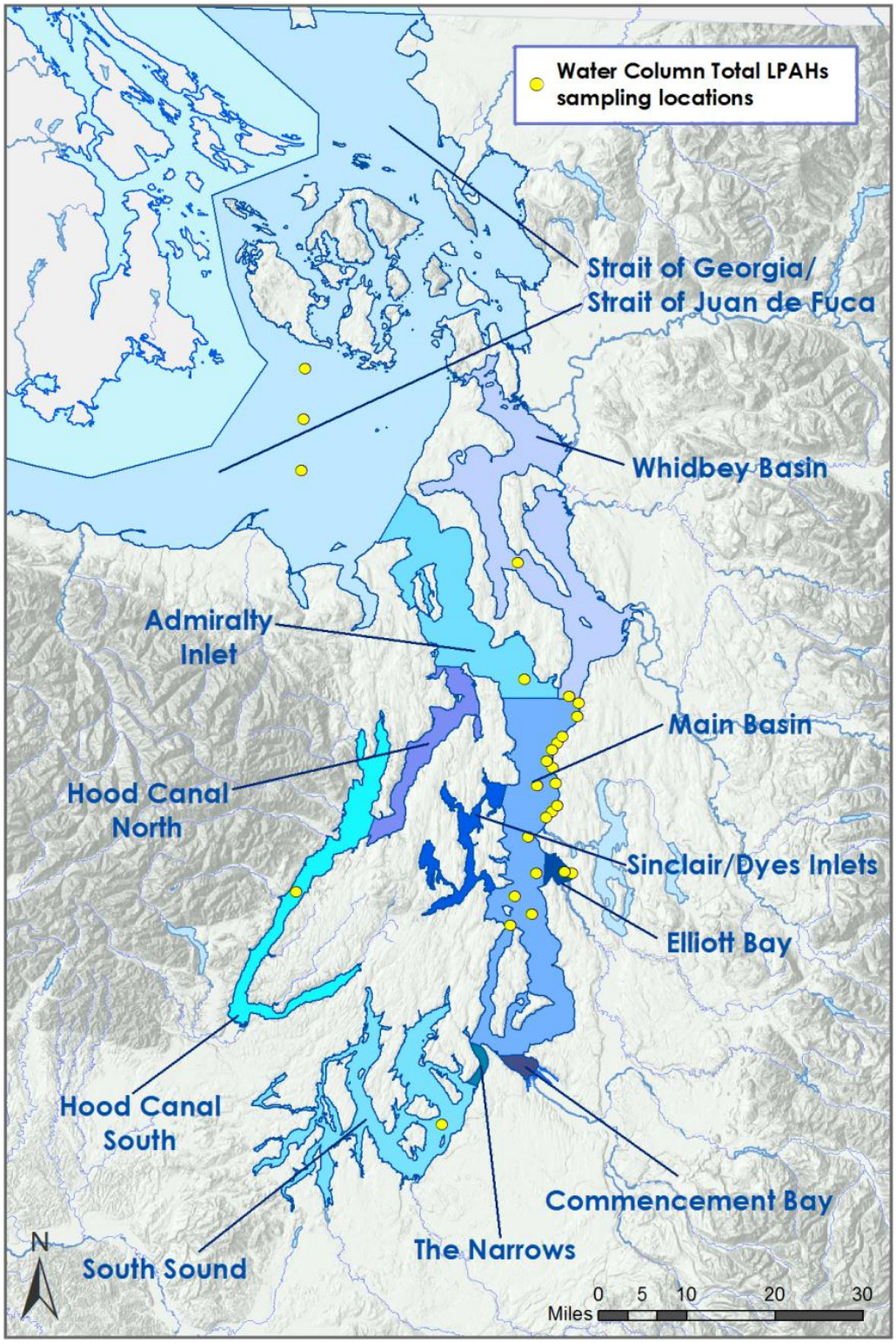


Figure C-7. Sampling locations for Total LPAHs in water.

Table C-7. Statistical summary of Total LPAHs data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Total LPAHs	Admiralty Inlet	Surface	4	4	100	0.0060	0.0060	0.0060	0.0060	0.0060	ug/L	
	Hood Canal (North)	Surface	152	109	72	0.0012	0.0060	0.0065	0.012	0.10	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.0012	0.0020	0.0043	0.013	0.016	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	139	96	69	0.0012	0.0060	0.0065	0.012	0.10	ug/L	
	The Narrows	Surface	152	109	72	0.0012	0.0060	0.0065	0.012	0.10	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.0012	0.0028	0.0045	0.010	0.016	ug/L	
	Whidbey Basin	Surface	4	4	100	0.0060	0.0060	0.0060	0.0060	0.0060	ug/L	
	Comm. Bay	Surface	8	2	25	0.010	0.012	0.028	0.079	0.26	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	2	25	0.010	0.012	0.028	0.079	0.26	ug/L	
	Sinclair/Dyes Inlet	Surface	8	2	25	0.010	0.012	0.028	0.079	0.26	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	160	111	69	0.0012	0.0060	0.0065	0.012	0.26	ug/L	
	Basins	Surface	152	109	72	0.0012	0.0060	0.0065	0.012	0.10	ug/L	
	Urban Bays	Surface	8	2	25	0.0100	0.012	0.028	0.079	0.26	ug/L	
	SJF/SOG	Surface	9	9	100	0.0012	0.0012	0.0043	0.016	0.016	ug/L	
Total LPAHs	Admiralty Inlet	Deep	8	8	100	0.0060	0.0060	0.0060	0.0060	0.0060	ug/L	
	Hood Canal (North)	Deep	68	67	99	0.0012	0.0060	0.0060	0.012	0.027	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.0012	0.0012	0.0028	0.0071	0.016	ug/L	
	Main Basin	Deep	39	38	97	0.0012	0.0060	0.0060	0.012	0.027	ug/L	
	The Narrows	Deep	68	67	99	0.0012	0.0060	0.0060	0.012	0.027	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.0012	0.0028	0.0044	0.010	0.016	ug/L	
	Whidbey Basin	Deep	14	14	100	0.0012	0.0047	0.0060	0.0060	0.016	ug/L	
	Comm. Bay	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	75	99	0.0012	0.0060	0.0060	0.012	0.027	ug/L	
	Basins	Deep	68	67	99	0.0012	0.0060	0.0060	0.012	0.027	ug/L	
	Urban Bays	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	SJF/SOG	Deep	9	9	100	0.0012	0.0013	0.0043	0.016	0.017	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

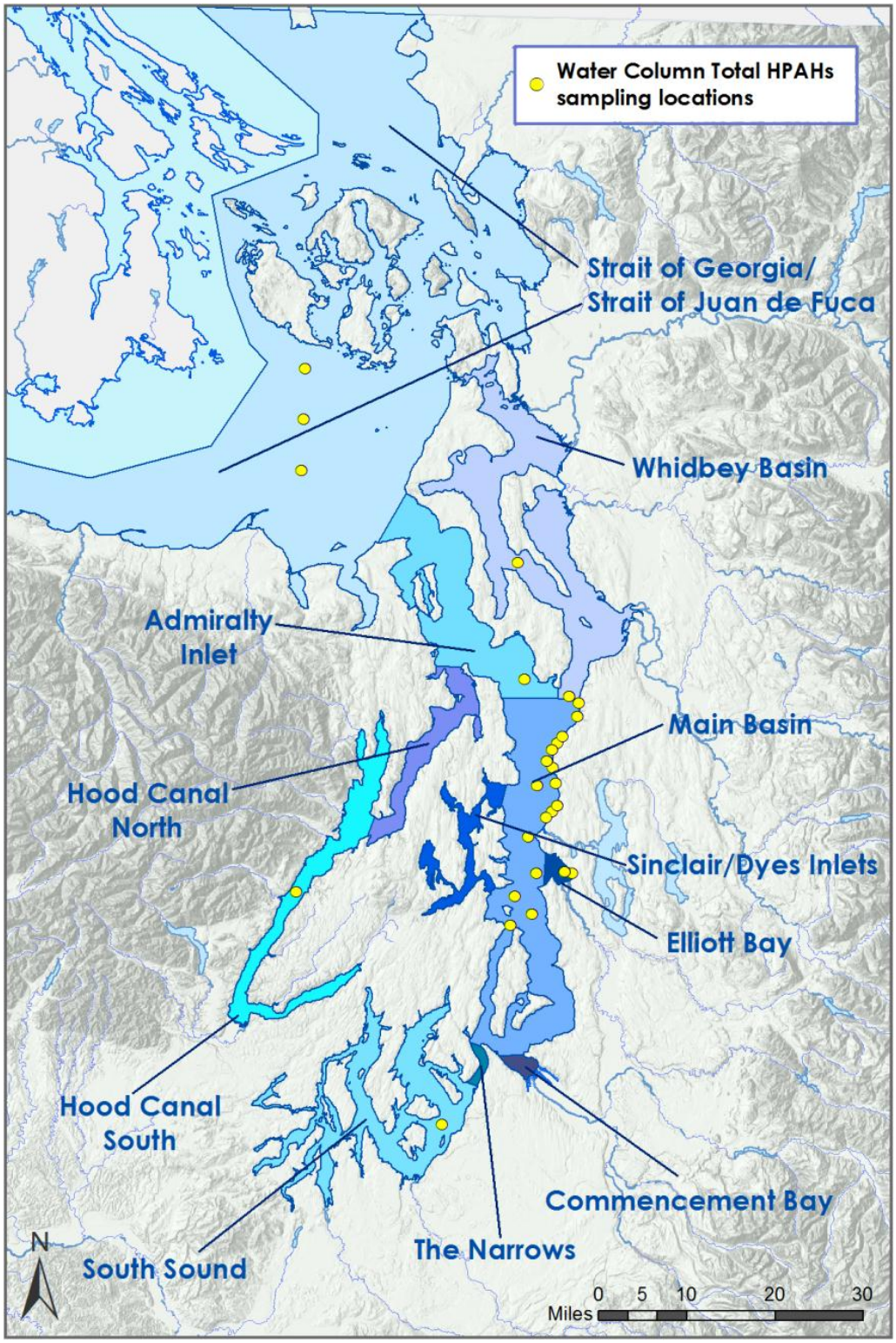


Figure C-8. Sampling locations for Total HPAHs in water.

Table C-8. Statistical summary of Total HPAHs data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Total HPAHs	Admiralty Inlet	Surface	4	3	75	0.0052	0.010	0.012	0.012	0.012	ug/L	
	Hood Canal (North)	Surface	152	128	84	0.0010	0.012	0.012	0.013	0.14	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.0010	0.0010	0.0010	0.0010	0.0010	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	139	116	83	0.0010	0.012	0.013	0.014	0.14	ug/L	
	The Narrows	Surface	152	128	84	0.0010	0.012	0.012	0.013	0.14	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.0010	0.0010	0.0010	0.0010	0.0010	ug/L	
	Whidbey Basin	Surface	4	4	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Comm. Bay	Surface	8	1	13	0.011	0.017	0.030	0.048	0.35	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	1	13	0.011	0.017	0.030	0.048	0.35	ug/L	
	Sinclair/Dyes Inlet	Surface	8	1	13	0.011	0.017	0.030	0.048	0.35	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	160	129	81	0.0010	0.012	0.012	0.015	0.35	ug/L	
	Basins	Surface	152	128	84	0.0010	0.012	0.012	0.013	0.14	ug/L	
	Urban Bays	Surface	8	1	13	0.011	0.017	0.030	0.048	0.35	ug/L	
	SJF/SOG	Surface	9	9	100	0.0010	0.0010	0.0010	0.0010	0.0010	ug/L	
Total HPAHs	Admiralty Inlet	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Hood Canal (North)	Deep	68	68	100	0.0010	0.012	0.012	0.012	0.048	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.0010	0.0010	0.0010	0.0010	0.0010	ug/L	
	Main Basin	Deep	39	39	100	0.0010	0.012	0.012	0.047	0.048	ug/L	
	The Narrows	Deep	68	68	100	0.0010	0.012	0.012	0.012	0.048	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.0010	0.0010	0.0010	0.0010	0.0010	ug/L	
	Whidbey Basin	Deep	14	14	100	0.0010	0.0010	0.012	0.012	0.012	ug/L	
	Comm. Bay	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	76	100	0.0010	0.012	0.012	0.047	0.048	ug/L	
	Basins	Deep	68	68	100	0.0010	0.012	0.012	0.012	0.048	ug/L	
	Urban Bays	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	
	SJF/SOG	Deep	9	9	100	0.0010	0.0010	0.0010	0.0010	0.0011	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

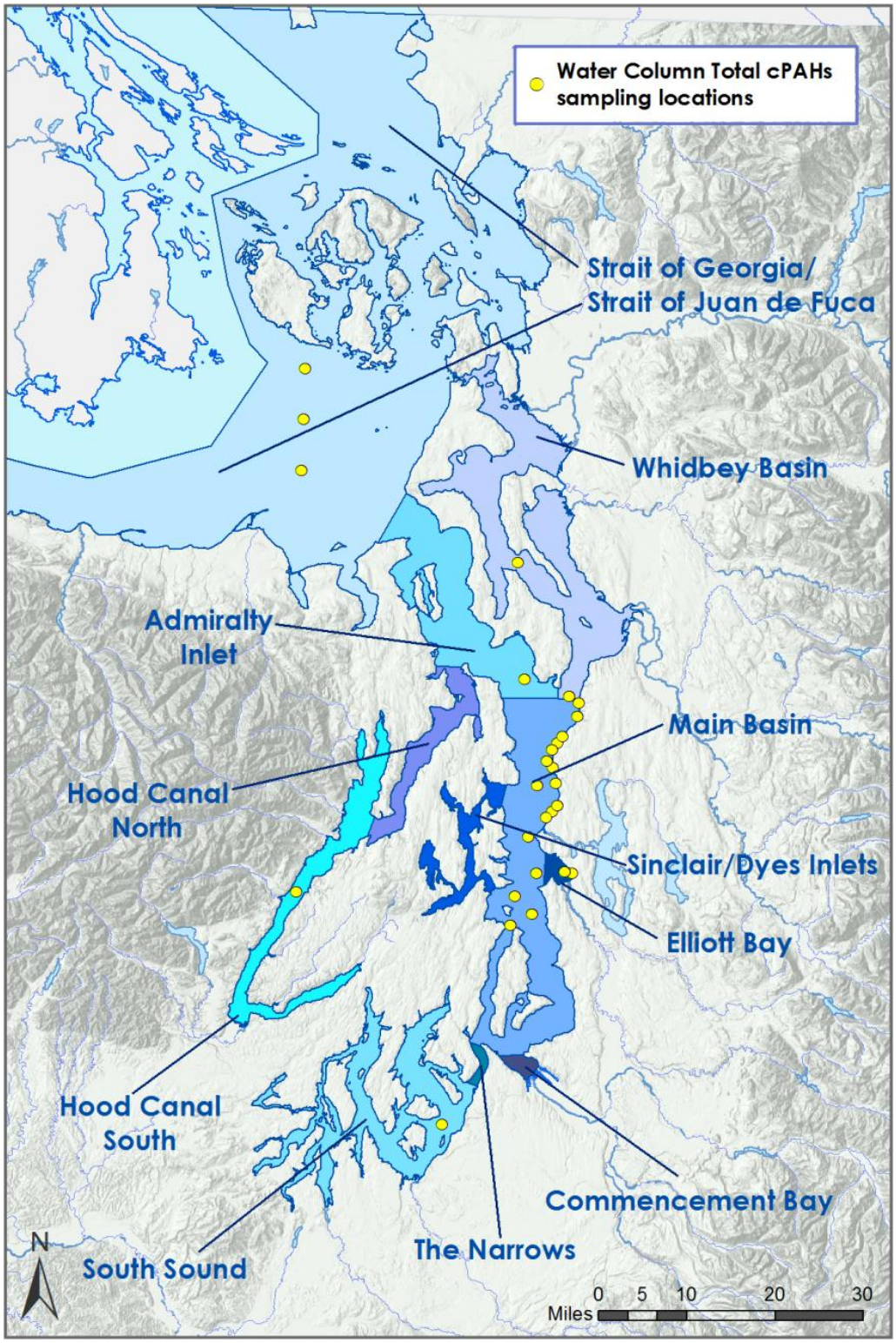


Figure C-9. Sampling locations for Total cPAHs in water.

Table C-9. Statistical summary of Total cPAHs data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Total cPAHs	Admiralty Inlet	Surface	4	4	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Hood Canal (North)	Surface	152	150	99	0.0010	0.012	0.013	0.013	0.058	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.0010	0.0010	0.0010	0.0010	0.0010	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	139	137	99	0.0010	0.012	0.013	0.013	0.058	ug/L	
	The Narrows	Surface	152	150	99	0.0010	0.012	0.013	0.013	0.058	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.0010	0.0010	0.0010	0.0010	0.0010	ug/L	
	Whidbey Basin	Surface	4	4	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Comm. Bay	Surface	8	6	75	0.010	0.047	0.047	0.047	0.23	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	6	75	0.010	0.047	0.047	0.047	0.23	ug/L	
	Sinclair/Dyes Inlet	Surface	8	6	75	0.010	0.047	0.047	0.047	0.23	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	160	156	98	0.0010	0.012	0.013	0.013	0.23	ug/L	
	Basins	Surface	152	150	99	0.0010	0.012	0.013	0.013	0.058	ug/L	
	Urban Bays	Surface	8	6	75	0.010	0.047	0.047	0.047	0.23	ug/L	
	SJF/SOG	Surface	9	9	100	0.0010	0.0010	0.0010	0.0010	0.0010	ug/L	
Total cPAHs	Admiralty Inlet	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Hood Canal (North)	Deep	68	68	100	0.0010	0.012	0.012	0.012	0.048	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.0010	0.0010	0.0010	0.0010	0.0010	ug/L	
	Main Basin	Deep	39	39	100	0.0010	0.012	0.012	0.047	0.048	ug/L	
	The Narrows	Deep	68	68	100	0.0010	0.012	0.012	0.012	0.048	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.0010	0.0010	0.0010	0.0010	0.0010	ug/L	
	Whidbey Basin	Deep	14	14	100	0.0010	0.0010	0.012	0.012	0.012	ug/L	
	Comm. Bay	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	76	100	0.0010	0.012	0.012	0.047	0.048	ug/L	
	Basins	Deep	68	68	100	0.0010	0.012	0.012	0.012	0.048	ug/L	
	Urban Bays	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	
	SJF/SOG	Deep	9	9	100	0.0010	0.0010	0.0010	0.0010	0.0011	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

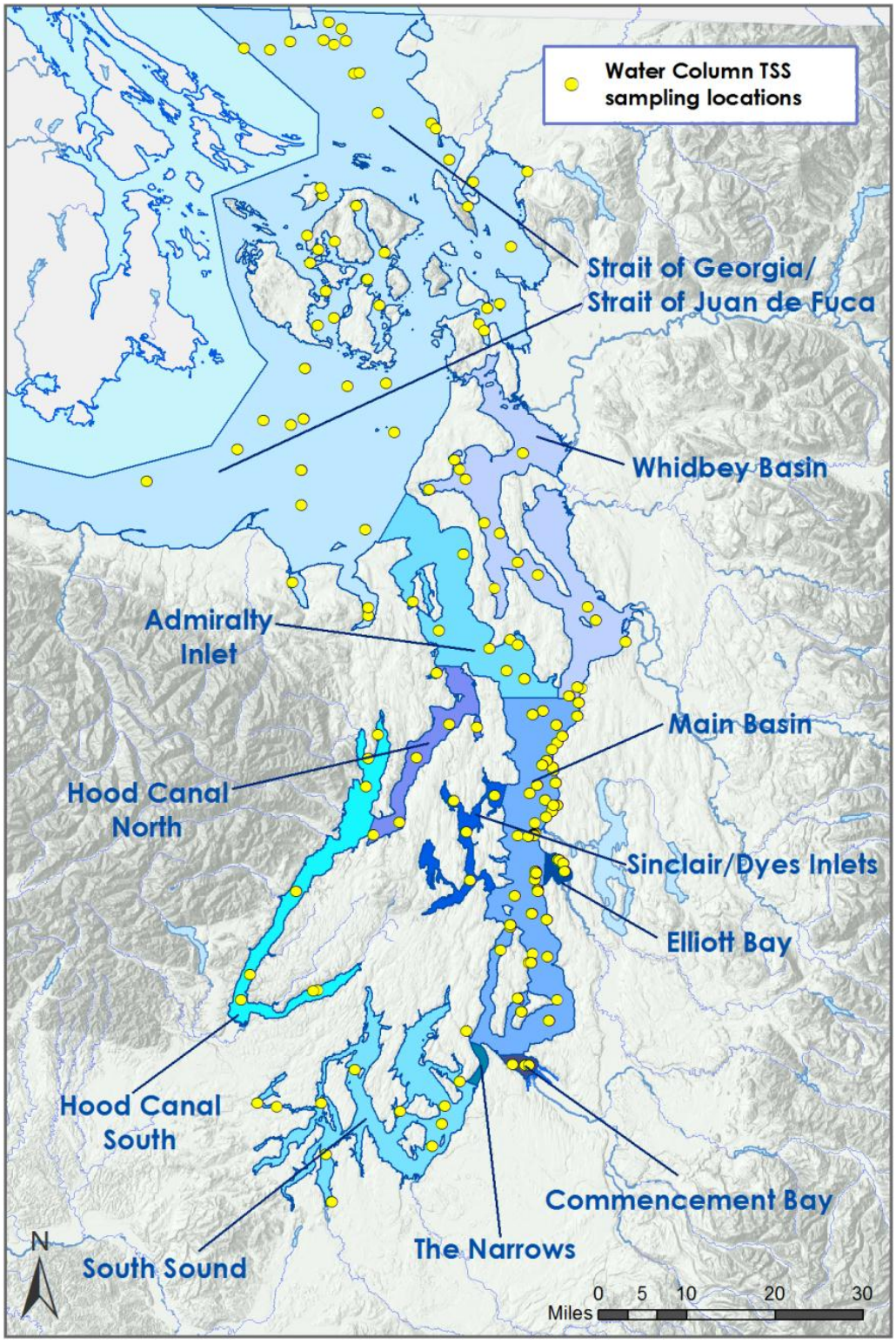


Figure C-10. Sampling locations for TSS in water.

Table C-10. Statistical summary of TSS data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
TSS	Admiralty Inlet	Surface	88	0	0	0.5	1.5	2.6	3.7	21.8	mg/L	
	Hood Canal (North)	Surface	10	0	0	3.0	4.0	5.0	5.0	8.0	mg/L	
	Hood Canal (South)	Surface	12	0	0	1.2	3.8	5.0	17.3	29.4	mg/L	
	Main Basin	Surface	6171	174	3	0.3	1.3	2.0	3.1	165.0	mg/L	
	The Narrows	Surface	6349	174	3	0.3	1.3	2.0	3.2	165.0	mg/L	Basins (Surface Layer)
	South Sound	Surface	24	0	0	0.9	5.0	6.5	8.0	22.6	mg/L	
	Whidbey Basin	Surface	44	0	0	0.8	3.5	4.7	7.4	28.0	mg/L	
	Comm. Bay	Surface	8	0	0	4.0	4.8	5.0	6.3	13.0	mg/L	
	Elliott Bay	Surface	1025	41	4	0.3	1.1	1.7	2.8	21.2	mg/L	
	Sinclair/Dyes Inlet	Surface	8	0	0	4.0	5.0	5.0	6.3	41.0	mg/L	
	All Regions	Surface	7390	215	3	0.3	1.3	2.0	3.2	165.0	mg/L	
	Basins	Surface	6349	174	3	0.3	1.3	2.0	3.2	165.0	mg/L	
	Urban Bays	Surface	1041	41	4	0.3	1.1	1.8	2.8	41.0	mg/L	
	SJF/SOG	Surface	131	0	0	1.1	3.0	4.0	6.0	15.0	mg/L	
TSS	Admiralty Inlet	Deep	61	1	2	0.5	1.0	2.4	3.6	6.0	mg/L	
	Hood Canal (North)	Deep	6	0	0	2.0	3.0	3.5	6.0	8.0	mg/L	
	Hood Canal (South)	Deep	13	0	0	1.0	1.5	4.0	5.0	7.0	mg/L	
	Main Basin	Deep	2906	57	2	0.3	1.3	2.0	3.1	23.0	mg/L	
	The Narrows	Deep	3133	68	2	0.3	1.3	2.1	3.1	23.0	mg/L	Basins (Deep Layer)
	South Sound	Deep	9	0	0	0.8	1.6	4.0	5.0	5.0	mg/L	
	Whidbey Basin	Deep	138	10	7	0.3	1.1	2.1	3.0	8.0	mg/L	
	Comm. Bay	Deep	4	0	0	3.0	3.8	4.0	4.3	5.0	mg/L	
	Elliott Bay	Deep	303	3	1	0.3	1.6	2.4	3.3	18.0	mg/L	
	Sinclair/Dyes Inlet	Deep	10	0	0	4.0	4.3	5.0	5.8	41.0	mg/L	Sinclair/Dyes (Full Water Column)
	All Regions	Deep	3442	71	2	0.3	1.4	2.1	3.1	23.0	mg/L	
	Basins	Deep	3133	68	2	0.3	1.3	2.1	3.1	23.0	mg/L	
	Urban Bays	Deep	309	3	1	0.3	1.6	2.4	3.3	18.0	mg/L	
	SJF/SOG	Deep	34	0	0	1.0	2.1	4.0	5.0	8.0	mg/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

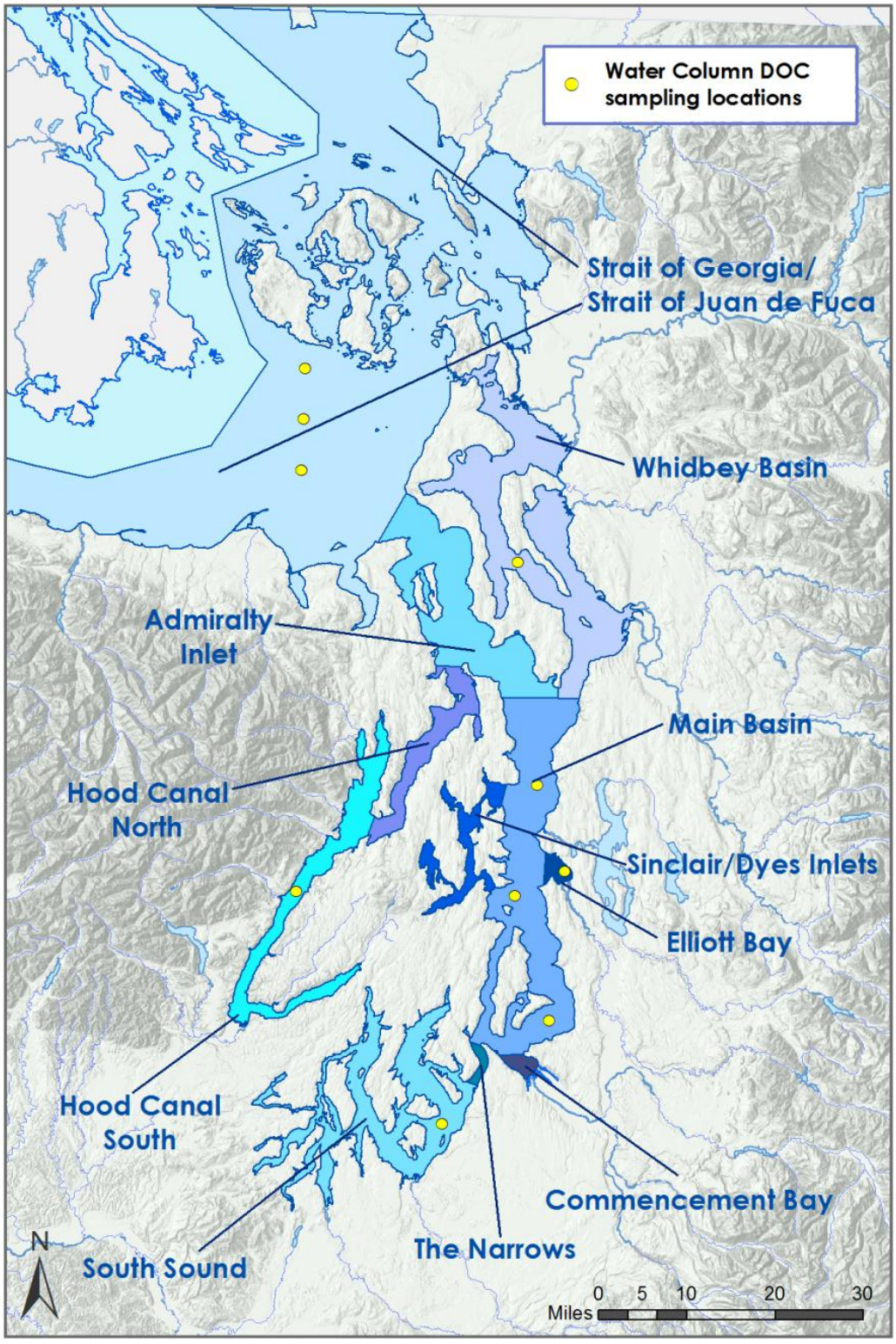


Figure C-11. Sampling locations for DOC in water.

Table C-11. Statistical summary of DOC data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
DOC	Admiralty Inlet	Surface	10	0	0	0.75	0.82	0.92	1.68	2.01	mg/L	Basins (Surface Layer)
	Hood Canal (North)	Surface	10	0	0	0.75	0.82	0.92	1.68	2.01	mg/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	4	0	0	0.71	0.71	0.73	0.78	0.87	mg/L	Hood South (Full Water Column)
	Main Basin	Surface	6	0	0	0.75	0.96	1.62	1.80	2.01	mg/L	
	The Narrows	Surface	10	0	0	0.75	0.82	0.92	1.68	2.01	mg/L	Basins (Surface Layer)
	South Sound	Surface	4	0	0	0.79	0.80	0.82	0.83	0.84	mg/L	Puget South (Full Water Column)
	Whidbey Basin	Surface	4	0	0	0.78	0.80	0.89	0.97	0.97	mg/L	Whidbey (Full Water Column)
	Comm. Bay	Surface	4	0	0	1.73	1.76	1.80	1.84	1.85	mg/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	4	0	0	1.73	1.76	1.80	1.84	1.85	mg/L	
	Sinclair/Dyes Inlet	Surface	4	0	0	1.73	1.76	1.80	1.84	1.85	mg/L	Urban Bays (Surface Layer)
	All Regions	Surface	14	0	0	0.75	0.85	1.62	1.81	2.01	mg/L	
	Basins	Surface	10	0	0	0.75	0.82	0.92	1.68	2.01	mg/L	
	Urban Bays	Surface	4	0	0	1.73	1.76	1.80	1.84	1.85	mg/L	
	SJF/SOG	Surface	6	0	0	0.69	0.70	0.70	0.75	0.81	mg/L	
DOC	Admiralty Inlet	Deep	10	0	0	0.71	0.73	0.77	0.80	0.97	mg/L	Basins (Deep Layer)
	Hood Canal (North)	Deep	10	0	0	0.71	0.73	0.77	0.80	0.97	mg/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	3	0	0	0.71	0.71	0.71	0.73	0.75	mg/L	
	Main Basin	Deep	8	0	0	0.72	0.75	1.14	1.75	2.01	mg/L	Puget Main (Full Water Column)
	The Narrows	Deep	10	0	0	0.71	0.73	0.77	0.80	0.97	mg/L	Basins (Deep Layer)
	South Sound	Deep	4	0	0	0.79	0.80	0.82	0.83	0.84	mg/L	Puget South (Full Water Column)
	Whidbey Basin	Deep	3	0	0	0.78	0.79	0.81	0.89	0.97	mg/L	
	Comm. Bay	Deep	4	0	0	1.73	1.76	1.80	1.84	1.85	mg/L	Urban Bays (Full Water Column)
	Elliott Bay	Deep	4	0	0	1.73	1.76	1.80	1.84	1.85	mg/L	Elliott Bay (Full Water Column)
	Sinclair/Dyes Inlet	Deep	4	0	0	1.73	1.76	1.80	1.84	1.85	mg/L	Urban Bays (Full Water Column)
	All Regions	Deep	10	0	0	0.71	0.73	0.77	0.80	0.97	mg/L	
	Basins	Deep	10	0	0	0.71	0.73	0.77	0.80	0.97	mg/L	
	Urban Bays	Deep	0	0	NA	NA	NA	NA	NA	NA	mg/L	
	SJF/SOG	Deep	6	0	0	0.61	0.63	0.66	0.69	0.72	mg/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

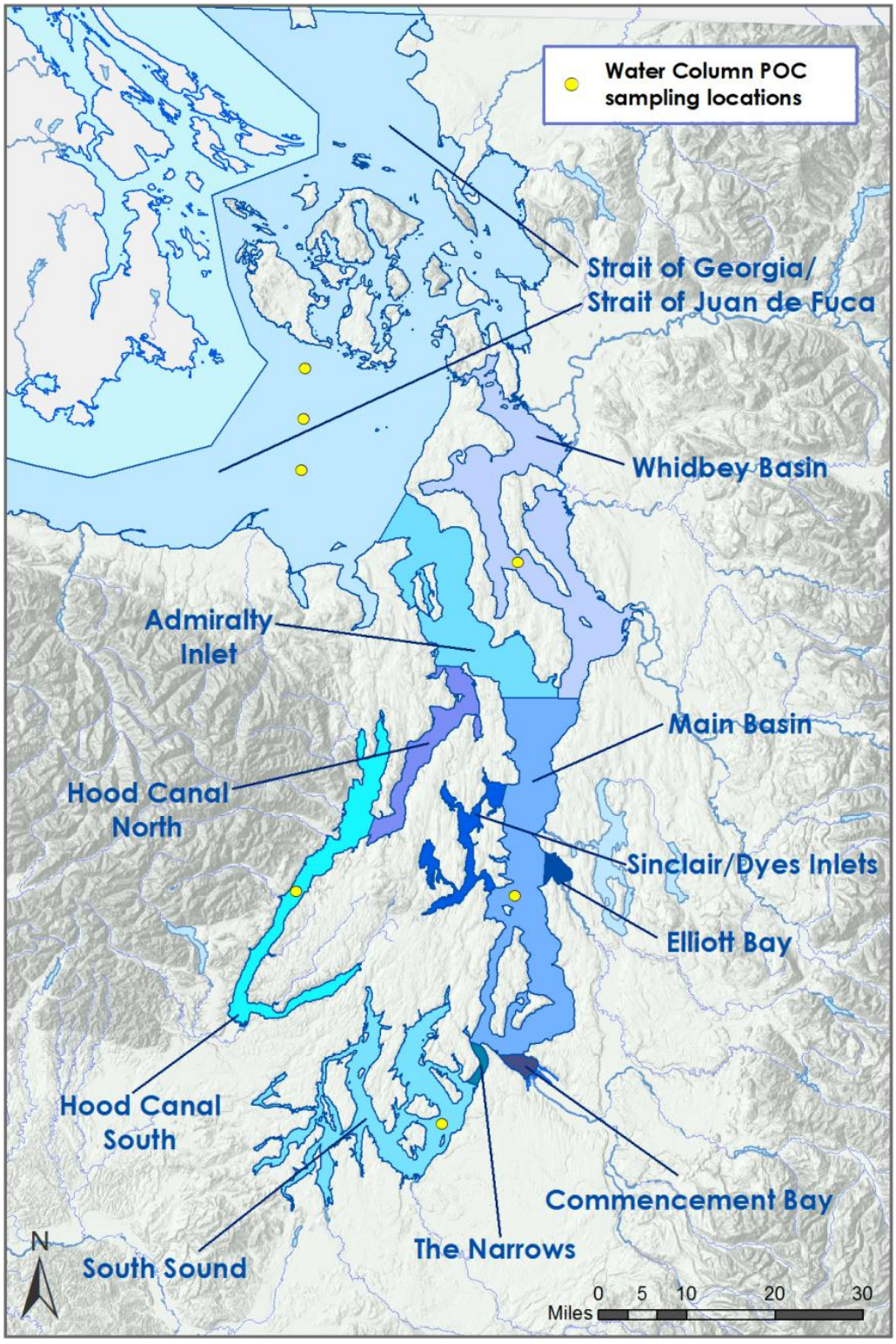


Figure C-12. Sampling locations for POC in water.

Table C-12. Statistical summary of POC data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
POC	Admiralty Inlet	Surface	6	0	0	0.03	0.07	0.15	0.21	1.78	mg/L	Basins (Surface Layer)
	Hood Canal (North)	Surface	6	0	0	0.03	0.07	0.15	0.21	1.78	mg/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	4	0	0	0.03	0.06	0.08	0.11	0.22	mg/L	Hood South (Full Water Column)
	Main Basin	Surface	4	0	0	0.03	0.03	0.06	0.10	0.12	mg/L	Puget Main (Full Water Column)
	The Narrows	Surface	6	0	0	0.03	0.07	0.15	0.21	1.78	mg/L	Basins (Surface Layer)
	South Sound	Surface	4	0	0	0.05	0.05	0.08	0.13	0.18	mg/L	Puget South (Full Water Column)
	Whidbey Basin	Surface	4	0	0	0.05	0.05	0.06	0.49	1.78	mg/L	Whidbey (Full Water Column)
	Comm. Bay	Surface	6	0	0	0.03	0.07	0.15	0.21	1.78	mg/L	All Regions (Surface Layer)
	Elliott Bay	Surface	6	0	0	0.03	0.07	0.15	0.21	1.78	mg/L	All Regions (Surface Layer)
	Sinclair/Dyes Inlet	Surface	6	0	0	0.03	0.07	0.15	0.21	1.78	mg/L	All Regions (Surface Layer)
	All Regions	Surface	6	0	0	0.03	0.07	0.15	0.21	1.78	mg/L	
	Basins	Surface	6	0	0	0.03	0.07	0.15	0.21	1.78	mg/L	
	Urban Bays	Surface	0	0	NA	NA	NA	NA	NA	NA	mg/L	
	SJF/SOG	Surface	6	0	0	0.04	0.05	0.05	0.05	0.08	mg/L	
POC	Admiralty Inlet	Deep	10	0	0	0.03	0.05	0.06	0.08	0.11	mg/L	Basins (Deep Layer)
	Hood Canal (North)	Deep	10	0	0	0.03	0.05	0.06	0.08	0.11	mg/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	3	0	0	0.03	0.05	0.07	0.08	0.08	mg/L	
	Main Basin	Deep	4	0	0	0.03	0.03	0.06	0.10	0.12	mg/L	Puget Main (Full Water Column)
	The Narrows	Deep	10	0	0	0.03	0.05	0.06	0.08	0.11	mg/L	Basins (Deep Layer)
	South Sound	Deep	4	0	0	0.05	0.05	0.08	0.13	0.18	mg/L	Puget South (Full Water Column)
	Whidbey Basin	Deep	3	0	0	0.05	0.05	0.05	0.06	0.06	mg/L	
	Comm. Bay	Deep	10	0	0	0.03	0.05	0.06	0.08	0.11	mg/L	All Regions (Deep Layer)
	Elliott Bay	Deep	10	0	0	0.03	0.05	0.06	0.08	0.11	mg/L	All Regions (Deep Layer)
	Sinclair/Dyes Inlet	Deep	10	0	0	0.03	0.05	0.06	0.08	0.11	mg/L	All Regions (Deep Layer)
	All Regions	Deep	10	0	0	0.03	0.05	0.06	0.08	0.11	mg/L	
	Basins	Deep	10	0	0	0.03	0.05	0.06	0.08	0.11	mg/L	
	Urban Bays	Deep	0	0	NA	NA	NA	NA	NA	NA	mg/L	
	SJF/SOG	Deep	6	0	0	0.04	0.04	0.06	0.07	0.11	mg/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

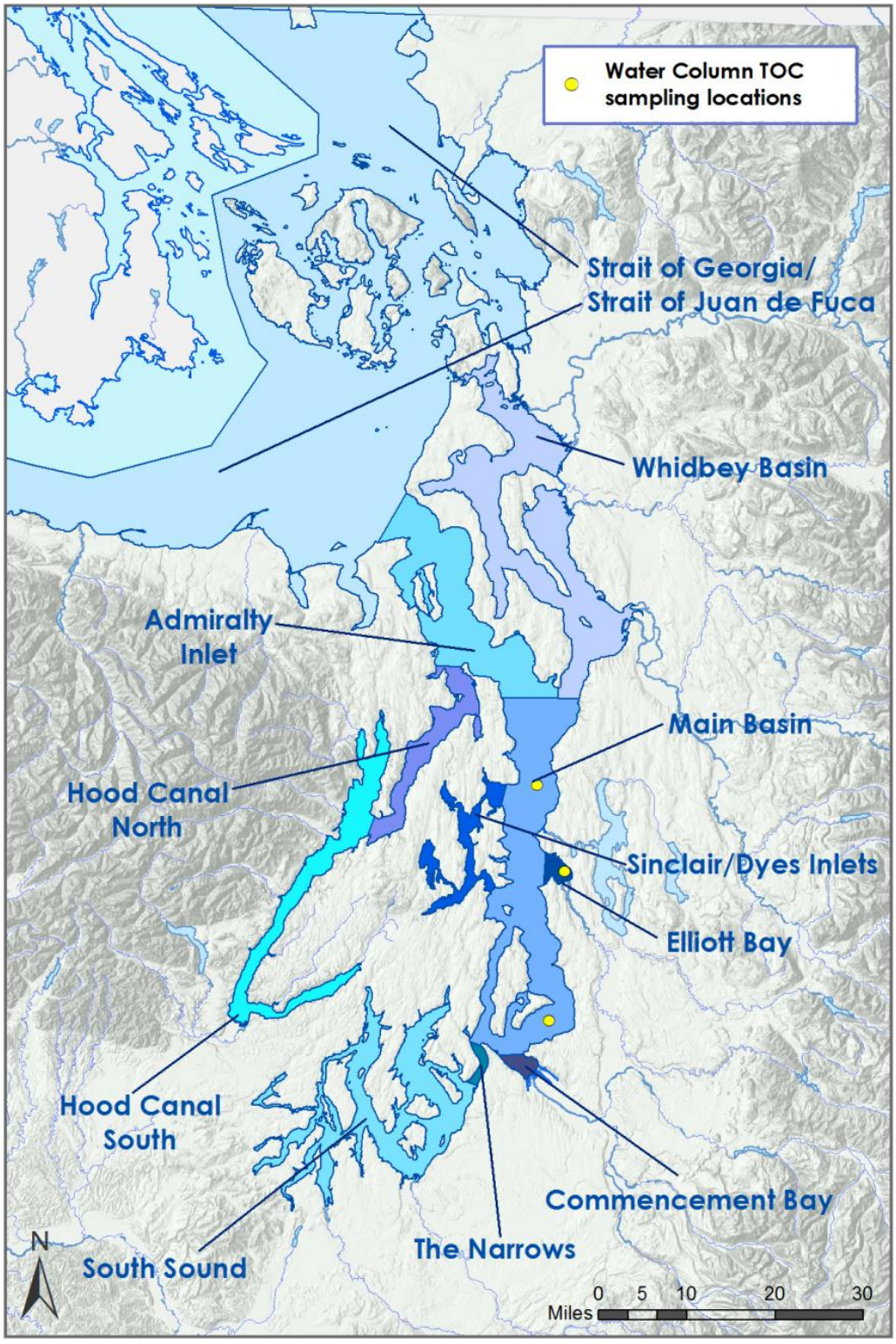


Figure C-13. Sampling locations for TOC in water.

Table C-13. Statistical summary of TOC data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
TOC	Admiralty Inlet	Surface	4	0	0	1.80	1.91	2.33	2.95	3.68	mg/L	Basins (Surface Layer)
	Hood Canal (North)	Surface	4	0	0	1.80	1.91	2.33	2.95	3.68	mg/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	4	0	0	1.80	1.91	2.33	2.95	3.68	mg/L	Basins (Surface Layer)
	Main Basin	Surface	4	0	0	1.80	1.91	2.33	2.95	3.68	mg/L	
	The Narrows	Surface	4	0	0	1.80	1.91	2.33	2.95	3.68	mg/L	Basins (Surface Layer)
	South Sound	Surface	4	0	0	1.80	1.91	2.33	2.95	3.68	mg/L	Basins (Surface Layer)
	Whidbey Basin	Surface	4	0	0	1.80	1.91	2.33	2.95	3.68	mg/L	Basins (Surface Layer)
	Comm. Bay	Surface	4	0	0	1.64	1.70	1.74	1.80	1.92	mg/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	4	0	0	1.64	1.70	1.74	1.80	1.92	mg/L	
	Sinclair/Dyes Inlet	Surface	4	0	0	1.64	1.70	1.74	1.80	1.92	mg/L	Urban Bays (Surface Layer)
	All Regions	Surface	8	0	0	1.64	1.75	1.86	2.13	3.68	mg/L	
	Basins	Surface	4	0	0	1.80	1.91	2.33	2.95	3.68	mg/L	
	Urban Bays	Surface	4	0	0	1.64	1.70	1.74	1.80	1.92	mg/L	
	SJF/SOG	Surface	8	0	0	1.64	1.75	1.86	2.13	3.68	mg/L	All Regions (Surface Layer)
TOC	Admiralty Inlet	Deep	4	0	0	1.80	1.91	2.33	2.95	3.68	mg/L	Basins (Full Water Column)
	Hood Canal (North)	Deep	4	0	0	1.80	1.91	2.33	2.95	3.68	mg/L	Basins (Full Water Column)
	Hood Canal (South)	Deep	4	0	0	1.80	1.91	2.33	2.95	3.68	mg/L	Basins (Full Water Column)
	Main Basin	Deep	4	0	0	1.80	1.91	2.33	2.95	3.68	mg/L	Puget Main (Full Water Column)
	The Narrows	Deep	4	0	0	1.80	1.91	2.33	2.95	3.68	mg/L	Basins (Full Water Column)
	South Sound	Deep	4	0	0	1.80	1.91	2.33	2.95	3.68	mg/L	Basins (Full Water Column)
	Whidbey Basin	Deep	4	0	0	1.80	1.91	2.33	2.95	3.68	mg/L	Basins (Full Water Column)
	Comm. Bay	Deep	4	0	0	1.64	1.70	1.74	1.80	1.92	mg/L	Urban Bays (Full Water Column)
	Elliott Bay	Deep	4	0	0	1.64	1.70	1.74	1.80	1.92	mg/L	Elliott Bay (Full Water Column)
	Sinclair/Dyes Inlet	Deep	4	0	0	1.64	1.70	1.74	1.80	1.92	mg/L	Urban Bays (Full Water Column)
	All Regions	Deep	0	0	NA	NA	NA	NA	NA	NA	mg/L	
	Basins	Deep	0	0	NA	NA	NA	NA	NA	NA	mg/L	
	Urban Bays	Deep	0	0	NA	NA	NA	NA	NA	NA	mg/L	
	SJF/SOG	Deep	8	0	0	1.64	1.75	1.86	2.13	3.68	mg/L	All Regions (Full Water Column)

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table C-14. Statistical summary of Acenaphthene data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Acenaphthene	Admiralty Inlet	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Surface	152	146	96	0.00050	0.0024	0.0026	0.0032	0.010	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.00050	0.0014	0.0043	0.0043	0.0044	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	139	133	96	0.00050	0.0024	0.0026	0.0029	0.010	ug/L	
	The Narrows	Surface	152	146	96	0.00050	0.0024	0.0026	0.0032	0.010	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.00050	0.0024	0.0043	0.0044	0.0045	ug/L	
	Whidbey Basin	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Comm. Bay	Surface	8	3	38	0.0047	0.0049	0.012	0.015	0.045	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	3	38	0.0047	0.0049	0.012	0.015	0.045	ug/L	
	Sinclair/Dyes Inlet	Surface	8	3	38	0.0047	0.0049	0.012	0.015	0.045	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	160	149	93	0.00050	0.0024	0.0026	0.0044	0.045	ug/L	
	Basins	Surface	152	146	96	0.00050	0.0024	0.0026	0.0032	0.010	ug/L	
	Urban Bays	Surface	8	3	38	0.0047	0.0049	0.012	0.015	0.045	ug/L	
	SJF/SOG	Surface	9	9	100	0.00050	0.00050	0.0043	0.0043	0.0045	ug/L	
Acenaphthene	Admiralty Inlet	Deep	8	8	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Deep	68	68	100	0.00050	0.0024	0.0024	0.0043	0.0048	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.00050	0.00050	0.0024	0.0043	0.0043	ug/L	
	Main Basin	Deep	39	39	100	0.00050	0.0024	0.0024	0.0047	0.0048	ug/L	
	The Narrows	Deep	68	68	100	0.00050	0.0024	0.0024	0.0043	0.0048	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.00050	0.0025	0.0044	0.0044	0.0044	ug/L	
	Whidbey Basin	Deep	14	14	100	0.00050	0.0024	0.0024	0.0038	0.0044	ug/L	
	Comm. Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	76	100	0.00050	0.0024	0.0024	0.0047	0.0048	ug/L	
	Basins	Deep	68	68	100	0.00050	0.0024	0.0024	0.0043	0.0048	ug/L	
	Urban Bays	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	SJF/SOG	Deep	9	9	100	0.00050	0.00055	0.0043	0.0044	0.0045	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table C-15. Statistical summary of Acenaphthylene data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Acenaphthylene	Admiralty Inlet	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Surface	152	152	100	0.00090	0.0024	0.0026	0.0026	0.0054	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.00090	0.0017	0.0042	0.0042	0.0044	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	139	139	100	0.00090	0.0024	0.0026	0.0026	0.0054	ug/L	
	The Narrows	Surface	152	152	100	0.00090	0.0024	0.0026	0.0026	0.0054	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.00090	0.0026	0.0042	0.0043	0.0044	ug/L	
	Whidbey Basin	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Comm. Bay	Surface	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0049	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0049	ug/L	
	Sinclair/Dyes Inlet	Surface	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0049	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	160	160	100	0.00090	0.0024	0.0026	0.0032	0.0054	ug/L	
	Basins	Surface	152	152	100	0.00090	0.0024	0.0026	0.0026	0.0054	ug/L	
	Urban Bays	Surface	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0049	ug/L	
	SJF/SOG	Surface	9	9	100	0.00090	0.00090	0.0042	0.0043	0.0044	ug/L	
Acenaphthylene	Admiralty Inlet	Deep	8	8	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Deep	68	68	100	0.00090	0.0024	0.0024	0.0042	0.0048	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.00090	0.00090	0.0026	0.0042	0.0042	ug/L	
	Main Basin	Deep	39	39	100	0.00090	0.0024	0.0024	0.0047	0.0048	ug/L	
	The Narrows	Deep	68	68	100	0.00090	0.0024	0.0024	0.0042	0.0048	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.00090	0.0026	0.0043	0.0043	0.0043	ug/L	
	Whidbey Basin	Deep	14	14	100	0.00090	0.0024	0.0024	0.0037	0.0043	ug/L	
	Comm. Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	76	100	0.00090	0.0024	0.0024	0.0047	0.0048	ug/L	
	Basins	Deep	68	68	100	0.00090	0.0024	0.0024	0.0042	0.0048	ug/L	
	Urban Bays	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	SJF/SOG	Deep	9	9	100	0.00090	0.0010	0.0042	0.0043	0.0044	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table C-16. Statistical summary of Anthracene data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Anthracene	Admiralty Inlet	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Surface	152	151	99	0.0011	0.0024	0.0025	0.0026	0.019	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.0012	0.0015	0.0025	0.0026	0.0026	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	139	138	99	0.0011	0.0024	0.0026	0.0026	0.019	ug/L	
	The Narrows	Surface	152	151	99	0.0011	0.0024	0.0025	0.0026	0.019	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.0011	0.0018	0.0025	0.0026	0.0027	ug/L	
	Whidbey Basin	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Comm. Bay	Surface	8	7	88	0.0047	0.0047	0.0047	0.0048	0.019	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	7	88	0.0047	0.0047	0.0047	0.0048	0.019	ug/L	
	Sinclair/Dyes Inlet	Surface	8	7	88	0.0047	0.0047	0.0047	0.0048	0.019	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	160	158	99	0.0011	0.0024	0.0026	0.0027	0.019	ug/L	
	Basins	Surface	152	151	99	0.0011	0.0024	0.0025	0.0026	0.019	ug/L	
	Urban Bays	Surface	8	7	88	0.0047	0.0047	0.0047	0.0048	0.019	ug/L	
	SJF/SOG	Surface	9	9	100	0.0011	0.0012	0.0025	0.0026	0.0027	ug/L	
Anthracene	Admiralty Inlet	Deep	8	8	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Deep	68	68	100	0.0011	0.0024	0.0024	0.0026	0.0048	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.0012	0.0012	0.0018	0.0025	0.0026	ug/L	
	Main Basin	Deep	39	39	100	0.0011	0.0024	0.0024	0.0047	0.0048	ug/L	
	The Narrows	Deep	68	68	100	0.0011	0.0024	0.0024	0.0026	0.0048	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.0011	0.0019	0.0026	0.0026	0.0026	ug/L	
	Whidbey Basin	Deep	14	14	100	0.0011	0.0024	0.0024	0.0025	0.0026	ug/L	
	Comm. Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	76	100	0.0011	0.0024	0.0024	0.0047	0.0048	ug/L	
	Basins	Deep	68	68	100	0.0011	0.0024	0.0024	0.0026	0.0048	ug/L	
	Urban Bays	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	SJF/SOG	Deep	9	9	100	0.0011	0.0012	0.0026	0.0026	0.0027	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table C-17. Statistical summary of Benzo(a)anthracene data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Benzo(a)anthracene	Admiralty Inlet	Surface	4	4	100	0.0060	0.0060	0.0060	0.0060	0.0060	ug/L	
	Hood Canal (North)	Surface	152	151	99	0.00045	0.0060	0.0063	0.0065	0.015	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.00045	0.00045	0.00045	0.00049	0.001	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	139	138	99	0.00045	0.0060	0.0065	0.0065	0.015	ug/L	
	The Narrows	Surface	152	151	99	0.00045	0.0060	0.0063	0.0065	0.015	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.00045	0.00045	0.00045	0.00048	0.0005	ug/L	
	Whidbey Basin	Surface	4	4	100	0.0060	0.0060	0.0060	0.0060	0.0060	ug/L	
	Comm. Bay	Surface	8	7	88	0.012	0.012	0.012	0.012	0.041	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	7	88	0.012	0.012	0.012	0.012	0.041	ug/L	
	Sinclair/Dyes Inlet	Surface	8	7	88	0.012	0.012	0.012	0.012	0.041	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	160	158	99	0.00045	0.0060	0.0065	0.0065	0.041	ug/L	
	Basins	Surface	152	151	99	0.00045	0.0060	0.0063	0.0065	0.015	ug/L	
	Urban Bays	Surface	8	7	88	0.012	0.012	0.012	0.012	0.041	ug/L	
	SJF/SOG	Surface	9	9	100	0.00045	0.00045	0.00045	0.0005	0.0005	ug/L	
Benzo(a)anthracene	Admiralty Inlet	Deep	8	8	100	0.0060	0.0060	0.0060	0.0060	0.0060	ug/L	
	Hood Canal (North)	Deep	68	68	100	0.00045	0.0060	0.0060	0.0060	0.012	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.00045	0.00045	0.00048	0.0005	0.0005	ug/L	
	Main Basin	Deep	39	39	100	0.00045	0.0060	0.0060	0.012	0.012	ug/L	
	The Narrows	Deep	68	68	100	0.00045	0.0060	0.0060	0.0060	0.012	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.00045	0.00045	0.00045	0.00048	0.0005	ug/L	
	Whidbey Basin	Deep	14	14	100	0.00045	0.00046	0.0060	0.0060	0.0060	ug/L	
	Comm. Bay	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	76	100	0.00045	0.0060	0.0060	0.012	0.012	ug/L	
	Basins	Deep	68	68	100	0.00045	0.0060	0.0060	0.0060	0.012	ug/L	
	Urban Bays	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	SJF/SOG	Deep	9	9	100	0.00045	0.00045	0.00045	0.0005	0.0006	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table C-18. Statistical summary of Benzo(a)pyrene data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Benzo(a)pyrene	Admiralty Inlet	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Surface	152	150	99	0.00080	0.0024	0.0025	0.0026	0.018	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.00080	0.00080	0.00083	0.00089	0.00090	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	139	137	99	0.00080	0.0024	0.0026	0.0026	0.018	ug/L	
	The Narrows	Surface	152	150	99	0.00080	0.0024	0.0025	0.0026	0.018	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.00080	0.00083	0.00085	0.00088	0.00090	ug/L	
	Whidbey Basin	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Comm. Bay	Surface	8	7	88	0.0047	0.0047	0.0047	0.0048	0.015	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	7	88	0.0047	0.0047	0.0047	0.0048	0.015	ug/L	
	Sinclair/Dyes Inlet	Surface	8	7	88	0.0047	0.0047	0.0047	0.0048	0.015	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	160	157	98	0.00080	0.0024	0.0025	0.0027	0.018	ug/L	
	Basins	Surface	152	150	99	0.00080	0.0024	0.0025	0.0026	0.018	ug/L	
	Urban Bays	Surface	8	7	88	0.0047	0.0047	0.0047	0.0048	0.015	ug/L	
	SJF/SOG	Surface	9	9	100	0.00080	0.00080	0.00085	0.00090	0.00090	ug/L	
Benzo(a)pyrene	Admiralty Inlet	Deep	8	8	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Deep	68	68	100	0.00080	0.0024	0.0024	0.0024	0.0048	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.00080	0.00080	0.00085	0.00090	0.00090	ug/L	
	Main Basin	Deep	39	39	100	0.00080	0.0024	0.0024	0.0047	0.0048	ug/L	
	The Narrows	Deep	68	68	100	0.00080	0.0024	0.0024	0.0024	0.0048	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.00085	0.00085	0.00085	0.00088	0.00090	ug/L	
	Whidbey Basin	Deep	14	14	100	0.00080	0.00084	0.0024	0.0024	0.0024	ug/L	
	Comm. Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	76	100	0.00080	0.0024	0.0024	0.0047	0.0048	ug/L	
	Basins	Deep	68	68	100	0.00080	0.0024	0.0024	0.0024	0.0048	ug/L	
	Urban Bays	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	SJF/SOG	Deep	9	9	100	0.00080	0.00080	0.00085	0.00090	0.0010	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table C-19. Statistical summary of Benzo(b)fluoranthene data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Benzo(b)fluoranthene	Admiralty Inlet	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Surface	142	141	99	0.00050	0.0024	0.0024	0.0026	0.0089	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.00050	0.00050	0.00053	0.00055	0.00055	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	129	128	99	0.00050	0.0024	0.0025	0.0026	0.0089	ug/L	
	The Narrows	Surface	142	141	99	0.00050	0.0024	0.0024	0.0026	0.0089	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.00050	0.00053	0.00055	0.00055	0.00055	ug/L	
	Whidbey Basin	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Comm. Bay	Surface	8	6	75	0.0047	0.0047	0.0047	0.0061	0.073	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	6	75	0.0047	0.0047	0.0047	0.0061	0.073	ug/L	
	Sinclair/Dyes Inlet	Surface	8	6	75	0.0047	0.0047	0.0047	0.0061	0.073	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	150	147	98	0.00050	0.0024	0.0025	0.0027	0.073	ug/L	
	Basins	Surface	142	141	99	0.00050	0.0024	0.0024	0.0026	0.0089	ug/L	
	Urban Bays	Surface	8	6	75	0.0047	0.0047	0.0047	0.0061	0.073	ug/L	
	SJF/SOG	Surface	9	9	100	0.00050	0.00050	0.00050	0.00055	0.00055	ug/L	
Benzo(b)fluoranthene	Admiralty Inlet	Deep	8	8	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Deep	68	68	100	0.00050	0.0024	0.0024	0.0024	0.0048	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.00050	0.00050	0.00053	0.00055	0.00055	ug/L	
	Main Basin	Deep	39	39	100	0.00050	0.0024	0.0024	0.0047	0.0048	ug/L	
	The Narrows	Deep	68	68	100	0.00050	0.0024	0.0024	0.0024	0.0048	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.00050	0.00050	0.00050	0.00053	0.00055	ug/L	
	Whidbey Basin	Deep	14	14	100	0.00050	0.00053	0.0024	0.0024	0.0024	ug/L	
	Comm. Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	76	100	0.00050	0.0024	0.0024	0.0047	0.0048	ug/L	
	Basins	Deep	68	68	100	0.00050	0.0024	0.0024	0.0024	0.0048	ug/L	
	Urban Bays	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	SJF/SOG	Deep	9	9	100	0.00050	0.00050	0.00050	0.00055	0.00060	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table C-20. Statistical summary of Benzo(g,h,i)perylene data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Benzo(g,h,i)perylene	Admiralty Inlet	Surface	4	4	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Hood Canal (North)	Surface	152	152	100	0.00080	0.012	0.012	0.013	0.054	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.00080	0.00080	0.00080	0.00084	0.00085	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	139	139	100	0.00080	0.012	0.013	0.013	0.054	ug/L	
	The Narrows	Surface	152	152	100	0.00080	0.012	0.012	0.013	0.054	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.00080	0.00083	0.00085	0.00085	0.00085	ug/L	
	Whidbey Basin	Surface	4	4	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Comm. Bay	Surface	8	8	100	0.047	0.047	0.047	0.047	0.049	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	8	100	0.047	0.047	0.047	0.047	0.049	ug/L	
	Sinclair/Dyes Inlet	Surface	8	8	100	0.047	0.047	0.047	0.047	0.049	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	160	160	100	0.00080	0.012	0.013	0.013	0.054	ug/L	
	Basins	Surface	152	152	100	0.00080	0.012	0.012	0.013	0.054	ug/L	
	Urban Bays	Surface	8	8	100	0.047	0.047	0.047	0.047	0.049	ug/L	
	SJF/SOG	Surface	9	9	100	0.00080	0.00080	0.00080	0.00085	0.00085	ug/L	
Benzo(g,h,i)perylene	Admiralty Inlet	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Hood Canal (North)	Deep	68	68	100	0.00080	0.012	0.012	0.012	0.048	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.00080	0.00080	0.00083	0.00085	0.00085	ug/L	
	Main Basin	Deep	39	39	100	0.00080	0.012	0.012	0.047	0.048	ug/L	
	The Narrows	Deep	68	68	100	0.00080	0.012	0.012	0.012	0.048	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.00080	0.00080	0.00080	0.00083	0.00085	ug/L	
	Whidbey Basin	Deep	14	14	100	0.00080	0.00083	0.012	0.012	0.012	ug/L	
	Comm. Bay	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	76	100	0.00080	0.012	0.012	0.047	0.048	ug/L	
	Basins	Deep	68	68	100	0.00080	0.012	0.012	0.012	0.048	ug/L	
	Urban Bays	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	
	SJF/SOG	Deep	9	9	100	0.00080	0.00080	0.00080	0.00085	0.00090	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table C-21. Statistical summary of Benzo(k)fluoranthene data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Benzo(k)fluoranthene	Admiralty Inlet	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Surface	142	141	99	0.00025	0.0024	0.0024	0.0026	0.0078	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.00025	0.00025	0.00025	0.00029	0.00030	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	129	128	99	0.00025	0.0024	0.0025	0.0026	0.0078	ug/L	
	The Narrows	Surface	142	141	99	0.00025	0.0024	0.0024	0.0026	0.0078	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.00025	0.00025	0.00025	0.00028	0.00030	ug/L	
	Whidbey Basin	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Comm. Bay	Surface	8	7	88	0.0047	0.0047	0.0047	0.0048	0.039	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	7	88	0.0047	0.0047	0.0047	0.0048	0.039	ug/L	
	Sinclair/Dyes Inlet	Surface	8	7	88	0.0047	0.0047	0.0047	0.0048	0.039	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	150	148	99	0.00025	0.0024	0.0025	0.0027	0.039	ug/L	
	Basins	Surface	142	141	99	0.00025	0.0024	0.0024	0.0026	0.0078	ug/L	
	Urban Bays	Surface	8	7	88	0.0047	0.0047	0.0047	0.0048	0.039	ug/L	
	SJF/SOG	Surface	9	9	100	0.00025	0.00025	0.00025	0.00030	0.00030	ug/L	
Benzo(k)fluoranthene	Admiralty Inlet	Deep	8	8	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Deep	68	68	100	0.00025	0.0024	0.0024	0.0024	0.0048	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.00025	0.00025	0.00028	0.00030	0.00030	ug/L	
	Main Basin	Deep	39	39	100	0.00025	0.0024	0.0024	0.0047	0.0048	ug/L	
	The Narrows	Deep	68	68	100	0.00025	0.0024	0.0024	0.0024	0.0048	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.00025	0.00025	0.00025	0.00028	0.00030	ug/L	
	Whidbey Basin	Deep	14	14	100	0.00025	0.00028	0.0024	0.0024	0.0024	ug/L	
	Comm. Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	76	100	0.00025	0.0024	0.0024	0.0047	0.0048	ug/L	
	Basins	Deep	68	68	100	0.00025	0.0024	0.0024	0.0024	0.0048	ug/L	
	Urban Bays	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	SJF/SOG	Deep	9	9	100	0.00025	0.00025	0.00025	0.00030	0.00030	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table C-22. Statistical summary of Chrysene data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Chrysene	Admiralty Inlet	Surface	4	4	100	0.0060	0.0060	0.0060	0.0060	0.0060	ug/L	
	Hood Canal (North)	Surface	152	151	99	0.00040	0.0060	0.0063	0.0065	0.025	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.00040	0.00045	0.00045	0.00045	0.00045	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	139	138	99	0.00040	0.0060	0.0065	0.0065	0.025	ug/L	
	The Narrows	Surface	152	151	99	0.00040	0.0060	0.0063	0.0065	0.025	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.00040	0.00043	0.00045	0.00045	0.00045	ug/L	
	Whidbey Basin	Surface	4	4	100	0.0060	0.0060	0.0060	0.0060	0.0060	ug/L	
	Comm. Bay	Surface	8	7	88	0.012	0.012	0.012	0.012	0.062	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	7	88	0.012	0.012	0.012	0.012	0.062	ug/L	
	Sinclair/Dyes Inlet	Surface	8	7	88	0.012	0.012	0.012	0.012	0.062	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	160	158	99	0.00040	0.0060	0.0065	0.0065	0.062	ug/L	
	Basins	Surface	152	151	99	0.00040	0.0060	0.0063	0.0065	0.025	ug/L	
	Urban Bays	Surface	8	7	88	0.012	0.012	0.012	0.012	0.062	ug/L	
	SJF/SOG	Surface	9	9	100	0.00040	0.00045	0.00045	0.00045	0.00045	ug/L	
Chrysene	Admiralty Inlet	Deep	8	8	100	0.0060	0.0060	0.0060	0.0060	0.0060	ug/L	
	Hood Canal (North)	Deep	68	68	100	0.00040	0.0060	0.0060	0.0060	0.012	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.00040	0.00044	0.00045	0.00045	0.00045	ug/L	
	Main Basin	Deep	39	39	100	0.00040	0.0060	0.0060	0.012	0.012	ug/L	
	The Narrows	Deep	68	68	100	0.00040	0.0060	0.0060	0.0060	0.012	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.00045	0.00045	0.00045	0.00045	0.00045	ug/L	
	Whidbey Basin	Deep	14	14	100	0.00040	0.00043	0.0060	0.0060	0.0060	ug/L	
	Comm. Bay	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	76	100	0.00040	0.0060	0.0060	0.012	0.012	ug/L	
	Basins	Deep	68	68	100	0.00040	0.0060	0.0060	0.0060	0.012	ug/L	
	Urban Bays	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	SJF/SOG	Deep	9	9	100	0.00040	0.00045	0.00045	0.00045	0.00050	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table C-23. Statistical summary of Dibenzo(a,h)anthracene data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Dibenzo(a,h)anthracene	Admiralty Inlet	Surface	4	4	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Hood Canal (North)	Surface	152	152	100	0.00070	0.012	0.012	0.013	0.054	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.00070	0.00070	0.00070	0.00074	0.00075	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	139	139	100	0.00070	0.012	0.013	0.013	0.054	ug/L	
	The Narrows	Surface	152	152	100	0.00070	0.012	0.012	0.013	0.054	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.00070	0.00073	0.00075	0.00075	0.00075	ug/L	
	Whidbey Basin	Surface	4	4	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Comm. Bay	Surface	8	8	100	0.047	0.047	0.047	0.047	0.049	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	8	100	0.047	0.047	0.047	0.047	0.049	ug/L	
	Sinclair/Dyes Inlet	Surface	8	8	100	0.047	0.047	0.047	0.047	0.049	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	160	160	100	0.00070	0.012	0.013	0.013	0.054	ug/L	
	Basins	Surface	152	152	100	0.00070	0.012	0.012	0.013	0.054	ug/L	
	Urban Bays	Surface	8	8	100	0.047	0.047	0.047	0.047	0.049	ug/L	
	SJF/SOG	Surface	9	9	100	0.00070	0.00070	0.00070	0.00075	0.00075	ug/L	
Dibenzo(a,h)anthracene	Admiralty Inlet	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Hood Canal (North)	Deep	68	68	100	0.00070	0.012	0.012	0.012	0.048	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.00070	0.00070	0.00073	0.00075	0.00075	ug/L	
	Main Basin	Deep	39	39	100	0.00070	0.012	0.012	0.047	0.048	ug/L	
	The Narrows	Deep	68	68	100	0.00070	0.012	0.012	0.012	0.048	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.00070	0.00070	0.00070	0.00073	0.00075	ug/L	
	Whidbey Basin	Deep	14	14	100	0.00070	0.00073	0.012	0.012	0.012	ug/L	
	Comm. Bay	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	76	100	0.00070	0.012	0.012	0.047	0.048	ug/L	
	Basins	Deep	68	68	100	0.00070	0.012	0.012	0.012	0.048	ug/L	
	Urban Bays	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	
	SJF/SOG	Deep	9	9	100	0.00070	0.00070	0.00070	0.00075	0.00080	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table C-24. Statistical summary of Fluoranthene data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Fluoranthene	Admiralty Inlet	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Surface	152	131	86	0.00050	0.0024	0.0026	0.0047	0.051	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.00050	0.00056	0.00075	0.00075	0.00080	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	139	118	85	0.00050	0.0024	0.0026	0.0047	0.051	ug/L	
	The Narrows	Surface	152	131	86	0.00050	0.0024	0.0026	0.0047	0.051	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.00050	0.00063	0.00075	0.00078	0.00080	ug/L	
	Whidbey Basin	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Comm. Bay	Surface	8	1	13	0.0047	0.012	0.018	0.021	0.081	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	1	13	0.0047	0.012	0.018	0.021	0.081	ug/L	
	Sinclair/Dyes Inlet	Surface	8	1	13	0.0047	0.012	0.018	0.021	0.081	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	160	132	83	0.00050	0.0024	0.0026	0.0047	0.081	ug/L	
	Basins	Surface	152	131	86	0.00050	0.0024	0.0026	0.0047	0.051	ug/L	
	Urban Bays	Surface	8	1	13	0.0047	0.012	0.018	0.021	0.081	ug/L	
	SJF/SOG	Surface	9	9	100	0.00050	0.00050	0.00075	0.00075	0.00080	ug/L	
Fluoranthene	Admiralty Inlet	Deep	8	8	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Deep	68	68	100	0.00050	0.0024	0.0024	0.0024	0.0048	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.00050	0.00050	0.00063	0.00075	0.00075	ug/L	
	Main Basin	Deep	39	39	100	0.00050	0.0024	0.0024	0.0047	0.0048	ug/L	
	The Narrows	Deep	68	68	100	0.00050	0.0024	0.0024	0.0024	0.0048	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.00050	0.00065	0.00080	0.00080	0.00080	ug/L	
	Whidbey Basin	Deep	14	14	100	0.00050	0.00075	0.0024	0.0024	0.0024	ug/L	
	Comm. Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	76	100	0.00050	0.0024	0.0024	0.0047	0.0048	ug/L	
	Basins	Deep	68	68	100	0.00050	0.0024	0.0024	0.0024	0.0048	ug/L	
	Urban Bays	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	SJF/SOG	Deep	9	9	100	0.00050	0.00055	0.00075	0.00080	0.00080	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table C-25. Statistical summary of Fluorene data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Fluorene	Admiralty Inlet	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Surface	152	147	97	0.00035	0.0024	0.0026	0.0028	0.023	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.00035	0.0012	0.0037	0.0037	0.0038	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	139	134	96	0.00035	0.0024	0.0026	0.0027	0.023	ug/L	
	The Narrows	Surface	152	147	97	0.00035	0.0024	0.0026	0.0028	0.023	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.00035	0.0020	0.0037	0.0038	0.0039	ug/L	
	Whidbey Basin	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Comm. Bay	Surface	8	5	63	0.0047	0.0047	0.0048	0.010	0.034	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	5	63	0.0047	0.0047	0.0048	0.010	0.034	ug/L	
	Sinclair/Dyes Inlet	Surface	8	5	63	0.0047	0.0047	0.0048	0.010	0.034	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	160	152	95	0.00035	0.0024	0.0026	0.0037	0.034	ug/L	
	Basins	Surface	152	147	97	0.00035	0.0024	0.0026	0.0028	0.023	ug/L	
	Urban Bays	Surface	8	5	63	0.0047	0.0047	0.0048	0.010	0.034	ug/L	
	SJF/SOG	Surface	9	9	100	0.00035	0.00035	0.0037	0.0037	0.0039	ug/L	
Fluorene	Admiralty Inlet	Deep	8	8	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Deep	68	68	100	0.00035	0.0024	0.0024	0.0037	0.0048	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.00035	0.00035	0.0020	0.0037	0.0037	ug/L	
	Main Basin	Deep	39	39	100	0.00035	0.0024	0.0024	0.0047	0.0048	ug/L	
	The Narrows	Deep	68	68	100	0.00035	0.0024	0.0024	0.0037	0.0048	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.00035	0.0021	0.0038	0.0038	0.0038	ug/L	
	Whidbey Basin	Deep	14	14	100	0.00035	0.0024	0.0024	0.0033	0.0038	ug/L	
	Comm. Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	76	100	0.00035	0.0024	0.0024	0.0047	0.0048	ug/L	
	Basins	Deep	68	68	100	0.00035	0.0024	0.0024	0.0037	0.0048	ug/L	
	Urban Bays	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	SJF/SOG	Deep	9	9	100	0.00035	0.00035	0.0037	0.0038	0.0039	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table C-26. Statistical summary of Indeno(1,2,3-cd)pyrene data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Indeno(1,2,3-cd)pyrene	Admiralty Inlet	Surface	4	4	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Hood Canal (North)	Surface	152	152	100	0.0010	0.012	0.012	0.013	0.054	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.0010	0.0010	0.0010	0.0010	0.0010	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	139	139	100	0.0010	0.012	0.013	0.013	0.054	ug/L	
	The Narrows	Surface	152	152	100	0.0010	0.012	0.012	0.013	0.054	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.0010	0.0010	0.0010	0.0010	0.0010	ug/L	
	Whidbey Basin	Surface	4	4	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Comm. Bay	Surface	8	8	100	0.047	0.047	0.047	0.047	0.049	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	8	100	0.047	0.047	0.047	0.047	0.049	ug/L	
	Sinclair/Dyes Inlet	Surface	8	8	100	0.047	0.047	0.047	0.047	0.049	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	160	160	100	0.0010	0.012	0.013	0.013	0.054	ug/L	
	Basins	Surface	152	152	100	0.0010	0.012	0.012	0.013	0.054	ug/L	
	Urban Bays	Surface	8	8	100	0.047	0.047	0.047	0.047	0.049	ug/L	
	SJF/SOG	Surface	9	9	100	0.0010	0.0010	0.0010	0.0010	0.0010	ug/L	
Indeno(1,2,3-cd)pyrene	Admiralty Inlet	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Hood Canal (North)	Deep	68	68	100	0.0010	0.012	0.012	0.012	0.048	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.0010	0.0010	0.0010	0.0010	0.0010	ug/L	
	Main Basin	Deep	39	39	100	0.0010	0.012	0.012	0.047	0.048	ug/L	
	The Narrows	Deep	68	68	100	0.0010	0.012	0.012	0.012	0.048	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.0010	0.0010	0.0010	0.0010	0.0010	ug/L	
	Whidbey Basin	Deep	14	14	100	0.0010	0.0010	0.012	0.012	0.012	ug/L	
	Comm. Bay	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	76	100	0.0010	0.012	0.012	0.047	0.048	ug/L	
	Basins	Deep	68	68	100	0.0010	0.012	0.012	0.012	0.048	ug/L	
	Urban Bays	Deep	8	8	100	0.047	0.047	0.047	0.047	0.048	ug/L	
	SJF/SOG	Deep	9	9	100	0.0010	0.0010	0.0010	0.0010	0.0011	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table C-27. Statistical summary of Naphthalene data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Naphthalene	Admiralty Inlet	Surface	4	4	100	0.0060	0.0060	0.0060	0.0060	0.0060	ug/L	
	Hood Canal (North)	Surface	140	123	88	0.00055	0.0060	0.0065	0.012	0.088	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.00055	0.00055	0.00055	0.012	0.016	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	127	110	87	0.00055	0.0060	0.0065	0.012	0.088	ug/L	
	The Narrows	Surface	140	123	88	0.00055	0.0060	0.0065	0.012	0.088	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.00055	0.00058	0.00060	0.0081	0.016	ug/L	
	Whidbey Basin	Surface	4	4	100	0.0060	0.0060	0.0060	0.0060	0.0060	ug/L	
	Comm. Bay	Surface	8	5	63	0.012	0.012	0.012	0.030	0.081	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	5	63	0.012	0.012	0.012	0.030	0.081	ug/L	
	Sinclair/Dyes Inlet	Surface	8	5	63	0.012	0.012	0.012	0.030	0.081	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	148	128	86	0.00055	0.0060	0.0065	0.012	0.088	ug/L	
	Basins	Surface	140	123	88	0.00055	0.0060	0.0065	0.012	0.088	ug/L	
	Urban Bays	Surface	8	5	63	0.012	0.012	0.012	0.030	0.081	ug/L	
	SJF/SOG	Surface	9	9	100	0.00055	0.00055	0.00055	0.016	0.016	ug/L	
Naphthalene	Admiralty Inlet	Deep	8	8	100	0.0060	0.0060	0.0060	0.0060	0.006	ug/L	
	Hood Canal (North)	Deep	68	67	99	0.00055	0.0060	0.0060	0.012	0.021	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.00055	0.00055	0.00055	0.0043	0.016	ug/L	
	Main Basin	Deep	39	38	97	0.00055	0.0060	0.0060	0.012	0.021	ug/L	
	The Narrows	Deep	68	67	99	0.00055	0.0060	0.0060	0.012	0.021	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.00055	0.00055	0.00055	0.0083	0.016	ug/L	
	Whidbey Basin	Deep	14	14	100	0.00055	0.0019	0.0060	0.0060	0.016	ug/L	
	Comm. Bay	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	75	99	0.00055	0.0060	0.0060	0.012	0.021	ug/L	
	Basins	Deep	68	67	99	0.00055	0.0060	0.0060	0.012	0.021	ug/L	
	Urban Bays	Deep	8	8	100	0.012	0.012	0.012	0.012	0.012	ug/L	
	SJF/SOG	Deep	9	9	100	0.00055	0.00055	0.00060	0.016	0.017	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table C-28. Statistical summary of Phenanthrene data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution*
Phenanthrene	Admiralty Inlet	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Surface	139	107	77	0.0012	0.0024	0.0026	0.0048	0.048	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.0012	0.0017	0.0030	0.0031	0.0032	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	126	94	75	0.0012	0.0024	0.0026	0.0052	0.048	ug/L	
	The Narrows	Surface	139	107	77	0.0012	0.0024	0.0026	0.0048	0.048	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.0012	0.0021	0.0030	0.0031	0.0032	ug/L	
	Whidbey Basin	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Comm. Bay	Surface	8	2	25	0.0047	0.0087	0.016	0.023	0.085	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	2	25	0.0047	0.0087	0.016	0.023	0.085	ug/L	
	Sinclair/Dyes Inlet	Surface	8	2	25	0.0047	0.0087	0.016	0.023	0.085	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	147	109	74	0.0012	0.0024	0.0026	0.0052	0.085	ug/L	
	Basins	Surface	139	107	77	0.0012	0.0024	0.0026	0.0048	0.048	ug/L	
	Urban Bays	Surface	8	2	25	0.0047	0.0087	0.016	0.023	0.085	ug/L	
	SJF/SOG	Surface	9	9	100	0.0012	0.0012	0.0030	0.0031	0.0032	ug/L	
Phenanthrene	Admiralty Inlet	Deep	8	8	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Deep	68	67	99	0.0012	0.0024	0.0024	0.0031	0.0057	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.0012	0.0012	0.0021	0.0030	0.0031	ug/L	
	Main Basin	Deep	39	38	97	0.0012	0.0024	0.0024	0.0047	0.0057	ug/L	
	The Narrows	Deep	68	67	99	0.0012	0.0024	0.0024	0.0031	0.0057	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.0012	0.0022	0.0031	0.0031	0.0031	ug/L	
	Whidbey Basin	Deep	14	14	100	0.0012	0.0024	0.0024	0.0029	0.0031	ug/L	
	Comm. Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	75	99	0.0012	0.0024	0.0024	0.0047	0.0057	ug/L	
	Basins	Deep	68	67	99	0.0012	0.0024	0.0024	0.0031	0.0057	ug/L	
	Urban Bays	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	SJF/SOG	Deep	9	9	100	0.0012	0.0013	0.0030	0.0031	0.0032	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Table C-29. Statistical summary of Pyrene data in the surface and deep water column layers for the model regions.

Contaminant	Region	Water Column Layer	N	#NDs	%NDs	Min.	25th %tile	Median	75th %tile	Max.	Units	Regional Substitution *
Pyrene	Admiralty Inlet	Surface	4	3	75	0.0024	0.0024	0.0024	0.0031	0.0052	ug/L	
	Hood Canal (North)	Surface	152	141	93	0.0009	0.0024	0.0026	0.0028	0.032	ug/L	Basins (Surface Layer)
	Hood Canal (South)	Surface	6	6	100	0.0009	0.00090	0.00090	0.0010	0.0010	ug/L	Hood South (Full Water Column)
	Main Basin	Surface	139	129	93	0.0009	0.0024	0.0026	0.0032	0.032	ug/L	
	The Narrows	Surface	152	141	93	0.0009	0.0024	0.0026	0.0028	0.032	ug/L	Basins (Surface Layer)
	South Sound	Surface	3	3	100	0.0009	0.00090	0.00090	0.00093	0.0010	ug/L	
	Whidbey Basin	Surface	4	4	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Comm. Bay	Surface	8	4	50	0.0047	0.0047	0.0079	0.013	0.039	ug/L	Urban Bays (Surface Layer)
	Elliott Bay	Surface	8	4	50	0.0047	0.0047	0.0079	0.013	0.039	ug/L	
	Sinclair/Dyes Inlet	Surface	8	4	50	0.0047	0.0047	0.0079	0.013	0.039	ug/L	Urban Bays (Surface Layer)
	All Regions	Surface	160	145	91	0.0009	0.0024	0.0026	0.0047	0.039	ug/L	
	Basins	Surface	152	141	93	0.0009	0.0024	0.0026	0.0028	0.032	ug/L	
	Urban Bays	Surface	8	4	50	0.0047	0.0047	0.0079	0.013	0.039	ug/L	
	SJF/SOG	Surface	9	9	100	0.0009	0.00090	0.00090	0.0010	0.0010	ug/L	
Pyrene	Admiralty Inlet	Deep	8	8	100	0.0024	0.0024	0.0024	0.0024	0.0024	ug/L	
	Hood Canal (North)	Deep	68	68	100	0.0009	0.0024	0.0024	0.0024	0.0048	ug/L	Basins (Deep Layer)
	Hood Canal (South)	Deep	4	4	100	0.0009	0.00090	0.0010	0.0010	0.0010	ug/L	
	Main Basin	Deep	39	39	100	0.0009	0.0024	0.0024	0.0047	0.0048	ug/L	
	The Narrows	Deep	68	68	100	0.0009	0.0024	0.0024	0.0024	0.0048	ug/L	Basins (Deep Layer)
	South Sound	Deep	3	3	100	0.0009	0.00090	0.00090	0.0010	0.0010	ug/L	
	Whidbey Basin	Deep	14	14	100	0.0009	0.00093	0.0024	0.0024	0.0024	ug/L	
	Comm. Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	Elliott Bay	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	Sinclair/Dyes Inlet	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	Urban Bays (Deep Layer)
	All Regions	Deep	76	76	100	0.0009	0.0024	0.0024	0.0047	0.0048	ug/L	
	Basins	Deep	68	68	100	0.0009	0.0024	0.0024	0.0024	0.0048	ug/L	
	Urban Bays	Deep	8	8	100	0.0047	0.0047	0.0047	0.0047	0.0048	ug/L	
	SJF/SOG	Deep	9	9	100	0.0009	0.00090	0.00090	0.0010	0.0011	ug/L	

* Where regional substitutions have been made, all statistics shown (including the number of samples, N, and non-detects, ND) are from the substituted region.

Appendix D. Updates to Water-Air Exchange Functions

In the fate and transport model, the transfer[5] of hydrophobic organic contaminants (HOCs) from the dissolved phase in water to the vapor phase in air is described by the volatilization rate constant, k_V (d^{-1}):

$$k_V = S_{AW} * \phi_{DW} * V_E / V_W$$

where ϕ_{DW} is the fraction of freely dissolved HOC in the bulk water available for volatilization, S_{AW}/V_W is the surface area-to-volume ratio of the water body (m^{-1}), and V_E is the volatilization mass transfer coefficient (m/day). The V_E is based on two-film model theory[6] in which the transport of HOC across the air-water interface is limited by the rate of molecular diffusion across the two layers (Liss and Slater, 1974; Whitman, 1923):

$$1 / V_E = 1 / V_{EW} + 1 / (K_{AW} * V_{EA})$$

where V_{EW} and V_{EA} (m/day) are the water-side and air-side mass transfer coefficients, respectively, and K_{AW} is the temperature- and salinity-adjusted dimensionless Henry's law constant for the modeled HOC.

The fate and transport model developed by Pelletier and Mohamedali (2009) and the Davis (2004) model on which it was based did not include routines to calculate the water- and air-side mass transfer coefficients; instead, those variables were determined externally by the user and entered as model inputs (constants). For the present study, routines were added to the PSRTM code to provide the capability to compute the water- and air-side mass transfer coefficients, dimensionless Henry's law constant, and volatilization mass transfer velocity at each time step during model run execution. Inputs to the routines include instantaneous conditions (water temperature and salinity, wind speed) and HOC-specific chemical characteristics (e.g., molecular weight, LeBas molar volume, Henry's law constant, enthalpy of water-air phase change).

The equations and variables used to derive the mass transfer coefficients are given in Table D-1 and are discussed below. Equations were adapted from Hornbuckle et al. (1994), with modifications based on recommendations in the literature (e.g., Johnson, 2010). The general approach uses empirical relationships to calculate the mass transfer of carbon dioxide (CO_2) across the water-side film and water vapor across the air-side film, and then corrects for the molecular diffusivities of HOC in water and air, respectively (Schwarzenbach et al., 2003; Hornbuckle et al., 1994).

For demonstration purposes, Tables D-2 through D-4 list the entire suite of variables involved in the derivation of the volatilization mass transfer velocity for the low molecular weight PAH Acenaphthene at several hypothetical conditions of water temperature, salinity, and wind speed.

[5] The PSRTM and related models in the literature (e.g., DeGasperi et al., 2014; Davis, 2004) assume that the concentration of HOC in the air is so low that only transfer from water to air needs to be considered; HOC transport across the air-water interface is therefore assumed to be uni-directional from water to air.

[6] While not mechanistically accurate in terms of the physical processes that occur at the interface, the two-film approach has been widely applied to estimate HOC exchange across the air-water interface (e.g., Odabasi et al., 2008; Wurl et al., 2006; Hornbuckle et al., 1994; Achman et al., 1993).

Water-side mass transfer

The mass transfer of HOC through the water film at the air-water interface was derived through correlation with the mass transfer velocity of CO_2. Sweeney et al. (2007) described variation in the mass transfer of CO_2 as a function of wind speed assuming a Schmidt number of 660 in seawater at 20 degrees Celsius. At each time step the Sweeney equation was used to calculate the mass transfer coefficient of CO_2 given the instantaneous winds. The molecular diffusivity of HOC in water was calculated using the Hayduk and Laudie method (Tucker and Nelken, 1982) and converted to the unitless Schmidt number using the kinematic viscosity of water at the ambient temperature and salinity (Schwarzenbach et al., 2003). Following Hornbuckle et al. (1994), the mass transfer velocity of CO_2 and the ratio of the Schmidt numbers for HOC and CO_2 were used to determine the water-side mass transfer coefficient of the HOC.

Air-side mass transfer

Transport of HOC across the air film was estimated through correlation with the mass transfer velocity of water vapor. At each time step the water vapor mass transfer velocity was calculated given the present wind speed according to Schwarzenbach et al. (2003). The molecular diffusivity of water vapor in air was calculated following the Fuller, Schettler, and Giddings (FSG) method, while the diffusivity of HOC in air was derived using both the FSG method and the Wilke and Lee (WL) method and was assigned the average (Tucker and Nelken, 1982). As in Hornbuckle et al. (1994), the mass transfer velocity of water vapor and the diffusivities of HOC and water vapor were used to determine the air-side mass transfer coefficient of the HOC.

Henry's law constant

The Henry's law constant, H, describes equilibrium partitioning of the HOC between the liquid and gaseous phases (see Table F-1 for HOC-specific values). The H has a significant non-linear temperature dependence; for example, Burkhard et al. (1985) predicted an order of magnitude increase of H with a 25°C increase in temperature. The variation of Henry's law constant as a function of temperature was modeled with the van't Hoff equation, assuming a constant enthalpy of phase change over the temperature range of concern. At each time step, the integrated form of the van't Hoff equation given in ten Hulscher et al. (1992) and Bamford et al. (1999) was used to adjust the Henry's law constant to the present condition of water temperature.

Water salinity also influences the solubility (and therefore the equilibrium partitioning) of organic compounds. The temperature-adjusted Henry's law constant was further adjusted to ambient conditions for salinity using the Setschenow equation given by Xie et al. (1997) assuming an empirical proportionality constant ("Setschenow constant") of 0.0018 L/cm^3.

After correcting for the prevailing water temperature and salinity, the Henry's law constant was converted to the *dimensionless* Henry's law constant, K_{AW}, following Schwarzenbach et al. (2003) and Hornbuckle et al. (1994). The K_{AW} was then used with the water- and air-side mass transfer coefficients to compute the volatilization mass transfer velocity.

Table D-1. Equations used for water-air exchange functions in the fate and transport model.

Variable	Symbol	Units	Example Value	Equation	References and Comments
Physical Characteristics at the Air-Water Interface					
Water temperature	T_C	°C	10		Instantaneous conditions
Water salinity	S	psu	30		Instantaneous conditions
Temperature at interface (water temp. is used by convention)	T	K	283.15	$T = T_C + 273.15$	See p. 919 of Schwarzenbach et al. (2003)
Density of water at T and S	ρ_w	g/m^3	1.023E+06		Eqn 8 of Sharqawy et al. (2010)
Dynamic viscosity of water at T and S	n_w	g/(m s)	1.382		Eqn 22 of Sharqawy et al. (2010)
Kinematic viscosity of water at T and S	v_w	cm^2/s	0.01351	$v_w = n_w / \rho_w \times 10000$	Gill (1982); units converted from m^2/s to cm^2/s
Air pressure	P	atm	1		Assumed for sea level; see p. 262 of Johnson (2010)
Wind speed measured at height z	U_z	m/s	4.42	$U_z =$ monthly average U_z	Data (2000-2012) from region-specific weather stations
Height of wind speed measurement	z	m	12.8		Metadata from region-specific weather stations
Average wind speed at 10 m reference height	U_{10}	m/s	4.32	$U_{10} = U_z \times ([\ln(10) + 8.1] / [\ln(z) + 8.1])$	Eqn 20-14 of Schwarzenbach et al. (2003)
Water-Side Mass Transfer					
Molecular diffusivity of HOC in water at T and S	$D_{w,HOC}$	cm^2/s	4.40E-06	$D_{w,HOC} = (13.26 \times 10^{-5}) / (n_w^{1.14} \times V'_{HOC}{}^{0.589})$	Hayduk and Laudie method from Eqn 17-24 of Tucker and Nelken (1982); see also Eqn 18-53 of Schwarzenbach et al. (2003)
Schmidt number for HOC in water	$Sc_{w,HOC}$	unitless	3068	$Sc_{w,HOC} = v_w / D_{w,HOC}$	Eqn 20-23 of Schwarzenbach et al. (2003)
Schmidt number for CO_2 in water	$Sc_{w,CO2}$	unitless	660	$Sc_{w,CO2} = 660$	Sweeney et al. (2007) for seawater at 20°C
Water-side mass transfer coefficient for CO_2	$k_{w,CO2}$	cm/h	5.03	$k_{w,CO2} = 0.27 \times U_{10}^2$	Table 1 of Sweeney et al. (2007)
Water-side mass transfer coefficient for the HOC	$k_{w,HOC}$	m/day	0.560	$k_{w,HOC} = k_{w,CO2} \times (Sc_{w,HOC} / Sc_{w,CO2})^{-0.5} / 100 \times 24$	Eqn 10 of Hornbuckle et al. (1994); see also Table 20.4 of Schwarzenbach et al. (2003); units converted from cm/h to m/day

Table D-1 (continued). Equations used for water-air exchange functions in the fate and transport model.

Variable	Symbol	Units	Example Value	Equation	References and Comments
Air-Side Mass Transfer					
Molecular weight of air	M_a	g/mol	28.97		Table 17-3 of Tucker and Nelken (1982)
Molecular weight of gaseous HOC	M_{HOC}	g/mol	154.20		See Table F-1 of this report
Molecular weight descriptor (reciprocal of the reduced mass)	M_r	g^{-1}	0.041	$M_r = (M_a + M_{HOC}) / (M_a \times M_{HOC})$	Eqn 17-10 of Tucker and Nelken (1982)
Molar volume of the gases in air	V_a	cm^3/mol	20.1		Table 17-3 of Tucker and Nelken (1982)
LeBas molar volume of the HOC	V'_{HOC}	cm^3/mol	173.1	$V'_{HOC} = \Sigma$ (HOC additive volume increments)	Table 17-5 of Tucker and Nelken (1982); see also Table F-1 of this report
Molar volume of gaseous HOC	V_{HOC}	cm^3/mol	151.4625	$V_{HOC} = 0.875 \times V'_{HOC}$	Eqn 17-13 of Tucker and Nelken (1982)
Theoretical diffusion coefficient	B'	cm^2/s	0.00207	$B' = 0.00217 - 0.00050 \times \mathrm{sqrt}[(1/M_a) + (1/M_{HOC})]$	Eqn 17-15 of Tucker and Nelken (1982)
Characteristic length of molecule	σ_{AB}	Å	5.144	$\sigma_{AB} = [3.711 + (1.18 \times V'_{HOC}{}^{1/3})] / 2$	Eqn 17-20 of Tucker and Nelken (1982)
Collision integral *	Ω	--	1.29	$\Omega = [a/(T^*)^b] + [c/e^{(d \times T^*)}] + [e/e^{(f \times T^*)}] + [g/e^{(h \times T^*)}]$	Eqn 17-16 of Tucker and Nelken (1982)
Constant in eqn. for collision integral	T*	K	1.269	$T^* = T / (\epsilon/k)_{AB}$	Eqn 17-17 of Tucker and Nelken (1982)
Boiling point of the HOC	T_b	K	550.65		See Table F-1 of this report
Ratio of energy of attraction and the Boltzmann constant	$(\epsilon/k)_{AB}$	K	223.10	$(\epsilon/k)_{AB} = \mathrm{sqrt}(78.6 \times 1.15 \times T_b)$	Eqn 17-18 of Tucker and Nelken (1982)
Molecular diffusivity of HOC in air: FSG method	$D_{a,HOC\ (FSG)}$	cm^2/s	0.061	$D_{a,HOC\ (FSG)} = [0.001 \times T^{1.75} \times \mathrm{sqrt}(M_r)] / [P\ (V_a{}^{1/3} + V_{HOC}{}^{1/3})^2]$	Eqn 17-12 of Tucker and Nelken (1982); see also Eqn 18-44 of Schwarzenbach et al. (2003)
Molecular diffusivity of HOC in air: WL method	$D_{a,HOC\ (WL)}$	cm^2/s	0.059	$D_{a,HOC\ (WL)} = [B' \times T^{3/2} \times \mathrm{sqrt}(M_r)] / [P \times \sigma_{AB}{}^2 \times \Omega]$	Eqn 17-14 of Tucker and Nelken (1982)
Molecular diffusivity of HOC in air: (average of FSG and WL)	$D_{a,HOC}$	cm^2/s	0.060	$D_{a,HOC} = [D_{a,HOC\ (FSG)} + D_{a,HOC\ (WL)}] / 2$	See p. 9 of Greenfield and Davis (2004)
Molecular diffusivity of water vapor in air: FSG method	$D_{a,H2O\ (FSG)}$	cm^2/s	0.238	$D_{a,H2O\ (FSG)} = 0.26 \times (T / 298.15)^{1.75}$	M. Odabasi (personal communication, 2009), derived from Eqn 17-12 of Tucker and Nelken (1982) and p. 916 of Schwarzenbach et al. (2003)
Air-side mass transfer coefficient for water vapor	$k_{a,H2O}$	cm/s	1.164	$k_{a,H2O} = 0.2 \times U_{10} + 0.3$	Eqn 20-15 of Schwarzenbach et al. (2003)
Air-side mass transfer coefficient for HOC	$k_{a,HOC}$	m/day	433	$k_{a,HOC} = k_{a,H2O} \times (D_{a,HOC} / D_{a,H2O\ (FSG)})^{0.61} / 100x60x60x24$	Eqn 8 of Hornbuckle et al. (1994); see also Table 20.4 of Schwarzenbach et al. (2003); units converted from cm/s to m/day

* Constants used to calculate the collision integral, Ω, were as follows: a=1.06036, b=0.15610, c=0.19300, d=0.47635, e=1.03587, f=1.52996, g=1.7674, and h=3.89411.

Table D-1 (continued). Equations used for water-air exchange functions in the fate and transport model.

Variable	Symbol	Units	Example Value	Equation	References and Comments
Volatilization Mass Transfer					
Enthalpy of volatilization	ΔH^o	J/mol	51900		See Table F-2 of this report
Henry's law constant at reference temperature T_1 and salinity S_1	H_1	Pa m^3/mol	14.265		See Table F-2 of this report
Reference temp. for Henry's law constant H_1	T_1	K	298.15		See Table F-2 of this report
Reference salinity for Henry's law constant H_1	S_1	psu	0		See Table F-2 of this report
Universal gas constant	R	J/(K mol)	8.314462		Assumed
Henry's law constant adjusted for T	H_2	Pa m^3/mol	4.4686	$H_2 = (T_2/T_1) \times H_1 \times \exp(\Delta H^o / R \times (1/T_1 - 1/T_2))$	Eqn 9 of ten Hulscher et al. (1992) and Eqn 9 of Bamford et al. (1999); derived from the van't Hoff equation
Setschenow proportionality constant	S_{PC}	L/cm^3	0.0018		Xie et al. (1997) and D. Mackay (personal communication, 2009)
Molar concentration of seawater at 35 psu	C_{35}	mol/L	0.5		Xie et al. (1997)
Henry's law constant adjusted for T and S	H	Pa m^3/mol	6.0772	$H = H_2 \times 10^{\wedge}(S_{PC} \times V'_{HOC} \times C_{35} \times S / 35)$	Xie et al. (1997) and D. Mackay (personal communication, 2009)
Air-water partition coefficient at T and S	H'	unitless	0.002581	$H' = H / (R \times T)$	Eqn 6-15 of Schwarzenbach et al. (2003); see also Eqn 4 of Hornbuckle et al. (1994)

CO_2 = Carbon dioxide.
Eqn = Equation.
FSG = Fuller, Schettler, and Gidding method.
HOC = Hydrophobic organic contaminant.
WL = Wilke and Lee method.

Table D-2. Mass transfer variables calculated at hypothetical field conditions where water temperature = 10°C, water salinity = 30 psu, and wind speed = 4.00 m/s measured at a height of 12.5 m.

Chemical Name	Diffusivity In Water $D_{w,HOC}$ (cm^2/s)	Schmidt Number $Sc_{w,HOC}$ (unitless)	Water-Side Mass Transfer Coefficient $k_{w,HOC}$ (m/day)	Diffusivity In Air $D_{a,HOC}$ (cm^2/s)	Air-Side Mass Transfer Coefficient $k_{a,HOC}$ (m/day)	Adjusted Henry's Law Constant H ($Pa\ m^3/mol$)	Volatilization Mass Transfer Coefficient V_E (m/day)
PCB-003	3.98E-06	3394	0.438	0.055	381	9.537	0.341
PCB-008	3.76E-06	3593	0.426	0.052	368	9.484	0.331
PCB-015	3.76E-06	3593	0.426	0.051	368	7.268	0.310
PCB-028	3.57E-06	3785	0.415	0.049	357	14.186	0.348
PCB-029	3.57E-06	3785	0.415	0.049	357	13.735	0.346
PCB-031	3.57E-06	3785	0.415	0.049	357	13.965	0.347
PCB-052	3.40E-06	3971	0.405	0.047	347	13.165	0.335
PCB-061	3.40E-06	3971	0.405	0.047	347	7.778	0.299
PCB-101	3.26E-06	4150	0.396	0.045	338	8.124	0.296
PCB-105	3.26E-06	4150	0.396	0.045	338	3.987	0.234
PCB-118	3.26E-06	4150	0.396	0.045	338	4.263	0.241
PCB-138	3.12E-06	4324	0.388	0.043	330	10.978	0.310
PCB-153	3.12E-06	4324	0.388	0.043	330	7.048	0.279
PCB-155	3.12E-06	4324	0.388	0.043	330	39.229	0.363
PCB-180	3.01E-06	4494	0.381	0.041	323	2.997	0.198
PCB-194	2.90E-06	4659	0.374	0.040	316	1.670	0.140
Mono-BDE	3.85E-06	3512	0.431	0.053	377	6.740	0.308
Di-BDE	3.62E-06	3729	0.418	0.050	363	3.142	0.225
Tri-BDE	3.43E-06	3937	0.407	0.048	352	1.464	0.142
Tetra-BDE	3.27E-06	4138	0.397	0.046	343	0.566	0.068
Penta-BDE	3.12E-06	4332	0.388	0.044	335	0.225	0.029
Hexa-BDE	2.99E-06	4521	0.380	0.042	327	0.108	0.014
Hepta-BDE	2.87E-06	4704	0.372	0.041	320	0.070	0.009
Octa-BDE	2.77E-06	4882	0.365	0.040	314	0.033	0.004
Nona-BDE	2.67E-06	5056	0.359	0.038	308	0.015	0.002
Deca-BDE	2.59E-06	5225	0.353	0.037	303	0.007	0.001
Acenaphthene	4.40E-06	3068	0.461	0.060	404	6.077	0.320
Acenaphthylene	4.52E-06	2990	0.467	0.061	409	4.029	0.280
Anthracene	4.08E-06	3308	0.444	0.055	385	2.045	0.191
Fluorene	4.20E-06	3220	0.450	0.057	393	4.206	0.274
Naphthalene	4.84E-06	2793	0.483	0.066	428	21.946	0.431
Phenanthrene	4.05E-06	3332	0.442	0.055	383	1.922	0.183
Benzo(a)anthracene	3.54E-06	3817	0.413	0.048	353	0.229	0.032
Benzo(a)pyrene	3.42E-06	3946	0.406	0.046	345	0.053	0.008
Benzo(b)fluoranthene	3.40E-06	3977	0.405	0.046	344	0.038	0.005
Benzo(g,h,i)perylene	3.32E-06	4073	0.400	0.045	338	0.038	0.005
Benzo(k)fluoranthene	3.40E-06	3977	0.405	0.046	344	0.031	0.004
Chrysene	3.54E-06	3817	0.413	0.048	353	0.064	0.009
Dibenzo(a,h)anthracene	3.17E-06	4261	0.391	0.043	331	0.004	0.001
Fluoranthene	3.85E-06	3508	0.431	0.052	371	0.575	0.075
Indeno(1,2,3-cd)pyrene	3.29E-06	4102	0.399	0.045	338	0.041	0.006
Pyrene	3.89E-06	3474	0.433	0.053	374	0.739	0.092

Table D-3. Mass transfer variables calculated at hypothetical field conditions where water temperature = 15°C, water salinity = 30 psu, and wind speed = 4.00 m/s measured at a height of 12.5 m.

Chemical Name	Diffusivity In Water $D_{w,HOC}$ (cm^2/s)	Schmidt Number $Sc_{w,HOC}$ (unitless)	Water-Side Mass Transfer Coefficient $k_{w,HOC}$ (m/day)	Diffusivity In Air $D_{a,HOC}$ (cm^2/s)	Air-Side Mass Transfer Coefficient $k_{a,HOC}$ (m/day)	Adjusted Henry's Law Constant H (Pa m^3/mol)	Volatilization Mass Transfer Coefficient V_E (m/day)
PCB-003	4.65E-06	2541	0.506	0.056	382	14.334	0.415
PCB-008	4.39E-06	2690	0.492	0.053	369	14.465	0.403
PCB-015	4.39E-06	2690	0.492	0.053	369	11.134	0.382
PCB-028	4.17E-06	2834	0.480	0.051	357	21.149	0.416
PCB-029	4.17E-06	2834	0.480	0.051	357	21.545	0.417
PCB-031	4.17E-06	2834	0.480	0.051	357	21.954	0.418
PCB-052	3.97E-06	2972	0.468	0.048	347	19.918	0.403
PCB-061	3.97E-06	2972	0.468	0.048	347	12.827	0.374
PCB-101	3.80E-06	3107	0.458	0.046	338	13.368	0.369
PCB-105	3.80E-06	3107	0.458	0.046	338	6.556	0.306
PCB-118	3.80E-06	3107	0.458	0.046	338	7.016	0.313
PCB-138	3.65E-06	3237	0.449	0.044	330	17.998	0.380
PCB-153	3.65E-06	3237	0.449	0.044	330	11.856	0.352
PCB-155	3.65E-06	3237	0.449	0.044	330	65.704	0.428
PCB-180	3.51E-06	3364	0.440	0.043	323	5.072	0.268
PCB-194	3.39E-06	3487	0.432	0.041	317	2.849	0.201
Mono-BDE	4.49E-06	2629	0.498	0.055	377	11.083	0.387
Di-BDE	4.23E-06	2792	0.483	0.052	363	5.166	0.299
Tri-BDE	4.01E-06	2947	0.470	0.049	352	2.408	0.202
Tetra-BDE	3.81E-06	3098	0.459	0.047	343	0.992	0.108
Penta-BDE	3.64E-06	3243	0.448	0.045	335	0.416	0.051
Hexa-BDE	3.49E-06	3384	0.439	0.044	327	0.198	0.026
Hepta-BDE	3.35E-06	3521	0.430	0.042	320	0.115	0.015
Octa-BDE	3.23E-06	3654	0.422	0.041	314	0.053	0.007
Nona-BDE	3.12E-06	3785	0.415	0.040	308	0.025	0.003
Deca-BDE	3.02E-06	3912	0.408	0.039	303	0.012	0.001
Acenaphthene	5.14E-06	2297	0.533	0.062	404	9.067	0.395
Acenaphthylene	5.28E-06	2238	0.540	0.063	410	6.024	0.354
Anthracene	4.77E-06	2476	0.513	0.057	385	2.982	0.248
Fluorene	4.90E-06	2410	0.520	0.059	393	6.133	0.343
Naphthalene	5.65E-06	2091	0.558	0.068	428	31.036	0.507
Phenanthrene	4.73E-06	2495	0.511	0.057	384	2.868	0.242
Benzo(a)anthracene	4.13E-06	2857	0.478	0.050	354	0.380	0.050
Benzo(a)pyrene	4.00E-06	2954	0.470	0.048	345	0.071	0.010
Benzo(b)fluoranthene	3.97E-06	2977	0.468	0.048	344	0.054	0.008
Benzo(g,h,i)perylene	3.87E-06	3049	0.462	0.046	338	0.046	0.006
Benzo(k)fluoranthene	3.97E-06	2977	0.468	0.048	344	0.045	0.006
Chrysene	4.13E-06	2857	0.478	0.050	353	0.138	0.019
Dibenzo(a,h)anthracene	3.70E-06	3190	0.452	0.045	331	0.006	0.001
Fluoranthene	4.50E-06	2626	0.498	0.054	372	0.878	0.107
Indeno(1,2,3-cd)pyrene	3.84E-06	3071	0.461	0.046	338	0.052	0.007
Pyrene	4.54E-06	2601	0.501	0.054	374	1.032	0.122

Table D-4. Mass transfer variables calculated at hypothetical field conditions where water temperature = 10°C, water salinity = 30 psu, and wind speed = 5.50 m/s measured at a height of 12.5 m.

Chemical Name	Diffusivity In Water $D_{w,HOC}$ (cm^2/s)	Schmidt Number $Sc_{w,HOC}$ (unitless)	Water-Side Mass Transfer Coefficient $k_{w,HOC}$ (m/day)	Diffusivity In Air $D_{a,HOC}$ (cm^2/s)	Air-Side Mass Transfer Coefficient $k_{a,HOC}$ (m/day)	Adjusted Henry's Law Constant H (Pa m^3/mol)	Volatilization Mass Transfer Coefficient V_E (m/day)
PCB-003	3.98E-06	3394	0.828	0.055	485	9.537	0.583
PCB-008	3.76E-06	3593	0.805	0.052	468	9.484	0.564
PCB-015	3.76E-06	3593	0.805	0.051	468	7.268	0.517
PCB-028	3.57E-06	3785	0.784	0.049	454	14.186	0.610
PCB-029	3.57E-06	3785	0.784	0.049	454	13.735	0.605
PCB-031	3.57E-06	3785	0.784	0.049	454	13.965	0.607
PCB-052	3.40E-06	3971	0.766	0.047	441	13.165	0.584
PCB-061	3.40E-06	3971	0.766	0.047	441	7.778	0.502
PCB-101	3.26E-06	4150	0.749	0.045	430	8.124	0.498
PCB-105	3.26E-06	4150	0.749	0.045	430	3.987	0.369
PCB-118	3.26E-06	4150	0.749	0.045	430	4.263	0.382
PCB-138	3.12E-06	4324	0.734	0.043	419	10.978	0.534
PCB-153	3.12E-06	4324	0.734	0.043	419	7.048	0.463
PCB-155	3.12E-06	4324	0.734	0.043	419	39.229	0.664
PCB-180	3.01E-06	4494	0.720	0.041	410	2.997	0.303
PCB-194	2.90E-06	4659	0.707	0.040	402	1.670	0.203
Mono-BDE	3.85E-06	3512	0.814	0.053	479	6.740	0.511
Di-BDE	3.62E-06	3729	0.790	0.050	462	3.142	0.346
Tri-BDE	3.43E-06	3937	0.769	0.048	448	1.464	0.205
Tetra-BDE	3.27E-06	4138	0.750	0.046	436	0.566	0.092
Penta-BDE	3.12E-06	4332	0.733	0.044	425	0.225	0.038
Hexa-BDE	2.99E-06	4521	0.718	0.042	416	0.108	0.019
Hepta-BDE	2.87E-06	4704	0.704	0.041	407	0.070	0.012
Octa-BDE	2.77E-06	4882	0.691	0.040	399	0.033	0.005
Nona-BDE	2.67E-06	5056	0.679	0.038	392	0.015	0.003
Deca-BDE	2.59E-06	5225	0.668	0.037	385	0.007	0.001
Acenaphthene	4.40E-06	3068	0.871	0.060	513	6.077	0.526
Acenaphthylene	4.52E-06	2990	0.883	0.061	520	4.029	0.443
Anthracene	4.08E-06	3308	0.839	0.055	489	2.045	0.282
Fluorene	4.20E-06	3220	0.851	0.057	499	4.206	0.435
Naphthalene	4.84E-06	2793	0.913	0.066	544	21.946	0.774
Phenanthrene	4.05E-06	3332	0.836	0.055	487	1.922	0.270
Benzo(a)anthracene	3.54E-06	3817	0.781	0.048	449	0.229	0.041
Benzo(a)pyrene	3.42E-06	3946	0.768	0.046	438	0.053	0.010
Benzo(b)fluoranthene	3.40E-06	3977	0.765	0.046	437	0.038	0.007
Benzo(g,h,i)perylene	3.32E-06	4073	0.756	0.045	429	0.038	0.007
Benzo(k)fluoranthene	3.40E-06	3977	0.765	0.046	437	0.031	0.006
Chrysene	3.54E-06	3817	0.781	0.048	449	0.064	0.012
Dibenzo(a,h)anthracene	3.17E-06	4261	0.739	0.043	420	0.004	0.001
Fluoranthene	3.85E-06	3508	0.815	0.052	472	0.575	0.101
Indeno(1,2,3-cd)pyrene	3.29E-06	4102	0.754	0.045	429	0.041	0.007
Pyrene	3.89E-06	3474	0.819	0.053	475	0.739	0.126

Appendix E. Updates to Wind Speed Inputs

In the fate and transport model the flux of a hydrophobic organic contaminant (HOC) across the air-water interface is based on a two-film model (see Appendix D) in which the mass transport coefficients of the water- and air-side layers are each a function of wind speed. The wind speed data used by Pelletier and Mohamedali (2009) consisted of 30-year monthly averages from the Interior Columbia Basin Ecosystem Management Project (ICBEMP). Those data were deemed unusable for the present study due to the unrealistic prevalence of monthly average wind speed values equal to zero for many regions. New wind data were acquired from regional weather stations for the period 2000-2012. Measurements were converted to common units (m/s) and were transformed to a reference height of 10 m using boundary layer theory (Schwarzenbach et al., 2003, after Mackay and Yeun, 1983):

$$u_z = [(\ln z + 8.1) / 10.4] \times u_{10}$$

where z is the height (in meters) of the original wind measurement and u_z and u_{10} are wind speeds (m/s) at heights z and 10 m. Monthly averages were computed based on the daily means from all stations in a given region.

Table E-1. Weather stations from which wind speed measurements were obtained for the estimation of monthly average regional wind speeds.

Model Region	Weather Station	Location	Site Elevation (m)	Anemometer Height at Site (m)	Anemometer Elevation (m)	Period of Record Start	Period of Record End
Admiralty	MTKEYS	Keystone, Coupeville	2.7	0.0	2.7	12/5/2007	7/8/2013
	MPTWW1	Port Townsend	0.0	2.0	2.0	12/5/2007	7/8/2013
	KWAHANSV4	Skunk Bay, Hansville	12.2	0.0	12.2	2/18/2006	7/8/2013
Hood North	KWAPOULS5	Lofall	18.3	0.0	18.3	12/3/2005	7/8/2013
Hood South	KWAHOODS4	Potlatch, Hoodsport	2.7	0.0	2.7	12/30/2008	7/8/2013
Main Basin	WPOW1	Discovery Park, West Point	3.0	9.8	12.8	1/1/1984	12/31/2008
	MTSOUT	Southworth	9.8	0.0	9.8	12/5/2007	7/8/2013
The Narrows	NA	NA	NA	NA	NA	NA	NA
South Sound	KWAOLYMP30	Boston Harbor, Olympia	3.0	0.0	3.0	10/21/2007	7/8/2013
	KWAOLYMP8	Swantown Marina, Olympia	10.4	0.0	10.4	10/7/2005	7/8/2013
	KWAANDER2	Oro Bay, Anderson Island	0.0	2.0	2.0	3/9/2008	7/8/2013
	KWAGRAPE1	Jarrell Cove, Grapeview	11.9	0.0	11.9	11/28/2005	7/8/2013
	IWASHING2	Pickering Passage, Grapeview	30.5	0.0	30.5	10/20/2008	7/8/2013
Whidbey	KWACAMAN11	Bayside, Camano Is.	56.4	0.0	56.4	12/2/2009	7/8/2013
	KWACAMAN21	Cama Beach SP, Camano Is.	7.0	0.0	7.0	3/22/2012	7/8/2013
Comm. Bay	TCMW1	Tacoma Met	3.0 *	10.8	13.8	1/1/2009	12/31/2012
Elliott Bay	MEBSW1	Seattle	15.0 *	10.0	25.0	4/1/2005	12/31/2012
Sinclair/Dyes	KVWAPORT1	Crane Ave E, Port Orchard	22.9	0.0	22.9	2/22/2007	7/8/2013
	KWAPORTO10	Waterman Point, Port Orchard	15.2	0.0	15.2	10/23/2007	7/8/2013

* Site elevation approximated from photos of the station.

Table E-2. Monthly average wind speeds (m/s) used in the fate and transport model. Values are given for a uniform standard elevation of 10 meters.

Month	Admiralty Inlet	Hood Canal North	Hood Canal South	Main Basin	The Narrows *	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes Inlet
January	3.26	1.19	0.65	4.33	2.06	1.16	1.18	2.29	2.17	0.99
February	3.01	1.04	0.70	4.03	1.92	1.07	1.57	2.59	2.13	1.03
March	3.29	1.08	0.78	4.10	1.99	1.26	1.65	3.14	2.46	1.17
April	2.68	0.89	0.92	3.82	1.88	1.36	1.92	3.04	2.22	1.09
May	2.36	0.64	1.02	3.39	1.69	1.28	1.59	2.99	2.13	1.04
June	2.15	0.51	1.02	3.12	1.55	1.36	1.14	2.94	2.08	0.92
July	2.03	0.48	1.14	2.84	1.49	1.28	0.88	2.89	1.89	0.96
August	1.91	0.39	0.95	2.70	1.35	1.17	0.99	2.64	1.80	0.81
September	2.02	0.42	0.75	2.87	1.35	0.92	0.99	2.44	1.75	0.80
October	2.60	0.72	0.56	3.60	1.63	0.90	1.32	2.39	1.99	0.87
November	3.52	1.06	0.39	4.44	1.97	1.21	1.58	2.59	2.27	0.93
December	3.45	1.14	0.53	4.39	2.02	1.13	1.45	2.24	2.13	1.02

* Wind speeds for The Narrows were calculated as the average of Main Basin and South Sound winds.

Appendix F. Physical-Chemical Parameters for the Fate and Transport Model

Table F-1. Chemical characteristics used as model inputs for the fate and transport model.

Chemical Name	Chemical Class	CAS No.	# Cl atoms (PCBs), # Br atoms (PBDEs), # rings (PAHs)	Molecular Formula	Molecular Weight [a] (g/mol)	Boiling Point [b] (K)	LeBas Molar Volume [c] (cm^3/mol)
Copper	Metals	7440-50-8	NA	NA	NA	NA	NA
Lead	Metals	7439-92-1	NA	NA	NA	NA	NA
Zinc	Metals	7440-66-6	NA	NA	NA	NA	NA
PCB-003	PCB Congeners	2051-62-9	1	C12H9Cl	188.65	564.15	205.5
PCB-008	PCB Congeners	34883-43-7	2	C12H8Cl2	223.10	585.15	226.4
PCB-015	PCB Congeners	2050-68-2	2	C12H8Cl2	223.10	588.15	226.4
PCB-028	PCB Congeners	7012-37-5	3	C12H7Cl3	257.54	610.15	247.3
PCB-029	PCB Congeners	15862-07-4	3	C12H7Cl3	257.54	610.15	247.3
PCB-031	PCB Congeners	16606-02-3	3	C12H7Cl3	257.54	610.15	247.3
PCB-052	PCB Congeners	35693-99-3	4	C12H6Cl4	291.99	633.15	268.2
PCB-061	PCB Congeners	33284-53-6	4	C12H6Cl4	291.99	633.15	268.2
PCB-101	PCB Congeners	37680-73-2	5	C12H5Cl5	326.43	654.15	289.1
PCB-105	PCB Congeners	32598-14-4	5	C12H5Cl5	326.43	654.15	289.1
PCB-118	PCB Congeners	31508-00-6	5	C12H5Cl5	326.43	654.15	289.1
PCB-138	PCB Congeners	35065-28-2	6	C12H4Cl6	360.88	673.15	310.0
PCB-153	PCB Congeners	35065-27-1	6	C12H4Cl6	360.88	673.15	310.0
PCB-155	PCB Congeners	33979-03-2	6	C12H4Cl6	360.88	673.15	310.0
PCB-180	PCB Congeners	35065-29-3	7	C12H3Cl7	395.32	690.15	330.9
PCB-194	PCB Congeners	35694-08-7	8	C12H2Cl8	429.77	705.15	351.8
Mono-BDE	PBDE Homologs	101-55-3	1	C12H9BrO	249.10	NA	217.8
Di-BDE	PBDE Homologs	2050-47-7	2	C12H8Br2O	328.00	NA	241.1
Tri-BDE	PBDE Homologs	49690-94-0	3	C12H7Br3O	406.90	NA	264.4
Tetra-BDE	PBDE Homologs	40088-47-9	4	C12H6Br4O	485.79	NA	287.7
Penta-BDE	PBDE Homologs	32534-81-9	5	C12H5Br5O	564.69	NA	311.0
Hexa-BDE	PBDE Homologs	36483-60-0	6	C12H4Br6O	643.58	NA	334.3
Hepta-BDE	PBDE Homologs	68928-80-3	7	C12H3Br7O	722.48	NA	357.6
Octa-BDE	PBDE Homologs	32536-52-0	8	C12H2Br8O	801.38	NA	380.9
Nona-BDE	PBDE Homologs	63936-56-1	9	C12H1Br9O	880.27	NA	404.2
Deca-BDE	PBDE Homologs	1163-19-5	10	C12Br10O	959.17	NA	427.5
Acenaphthene	LPAHs	83-32-9	3	C12H10	154.20	550.65	173.1
Acenaphthylene	LPAHs	208-96-8	3	C12H8	150.20	543.15	165.7
Anthracene	LPAHs	120-12-7	3	C14H10	178.24	613.15	196.7
Fluorene	LPAHs	86-73-7	3	C13H10	166.23	568.15	187.9
Naphthalene	LPAHs	91-20-3	2	C10H8	128.18	491.15	147.6
Phenanthrene	LPAHs	85-01-8	3	C14H10	178.24	612.15	199.2
B(a)anthracene	HPAHs	56-55-3	4	C18H12	228.30	708.15	250.8
B(a)pyrene	HPAHs	50-32-8	5	C20H12	252.32	768.15	265.4
B(b)fluoranthene	HPAHs	205-99-2	5	C20H12	252.32	754.15	268.9
B(g,h,i)perylene	HPAHs	191-24-2	6	C22H12	276.34	798.15	280.0
B(k)fluoranthene	HPAHs	207-08-9	5	C20H12	252.32	754.15	268.9
Chrysene	HPAHs	218-01-9	4	C18H12	228.30	721.15	250.8
D(a,h)anthracene	HPAHs	53-70-3	5	C22H14	278.36	797.15	302.4
Fluoranthene	HPAHs	206-44-0	4	C16H10	202.26	648.15	217.3
I(1,2,3-cd)pyrene	HPAHs	193-39-5	6	C22H12	276.34	770.15	283.5
Pyrene	HPAHs	129-00-0	4	C16H10	202.26	633.15	213.8

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Table F-1 (continued). Chemical characteristics used as fate and transport model inputs.

HPAH = High molecular weight polycyclic aromatic hydrocarbon.
LPAH = Low molecular weight polycyclic aromatic hydrocarbon.
NA = Not available or not applicable.
PBDE = Polybrominated diphenyl ether.
PCB = Polychlorinated biphenyl.

[a] Molecular weights were calculated assuming atomic weights (g/mol) of C = 12.0107, H = 1.00794, Cl = 35.4527, Br = 79.904, and O = 15.9994.
[b] Boiling points for PCB congeners were from Mackay et al. (1992a) pages 334-567 and Table 4.1. Values for PAH compounds were from Mackay et al. (1992b) pages 62-238.
[c] LeBas molar volumes for all contaminants were calculated following Table 1.1 of Mackay et al. (1992a); for method description see Reid et al. (1977) or Tucker and Nelken (1982).

Table F-2. Chemical parameters used in the fate and transport model.

Chemical Name	Enthalpy of Air-Water Volatilization [a] (kJ/mol)	Log Kaw [b] at 25 deg C and zero salinity (unitless)	Henry's Law Constant [c] at 25 deg C and zero salinity (Pa m^3/mol)	Enthalpy of Octanol-Water [d] (kJ/mol)	Log Kow [e] at 25 deg C and zero salinity (unitless)
Copper	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA
PCB-003	52.9	-2.06	21.6	-15.3	4.61
PCB-008	54.9	-2.06	21.6	-19.0	5.11
PCB-015	55.5	-2.17	16.8	-22.8	5.35
PCB-028	51.8	-1.93	29.1	-26.6	5.66
PCB-029	58.7	-1.88	32.7	-23.8	5.65
PCB-031	59.0	-1.87	33.4	-21.5	5.78
PCB-052	53.8	-1.96	27.2	-27.5	5.95
PCB-061	65.5	-2.08	20.6	-27.5	6.14
PCB-101	65.2	-2.08	20.6	-19.3	6.38
PCB-105	65.1	-2.39	10.1	-24.4	6.78
PCB-118	65.2	-2.36	10.8	-24.5	6.65
PCB-138	64.7	-1.97	26.6	-22.2	7.19
PCB-153	68.2	-2.13	18.4	-26.6	6.86
PCB-155	67.6	-1.39	101.0	-19.4	7.21
PCB-180	69.0	-2.51	7.7	-26.1	7.15
PCB-194	70.1	-2.77	4.2	-26.0	7.76
Mono-BDE	65.1	-2.11	19.376	-15	4.89
Di-BDE	65.1	-2.46	8.665	-15	5.35
Tri-BDE	65.1	-2.81	3.875	-15	5.82
Tetra-BDE	73.9	-3.16	1.733	-20	6.28
Penta-BDE	81.4	-3.51	0.775	-20	6.75
Hexa-BDE	79.8	-3.85	0.347	-20	7.22
Hepta-BDE	64.5	-4.20	0.155	-25	7.68
Octa-BDE	64.5	-4.55	0.069	-25	8.15
Nona-BDE	64.5	-4.90	0.031	-25	8.61
Deca-BDE	64.5	-5.25	0.014	-25	9.08
Acenaphthene	51.90	-2.24	14.265	-17.5	3.95
Acenaphthylene	52.2	-2.41	9.644	-17.2	3.85
Anthracene	48.80	-2.76	4.308	-19.7	4.57
Fluorene	48.80	-2.44	9.001	-19.0	4.11
Naphthalene	44.65	-1.73	46.160	-15.7	3.40
Phenanthrene	51.90	-2.76	4.308	-19.0	4.47
B(a)anthracene	66.40	-3.59	0.637	-23.3	5.83
B(a)pyrene	36.89	-4.51	0.077	-25.4	6.05
B(b)fluoranthene	45.3	-4.58	0.065	-24.7	5.86
B(g,h,i)perylene	26.1	-4.77	0.042	-26.4	6.63
B(k)fluoranthene	49.0	-4.64	0.057	-24.7	5.86
Chrysene	100.90	-3.82	0.375	-22.7	5.67
D(a,h)anthracene	48.8	-5.52	0.008	-26.6	6.51
Fluoranthene	54.91	-3.27	1.331	-20.8	4.97
I(1,2,3-cd)pyrene	30.0	-4.70	0.049	-26.4	6.57
Pyrene	42.90	-3.27	1.331	-19.2	5.01

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Table F-2 (continued). Chemical parameters used in the fate and transport model.

C = Celsius.
Kaw = Air-water partition coefficient.
Kow = Octanol-water partition coefficient.
NA = Not applicable.
PAH = Polycyclic aromatic hydrocarbon.
PBDE = Polybrominated diphenyl ether.
PCB = Polychlorinated biphenyl.

[a] Enthalpies of air-water volatilization were from Table 2 of Schenker et al. (2005) for PCB congeners. PBDE homolog air-water enthalpies were calculated as the difference of the octanol-water and octanol-air enthalpies, following equation A7 and with enthalpies from Table 4.3 of Palm et al. (2004).

[b] Dimensionless Henry's law constants for PCB congeners were from Table 1 of Schenker et al. (2005). For PBDE homologs, values were calculated using equation A5 in Palm et al. (2004). Values for PAH compounds were from Table 1 of Ma et al. (2010), except Dibenzo(a,h)anthracene was calculated using equation 6-15 of Schwarzenbach et al. (2003).

[c] Henry's law constants were calculated from dimensionless Henry's law constants using equation 6-15 of Schwarzenbach et al. (2003). The value for Dibenzo(a,h)anthracene was from p. 237 of Mackay et al. (1992b) because no literature values for the dimensionless Henry's law constant were found.

[d] Enthalpies of octanol-water phase change were from Table 2 of Schenker et al. (2005) for PCB congeners and Table 4.3 of Palm et al. (2004) for PBDE homologs. Enthalpies for nine PAH compounds were from Table 4 of Beyer et al. (2002); linear regression of those nine enthalpies with molecular weights provided an equation (r-squared = 0.93) that was used to calculate enthalpies for the remaining seven PAH compounds (Acenaphthene, Acenaphthylene, Benzo[b]fluoranthene, Benzo[g,h,i]perylene, Benzo[k]fluoranthene, Dibenzo[a,h]anthracene, and Indeno[1,2,3-cd]pyrene).

[e] Octanol-water partition coefficients were from Table 1 of Schenker et al. (2005) for PCB congeners and were calculated using equation A4 of Palm et al. (2004) for PBDE homologs. For PAH compounds, octanol-water partition coefficients were from Table 1 of Ma et al. (2010), except the value for Dibenzo(a,h)anthracene was from p. 113 of the Supporting Information in the same document.

Table F-3. Additional chemical parameters used in the fate and transport model.

Chemical Name	Degradation [a] in Water Surface Layer (1/day)	Degradation [a] in Water Deep Layer (1/day)	Degradation [a] in Sediment Surface Layer (1/day)	Degradation [a] in Sediment Deep Layer (1/day)	Suspended Matter/Water Partition Coefficient [b] (L/kg)	Sediment/ Porewater Partition Coefficient [b] (L/kg)	DOC/ Water Partition Coefficient [b] (L/kg)
Copper	0.0	0.0	0.0	0.0	5.50E+04	1.58E+04	1.23E+05
Lead	0.0	0.0	0.0	0.0	1.55E+06	1.26E+05	3.98E+05
Zinc	0.0	0.0	0.0	0.0	6.92E+04	5.01E+03	3.98E+04
PCB-003	0.000034	0.000034	0.000034	0.000034	NA	NA	NA
PCB-008	0.000034	0.000034	0.000034	0.000034	NA	NA	NA
PCB-015	0.000034	0.000034	0.000034	0.000034	NA	NA	NA
PCB-028	0.000034	0.000034	0.000034	0.000034	NA	NA	NA
PCB-029	0.000034	0.000034	0.000034	0.000034	NA	NA	NA
PCB-031	0.000034	0.000034	0.000034	0.000034	NA	NA	NA
PCB-052	0.000034	0.000034	0.000034	0.000034	NA	NA	NA
PCB-061	0.000034	0.000034	0.000034	0.000034	NA	NA	NA
PCB-101	0.000034	0.000034	0.000034	0.000034	NA	NA	NA
PCB-105	0.000034	0.000034	0.000034	0.000034	NA	NA	NA
PCB-118	0.000034	0.000034	0.000034	0.000034	NA	NA	NA
PCB-138	0.000034	0.000034	0.000034	0.000034	NA	NA	NA
PCB-153	0.000034	0.000034	0.000034	0.000034	NA	NA	NA
PCB-155	0.000034	0.000034	0.000034	0.000034	NA	NA	NA
PCB-180	0.000034	0.000034	0.000034	0.000034	NA	NA	NA
PCB-194	0.000034	0.000034	0.000034	0.000034	NA	NA	NA
Mono-BDE	0.0185	0.0185	0.0046	0.0046	NA	NA	NA
Di-BDE	0.0116	0.0116	0.0029	0.0029	NA	NA	NA
Tri-BDE	0.0116	0.0116	0.0029	0.0029	NA	NA	NA
Tetra-BDE	0.0046	0.0046	0.0012	0.0012	NA	NA	NA
Penta-BDE	0.0046	0.0046	0.0012	0.0012	NA	NA	NA
Hexa-BDE	0.0046	0.0046	0.0012	0.0012	NA	NA	NA
Hepta-BDE	0.0046	0.0046	0.0012	0.0012	NA	NA	NA
Octa-BDE	0.0046	0.0046	0.0012	0.0012	NA	NA	NA
Nona-BDE	0.0046	0.0046	0.0012	0.0012	NA	NA	NA
Deca-BDE	0.0046	0.0046	0.0012	0.0012	NA	NA	NA
Acenaphthene	0.01	0.01	0.01	0.01	NA	NA	NA
Acenaphthylene	0.01	0.01	0.01	0.01	NA	NA	NA
Anthracene	0.01	0.01	0.01	0.01	NA	NA	NA
Fluorene	0.01	0.01	0.01	0.01	NA	NA	NA
Naphthalene	0.03	0.03	0.03	0.03	NA	NA	NA
Phenanthrene	0.01	0.01	0.01	0.01	NA	NA	NA
B(a)anthracene	0.002	0.002	0.002	0.002	NA	NA	NA
B(a)pyrene	0.0003	0.0003	0.0003	0.0003	NA	NA	NA
B(b)fluoranthene	0.0003	0.0003	0.0003	0.0003	NA	NA	NA
B(g,h,i)perylene	0.0003	0.0003	0.0003	0.0003	NA	NA	NA
B(k)fluoranthene	0.0003	0.0003	0.0003	0.0003	NA	NA	NA
Chrysene	0.002	0.002	0.002	0.002	NA	NA	NA
D(a,h)anthracene	0.0003	0.0003	0.0003	0.0003	NA	NA	NA
Fluoranthene	0.002	0.002	0.002	0.002	NA	NA	NA
I(1,2,3-cd)pyrene	0.0003	0.0003	0.0003	0.0003	NA	NA	NA
Pyrene	0.002	0.002	0.002	0.002	NA	NA	NA

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Table F-3 (continued). Additional chemical parameters used in the fate and transport model.

DOC = Dissolved organic carbon.
NA = Not applicable.
PAH = Polycyclic aromatic hydrocarbon.
PBDE = Polybrominated diphenyl ether.
PCB = Polychlorinated biphenyl.
TSS = Total suspended solids.

[a] Degradation rates for PCB congeners in water and sediment were from Table 2 of Davis (2004), originally given in Table 1 of Gobas et al. (1995). Degradation rates for PBDE homologs were calculated from first-order half-lives given in Table 4 of Wania and Dugani (2003); see also Table 2 of Oram et al. (2008). No values were given in Table 4 of Wania and Dugani (2003) for octa- and nona-BDEs, and so the degradation rates of hepta- and deca- given in that table were used. PAH compound degradation rates were from Table 4 and p. 520-521 of the text in Greenfield and Davis (2005).

[b] Metals partition coefficients were from Allison and Allison (2005) or, whenever possible, derived from Puget Sound data (2000-2012) of TSS, DOC, and total and dissolved metals concentrations.

Table F-4. Setup and physical parameters used for the fate and transport model.

Model Parameter	Value	Units	Source
Setup			
Time step	0.005	days	Pelletier and Mohamedali (2009)
Tracer load type	flow proportional	-	NA
Salt forcing in the model boundary waters	composite [a]	-	NA
River forcing	time variable [b]	-	NA
Phase partitioning in the water column	3-phase [c]	-	NA
Physical Constants and Parameters			
Reference height for wind speed data	10	m	NA
Setchenow proportionality constant	0.0018	L/cm^3	Xie et al. (1997)
Disequilibrium factor for POC partitioning in water [d]	1.0	unitless	Arnot and Gobas (2004)
Disequilibrium factor for DOC partitioning in water [d]	1.0	unitless	Arnot and Gobas (2004)
Proportionality constant for phase partitioning of POC	0.35	unitless	Arnot and Gobas (2004)
Proportionality constant for phase partitioning of DOC	0.08	unitless	Arnot and Gobas (2004)
TOC fraction in the water column	0.030	unitless	Davis (2004)
Density of organic carbon	0.9	kg/L	Condon (2007)
Density of solids in the water column	1.1	kg/L	Davis (2004)
Density of solids in the active sediment layer	2.7	kg/L	Davis (2004)
Depth (thickness) of the active sediment layer [e]	0.1	m	Pelletier and Mohamedali (2009)

DOC = Dissolved organic carbon.
POC = Particulate organic carbon.

[a] "Composite" salinity forcing uses a repeating 365-day cycle of salinity in the boundary waters for each year.
[b] "Time variable" river forcing uses a repeating 365-day cycle of river flows based on annual averages.
[c] 3-phase partitioning includes freely dissolved, DOC-sorbed, and particulate forms.
[d] A value of 1.0 represents equilibrium partitioning.
[e] The active sediment layer thickness of 10 cm is based on the interquartile range of observed sediment cores in Puget Sound and the worldwide mean reported by Boudreau (1994).

Table F-5. Water column and active sediment parameters used for the fate and transport model.

Model Parameter	Units	Admiralty Inlet	Hood North	Hood South	Main Basin	The Narrows	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes Inlet	SJF/ SOG	Source
Water Column													
Depth (thickness) of surface water layer	m	37.0	19.8	13.0	50.2	21.5	29.9	9.1	20.0	40.0	23.0	50.0	1
Depth (thickness) of deep water layer	m	63.0	38.7	62.0	98.9	21.5	38.9	60.6	76.2	42.8	34.9	42.4	1
Surface area of the air-water interface (also the total sediment area) [a]	m^2	4.112E+08	1.386E+08	2.705E+08	5.850E+08	1.350E+07	4.247E+08	6.155E+08	1.998E+07	1.957E+07	9.132E+07	-	1
Surface area of the deep water layer [b]	m^2	3.105E+08	1.118E+08	2.705E+08	3.731E+08	1.350E+07	1.712E+08	4.439E+08	1.998E+07	9.720E+06	1.080E+07	-	1
Volume of surface water layer	m^3	1.455E+10	2.573E+09	3.803E+09	2.279E+10	4.090E+08	7.098E+09	4.039E+09	4.979E+08	6.318E+08	3.299E+08	-	1
Volume of deep water layer	m^3	1.955E+10	4.323E+09	1.678E+10	3.812E+10	2.440E+08	6.666E+09	2.688E+10	1.522E+09	4.158E+08	3.775E+08	-	1
Initial salinity of surface water layer	PSU	29.4194	28.7075	27.1364	29.0825	28.80645	28.5304	25.378	27.6031	29.4413	28.8878	30.8676	1
Initial salinity of deep water layer	PSU	29.9869	29.8947	29.6604	29.5602	29.40685	29.2535	29.3381	29.5866	29.528	29.652	31.5935	1
Initial pH of surface water layer	unitless	7.7626	7.8878	7.9333	7.7825	7.8365	7.8905	8.0462	7.8357	7.7791	7.869	-	1
Initial pH of deep water layer	unitless	7.7579	7.7152	7.5613	7.7447	7.794	7.8433	7.6819	7.7326	7.731	7.7991	-	1
Concentration of POC in surface water	kg/L	1.54E-07	1.54E-07	7.50E-08	6.00E-08	1.54E-07	8.20E-08	5.50E-08	5.30E-08	5.30E-08	5.30E-08	-	2
Concentration of POC in deep water	kg/L	5.50E-08	5.50E-08	7.20E-08	6.00E-08	5.50E-08	8.20E-08	4.90E-08	5.50E-08	5.50E-08	5.50E-08	-	2
Concentration of DOC in surface water	kg/L	9.22E-07	9.22E-07	7.32E-07	1.62E-06	9.22E-07	8.21E-07	8.88E-07	1.80E-06	1.80E-06	1.80E-06	-	2
Concentration of DOC in deep water	kg/L	7.66E-07	7.66E-07	7.12E-07	1.14E-06	7.66E-07	8.21E-07	8.08E-07	1.80E-06	1.80E-06	1.80E-06	-	2
Concentration of solids (TSS) in the surface water layer	kg/L	2.60E-06	5.00E-06	5.00E-06	2.00E-06	2.00E-06	6.50E-06	4.65E-06	5.00E-06	1.70E-06	5.00E-06	-	2
Concentration of solids (TSS) in the deep water layer	kg/L	2.40E-06	3.50E-06	4.00E-06	2.00E-06	2.10E-06	4.00E-06	2.10E-06	4.00E-06	2.40E-06	5.00E-06	-	2
Settling velocity of solids in the surface water layer [c]	m/d	10	10	10	10	10	10	10	10	10	10	-	1
Settling velocity of solids in the deep water layer [c]	m/d	10	10	10	10	10	10	10	10	10	10	-	1
Active Sediment													
TOC fraction in the AS below the surface water layer	unitless	0.0115	0.0246	0.0212	0.0041	0.0130	0.0181	0.0174	0.0126	0.0178	0.0260	-	2
TOC fraction in the AS below the deep water layer	unitless	0.0115	0.0246	0.0212	0.0041	0.0130	0.0181	0.0174	0.0126	0.0178	0.0260	-	2
Concentration of dry solids in the AS below the surface water layer [d]	kg/L	0.8202	0.8403	0.8482	0.8048	0.8383	0.8285	0.8528	0.8401	0.8167	0.8366	-	1
Concentration of dry solids in the AS below the deep water layer [d]	kg/L	0.7467	0.7951	0.7759	0.6894	0.8132	0.7831	0.7821	0.7511	0.7668	0.7958	-	1
Sediment burial velocity in the AS below the surface water layer [e]	m/d	1.096E-05	1.096E-05	1.096E-05	1.096E-05	1.096E-05	1.096E-05	1.096E-05	1.096E-05	1.096E-05	6.849E-06	-	1
Sediment burial velocity in the AS below the deep water layer [e]	m/d	1.096E-05	1.096E-05	1.096E-05	1.096E-05	1.096E-05	1.096E-05	1.096E-05	1.096E-05	1.096E-05	6.849E-06	-	1

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Table F-5 (continued). Water column and active sediment parameters used for the fate and transport model.

Model Parameter	Units	Admiralty Inlet	Hood North	Hood South	Main Basin	The Narrows	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes Inlet	SJF/ SOG	Source
Active Sediment													
Solids resuspension velocity of AS below the surface water layer [f]	m/d	4.384E-05	4.384E-05	4.384E-05	4.384E-05	4.384E-05	4.384E-05	4.384E-05	4.384E-05	4.384E-05	2.740E-05	-	1
Solids resuspension velocity of AS below the deep water layer [g]	m/d	2.192E-05	2.192E-05	2.192E-05	2.192E-05	2.192E-05	2.192E-05	2.192E-05	2.192E-05	2.192E-05	1.370E-05	-	1
Water-to-sediment diffusion coefficient for AS below the surface water layer	m/d	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	-	3
Water-to-sediment diffusion coefficient for AS below the deep water layer	m/d	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	-	3

AS = Active sediment.
DOC = Dissolved organic carbon.
POC = Particulate organic carbon.
TOC = Total organic carbon.
TSS = Total suspended solids.

[a] The area of sediment exposed to the surface water layer is determined as the difference between the total sediment area and the surface area of the deep water layer.
[b] The area of the deep water layer also defines the surface area of sediment exposed to the deep water layer.
[c] A typical settling velocity of about 10 m/day (range of 0.1 to 100 m/day) corresponds to silt-sized particle diameters of 10 to 100 um with specific gravity of 1 to 2.65 (Hakanson and Jansson, 1983).
[d] The sediment concentration of dry solids was estimated from a regression with water depth in meters for data from 87 cores in four sedimentation studies in Puget Sound (Lefkovitz et al., 1997): Cs = -0.0011674 x depth + 0.86342.
[e] The burial velocity was 0.4 cm/year based on the median of 87 Pb-201 cores adjusted for sediment focusing (Pelletier and Mohamedali, 2009), except for Sinclair/Dyes Inlet which was assumed to be 0.25 cm/year (Bob Johnston, U.S. Navy, personal communication, 2009).
[f] The default resuspension velocity in the surface layer was set at four times the burial rate based on typical values observed in sediment trap studies, as summarized in Pelletier and Mohamedali (2009).
[g] The default resuspension velocity in the deep layer was set at two times the burial rate based on typical values observed in sediment trap studies, as summarized in Pelletier and Mohamedali (2009).

Sources given in the final column correspond to:
1 = Pelletier and Mohamedali (2009).
2 = Data compilation (2000-2012) from the present study.
3 = Davis (2004).

Table F-6. Contaminant data inputs used for the fate and transport model.

Model Input	Units	Admiralty Inlet	Hood North	Hood South	Main Basin	The Narrows	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes Inlet	SJF/SOG
Copper												
Initial [ ] in surface water	pg/L	434000	455000	390000	457000	455000	420000	493000	815000	602000	810000	380000
Initial [ ] in deep water	pg/L	355000	380000	390000	380000	380000	410000	383000	815000	434000	434000	280000
Initial [ ] in the AS below the surface water	ng/g dw	12250	16000	33800	9800	18000	33000	35600	32050	44612	58550	-
Initial [ ] in the AS below the deep water	ng/g dw	12250	16000	33800	9800	18000	33000	35600	32050	44612	58550	-
External load to the surface water layer *	kg/yr	349.1	599.0	2742	4701	0.00	5501	14826	3115	1383	632.2	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	126.5	33.46	58.73	250.5	55.99	276.0	298.3	77.26	85.07	36.99	-
Lead												
Initial [ ] in surface water	pg/L	17500	37800	87500	40350	37800	31000	21000	43000	23000	29000	43000
Initial [ ] in deep water	pg/L	17000	36500	111500	37700	36500	42000	39600	43000	33950	33950	108000
Initial [ ] in the AS below the surface water	ng/g dw	7140	8000	10500	8097	9000	12000	11650	11600	39896	42900	-
Initial [ ] in the AS below the deep water	ng/g dw	7140	8000	10500	8097	9000	12000	11650	11600	39896	42900	-
External load to the surface water layer *	kg/yr	52.71	178.8	413.8	602.8	0.000	979.6	1865	413.7	231.8	177.6	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	51.30	16.04	28.16	93.66	27.75	116.6	97.21	38.29	42.16	12.90	-
Zinc												
Initial [ ] in surface water	pg/L	585000	700000	655000	730000	700000	690000	620000	1260000	905000	1080000	580000
Initial [ ] in deep water	pg/L	530000	590000	657500	580000	590000	530000	605000	1260000	543000	543000	680000
Initial [ ] in the AS below the surface water	ng/g dw	40650	49500	79600	32597	49252	65000	76300	47000	84837	113750	-
Initial [ ] in the AS below the deep water	ng/g dw	40650	49500	79600	32597	49252	65000	76300	47000	84837	113750	-
External load to the surface water layer *	kg/yr	1209	2396	9988	19669	0.000	20312	51074	11392	5401	2565	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	1024	244.1	428.5	1268	230.5	1363	1549	318.0	350.1	166.1	-
Total PCBs												
Initial [ ] in surface water	pg/L	29.95	29.95	26.13	31.14	29.95	28.76	51.74	80.40	80.40	80.40	18.20
Initial [ ] in deep water	pg/L	44.48	44.48	27.11	50.35	44.48	41.55	51.74	80.40	80.40	80.40	32.32
Initial [ ] in the AS below the surface water	ng/g dw	1.11	0.466	1.26	1.39	1.20	0.910	1.11	4.44	43.5	31.3	-
Initial [ ] in the AS below the deep water	ng/g dw	1.11	0.466	1.26	1.39	1.20	0.910	1.11	4.44	43.5	31.3	-
External load to the surface water layer *	kg/yr	0.04244	0.04871	0.3527	0.5209	0.000	0.6579	2.134	0.4387	0.2310	0.06407	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	0.04652	0.01205	0.02115	0.1110	0.008513	0.09947	0.08987	0.01175	0.01293	0.01314	-

Table F-6 (continued). Contaminant data inputs used for the fate and transport model.

Model Input	Units	Admiralty Inlet	Hood North	Hood South	Main Basin	The Narrows	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes Inlet	SJF/SOG
Total PBDEs												
Initial [ ] in surface water	pg/L	23.41	23.41	23.41	23.41	23.41	23.41	23.41	23.41	23.41	23.41	23.41
Initial [ ] in deep water	pg/L	14.84	14.84	14.84	14.84	14.84	14.84	14.84	14.84	14.84	14.84	14.84
Initial [ ] in the AS below the surface water	ng/g dw	0.420	0.200	0.333	0.677	0.420	0.285	0.330	4.19	4.93	0.520	-
Initial [ ] in the AS below the deep water	ng/g dw	0.420	0.200	0.333	0.677	0.420	0.285	0.330	4.19	4.93	0.520	-
External load to the surface water layer *	kg/yr	0.07149	0.05862	0.3869	6.558	0.000	1.683	3.583	1.486	0.2737	0.3689	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	0.4247	0.1343	0.2357	0.9431	0.1015	0.5905	0.6405	0.1400	0.1542	0.1270	-
Total PAHs												
Initial [ ] in surface water	pg/L	12000	12500	4300	12500	12500	4450	12000	52450	52450	52450	4250
Initial [ ] in deep water	pg/L	12000	12000	2750	12000	12000	4400	12000	47000	47000	47000	4250
Initial [ ] in the AS below the surface water	ng/g dw	268	200	118	242	236	303	231	555	2264	1010	-
Initial [ ] in the AS below the deep water	ng/g dw	268	200	118	242	236	303	231	555	2264	1010	-
External load to the surface water layer *	kg/yr	3.399	4.118	30.34	36.63	0.000	53.15	178.2	35.51	18.84	4.926	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	4.722	1.640	2.878	16.17	3.501	5.489	6.856	4.830	5.319	2.597	-
Total LPAHs												
Initial [ ] in surface water	pg/L	6000	6500	4300	6500	6500	4450	6000	27500	27500	27500	4250
Initial [ ] in deep water	pg/L	6000	6000	2750	6000	6000	4400	6000	12000	12000	12000	4250
Initial [ ] in the AS below the surface water	ng/g dw	93.5	50.1	33.0	28.3	33.3	49.0	48.6	223	279	160	-
Initial [ ] in the AS below the deep water	ng/g dw	93.5	50.1	33.0	28.3	33.3	49.0	48.6	223	279	160	-
External load to the surface water layer *	kg/yr	1.679	2.066	15.32	14.87	0.000	25.31	88.89	16.55	7.227	2.161	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	0.8379	0.4208	0.7388	8.109	0.8864	1.204	0.5617	1.223	1.347	1.296	-
Total HPAHs												
Initial [ ] in surface water	pg/L	12000	12000	1000	12500	12000	1000	12000	29500	29500	29500	1000
Initial [ ] in deep water	pg/L	12000	12000	1000	12000	12000	1000	12000	47000	47000	47000	1000
Initial [ ] in the AS below the surface water	ng/g dw	164	143	87	217	196	247	183	374	1909	858	-
Initial [ ] in the AS below the deep water	ng/g dw	164	143	87	217	196	247	183	374	1909	858	-
External load to the surface water layer *	kg/yr	3.348	4.147	30.81	27.50	0.000	51.52	178.0	33.96	18.07	4.409	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	4.310	1.253	2.200	11.51	2.626	5.633	7.935	3.623	3.989	1.446	-

Table F-6 (continued). Contaminant data inputs used for the fate and transport model.

Model Input	Units	Admiralty Inlet	Hood North	Hood South	Main Basin	The Narrows	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes Inlet	SJF/SOG
Total cPAHs												
Initial [ ] in surface water	pg/L	12000	12500	1000	12500	12500	1000	12000	47000	47000	47000	1000
Initial [ ] in deep water	pg/L	12000	12000	1000	12000	12000	1000	12000	47000	47000	47000	1000
Initial [ ] in the AS below the surface water	ng/g dw	82.8	69.8	55.8	118	104	121	98.5	228	1257	497	-
Initial [ ] in the AS below the deep water	ng/g dw	82.8	69.8	55.8	118	104	121	98.5	228	1257	497	-
External load to the surface water layer *	kg/yr	2.446	3.053	22.75	17.06	0.000	37.12	130.6	24.22	12.47	3.033	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	2.034	0.5893	1.034	4.701	1.091	2.476	3.619	1.506	1.658	0.4210	-
Acenaphthene												
Initial [ ] in surface water	pg/L	2350	2550	4275	2550	2550	4250	2350	12000	12000	12000	4250
Initial [ ] in deep water	pg/L	2350	2350	2375	2350	2350	4400	2350	4700	4700	4700	4250
Initial [ ] in the AS below the surface water	ng/g dw	2.80	4.05	0.680	4.61	4.05	4.05	4.01	17.0	17.6	6.90	-
Initial [ ] in the AS below the deep water	ng/g dw	2.80	4.05	0.680	4.61	4.05	4.05	4.01	17.0	17.6	6.90	-
External load to the surface water layer *	kg/yr	1.658	2.065	15.37	9.893	0.000	24.47	88.03	15.68	7.015	1.901	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	0.000	0.000	0.000	0.000	0.06202	0.000	0.000	0.08558	0.09423	0.000	-
Acenaphthylene												
Initial [ ] in surface water	pg/L	2350	2550	4200	2550	2550	4200	2350	4700	4700	4700	4200
Initial [ ] in deep water	pg/L	2350	2350	2550	2350	2350	4300	2350	4700	4700	4700	4200
Initial [ ] in the AS below the surface water	ng/g dw	4.60	4.30	2.30	7.83	6.26	4.30	4.30	10.5	17.6	12.9	-
Initial [ ] in the AS below the deep water	ng/g dw	4.60	4.30	2.30	7.83	6.26	4.30	4.30	10.5	17.6	12.9	-
External load to the surface water layer *	kg/yr	1.658	2.065	15.37	9.893	0.000	24.46	88.02	15.68	7.014	1.901	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	0.2531	0.1231	0.2160	0.6796	0.06479	0.2904	0.3257	0.08940	0.09844	0.1274	-
Anthracene												
Initial [ ] in surface water	pg/L	2350	2513	2525	2550	2513	2500	2350	4700	4700	4700	2500
Initial [ ] in deep water	pg/L	2350	2350	1825	2350	2350	2600	2350	4700	4700	4700	2550
Initial [ ] in the AS below the surface water	ng/g dw	8.60	7.50	3.15	7.38	7.39	6.53	9.69	29.0	96.0	30.4	-
Initial [ ] in the AS below the deep water	ng/g dw	8.60	7.50	3.15	7.38	7.39	6.53	9.69	29.0	96.0	30.4	-
External load to the surface water layer *	kg/yr	1.656	2.064	15.37	9.833	0.000	24.42	87.98	15.65	6.974	1.894	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	0.02627	0.000	0.000	0.1671	0.03240	0.08279	0.06681	0.04470	0.04922	0.02138	-

Table F-6 (continued). Contaminant data inputs used for the fate and transport model.

Model Input	Units	Admiralty Inlet	Hood North	Hood South	Main Basin	The Narrows	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes Inlet	SJF/SOG
Fluorene												
Initial [ ] in surface water	pg/L	2350	2550	3675	2550	2550	3650	2350	4825	4825	4825	3650
Initial [ ] in deep water	pg/L	2350	2350	2000	2350	2350	3800	2350	4700	4700	4700	3700
Initial [ ] in the AS below the surface water	ng/g dw	5.90	4.45	2.95	7.56	6.80	4.45	5.30	21.0	29.4	10.7	-
Initial [ ] in the AS below the deep water	ng/g dw	5.90	4.45	2.95	7.56	6.80	4.45	5.30	21.0	29.4	10.7	-
External load to the surface water layer *	kg/yr	1.668	2.067	15.37	12.03	0.000	24.80	88.48	16.02	6.983	2.006	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	0.3568	0.2600	0.4564	1.269	0.1023	0.8246	0.000	0.1411	0.1554	0.2180	-
Naphthalene												
Initial [ ] in surface water	pg/L	6000	6500	550	6500	6500	600	6000	12250	12250	12250	550
Initial [ ] in deep water	pg/L	6000	6000	550	6000	6000	550	6000	12000	12000	12000	600
Initial [ ] in the AS below the surface water	ng/g dw	25.5	11.3	7.70	5.93	6.83	11.1	9.00	62.0	15.1	22.4	-
Initial [ ] in the AS below the deep water	ng/g dw	25.5	11.3	7.70	5.93	6.83	11.1	9.00	62.0	15.1	22.4	-
External load to the surface water layer *	kg/yr	1.652	2.059	15.32	9.828	0.000	24.37	87.74	15.61	6.967	1.892	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Phenanthrene												
Initial [ ] in surface water	pg/L	2350	2550	3025	2600	2550	3000	2350	15500	15500	15500	3000
Initial [ ] in deep water	pg/L	2350	2350	2100	2400	2350	3100	2350	4700	4700	4700	3000
Initial [ ] in the AS below the surface water	ng/g dw	52.0	32.0	15.0	26.0	26.7	28.0	28.0	99.5	187	70.9	-
Initial [ ] in the AS below the deep water	ng/g dw	52.0	32.0	15.0	26.0	26.7	28.0	28.0	99.5	187	70.9	-
External load to the surface water layer *	kg/yr	1.669	2.068	15.37	11.72	0.000	24.85	88.46	16.06	7.227	2.005	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	0.000	0.000	0.000	5.957	0.5908	0.000	0.000	0.8152	0.8976	0.9297	-
Benzo(a)anthracene												
Initial [ ] in surface water	pg/L	6000	6250	450	6500	6250	450	6000	12000	12000	12000	450
Initial [ ] in deep water	pg/L	6000	6000	475	6000	6000	450	6000	12000	12000	12000	450
Initial [ ] in the AS below the surface water	ng/g dw	13.0	13.5	5.80	20.6	18.1	16.9	17.0	32.0	206	65.5	-
Initial [ ] in the AS below the deep water	ng/g dw	13.0	13.5	5.80	20.6	18.1	16.9	17.0	32.0	206	65.5	-
External load to the surface water layer *	kg/yr	1.660	2.066	15.37	10.10	0.000	24.56	88.09	15.77	7.191	1.921	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	0.1538	0.04429	0.07774	0.3318	0.09156	0.1937	0.3086	0.1263	0.1391	0.03508	-

Table F-6 (continued). Contaminant data inputs used for the fate and transport model.

Model Input	Units	Admiralty Inlet	Hood North	Hood South	Main Basin	The Narrows	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes Inlet	SJF/SOG
Benzo(a)pyrene												
Initial [ ] in surface water	pg/L	2350	2500	825	2550	2500	850	2350	4700	4700	4700	850
Initial [ ] in deep water	pg/L	2350	2350	850	2350	2350	850	2350	4700	4700	4700	850
Initial [ ] in the AS below the surface water	ng/g dw	12.0	14.5	8.00	26.0	20.0	19.6	19.5	36.0	208	78.3	-
Initial [ ] in the AS below the deep water	ng/g dw	12.0	14.5	8.00	26.0	20.0	19.6	19.5	36.0	208	78.3	-
External load to the surface water layer *	kg/yr	2.401	2.996	22.67	13.47	0.000	35.30	129.6	22.74	10.02	2.624	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	0.1969	0.04996	0.08769	0.4269	0.1202	0.1948	0.5019	0.1659	0.1826	0.04343	-
Benzo(b)fluoranthene												
Initial [ ] in surface water	pg/L	2350	2400	525	2525	2400	550	2350	4700	4700	4700	500
Initial [ ] in deep water	pg/L	2350	2350	525	2350	2350	500	2350	4700	4700	4700	500
Initial [ ] in the AS below the surface water	ng/g dw	15.0	17.5	9.75	22.0	22.0	30.0	27.0	48.5	295	125	-
Initial [ ] in the AS below the deep water	ng/g dw	15.0	17.5	9.75	22.0	22.0	30.0	27.0	48.5	295	125	-
External load to the surface water layer *	kg/yr	1.667	2.069	15.37	10.55	0.000	24.80	88.29	15.97	7.538	1.968	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	0.5244	0.1780	0.3124	1.255	0.2956	0.5611	0.7796	0.4079	0.4492	0.1192	-
Benzo(g,h,i)perylene												
Initial [ ] in surface water	pg/L	12000	12250	800	12500	12250	850	12000	47000	47000	47000	800
Initial [ ] in deep water	pg/L	12000	12000	825	12000	12000	800	12000	47000	47000	47000	800
Initial [ ] in the AS below the surface water	ng/g dw	15.0	6.50	13.5	15.2	13.5	19.8	14.0	27.0	117	79.6	-
Initial [ ] in the AS below the deep water	ng/g dw	15.0	6.50	13.5	15.2	13.5	19.8	14.0	27.0	117	79.6	-
External load to the surface water layer *	kg/yr	1.663	2.067	15.37	10.30	0.000	24.67	88.18	15.86	7.348	1.942	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	0.3396	0.09544	0.1675	0.8568	0.2584	0.4425	0.6888	0.3566	0.3926	0.08798	-
Benzo(k)fluoranthene												
Initial [ ] in surface water	pg/L	2350	2400	250	2525	2400	250	2350	4700	4700	4700	250
Initial [ ] in deep water	pg/L	2350	2350	275	2350	2350	250	2350	4700	4700	4700	250
Initial [ ] in the AS below the surface water	ng/g dw	14.0	8.60	8.20	21.0	14.9	11.1	15.0	25.5	240	48.2	-
Initial [ ] in the AS below the deep water	ng/g dw	14.0	8.60	8.20	21.0	14.9	11.1	15.0	25.5	240	48.2	-
External load to the surface water layer *	kg/yr	1.658	2.064	15.37	9.943	0.000	24.48	88.04	15.70	7.066	1.905	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	0.1852	0.06272	0.1101	0.3969	0.08568	0.2402	0.2759	0.1182	0.1302	0.05175	-

Table F-6 (continued). Contaminant data inputs used for the fate and transport model.

Model Input	Units	Admiralty Inlet	Hood North	Hood South	Main Basin	The Narrows	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes Inlet	SJF/SOG
Chrysene												
Initial [ ] in surface water	pg/L	6000	6250	450	6500	6250	450	6000	12000	12000	12000	450
Initial [ ] in deep water	pg/L	6000	6000	450	6000	6000	450	6000	12000	12000	12000	450
Initial [ ] in the AS below the surface water	ng/g dw	17.0	27.0	9.75	26.4	26.1	27.0	29.0	60.1	280	92.3	-
Initial [ ] in the AS below the deep water	ng/g dw	17.0	27.0	9.75	26.4	26.1	27.0	29.0	60.1	280	92.3	-
External load to the surface water layer *	kg/yr	1.665	2.068	15.37	10.42	0.000	24.73	88.23	15.91	7.444	1.954	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	0.4971	0.1438	0.2525	1.255	0.2931	0.6891	0.8208	0.4044	0.4453	0.1388	-
Dibenzo(a,h)anthracene												
Initial [ ] in surface water	pg/L	12000	12250	700	12500	12250	750	12000	47000	47000	47000	700
Initial [ ] in deep water	pg/L	12000	12000	725	12000	12000	700	12000	47000	47000	47000	700
Initial [ ] in the AS below the surface water	ng/g dw	3.45	4.20	2.80	5.90	4.25	4.25	4.20	7.76	47.0	12.7	-
Initial [ ] in the AS below the deep water	ng/g dw	3.45	4.20	2.80	5.90	4.25	4.25	4.20	7.76	47.0	12.7	-
External load to the surface water layer *	kg/yr	2.474	3.070	22.81	14.65	0.000	36.40	130.8	23.27	10.34	2.826	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	0.004398	0.000	0.000	0.07720	0.02489	0.07271	0.1301	0.03434	0.03781	0.000	-
Fluoranthene												
Initial [ ] in surface water	pg/L	2350	2550	750	2550	2550	750	2350	17500	17500	17500	750
Initial [ ] in deep water	pg/L	2350	2350	625	2350	2350	800	2350	4700	4700	4700	750
Initial [ ] in the AS below the surface water	ng/g dw	46.0	41.0	15.0	45.8	45.0	51.1	46.0	91.0	365	136	-
Initial [ ] in the AS below the deep water	ng/g dw	46.0	41.0	15.0	45.8	45.0	51.1	46.0	91.0	365	136	-
External load to the surface water layer *	kg/yr	1.677	2.072	15.37	12.16	0.000	25.16	88.67	16.32	7.780	2.063	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	1.210	0.3258	0.5719	3.153	0.6626	1.612	1.869	0.9143	1.007	0.5768	-
Indeno(1,2,3-cd)pyrene												
Initial [ ] in surface water	pg/L	12000	12250	1000	12500	12250	1000	12000	47000	47000	47000	1000
Initial [ ] in deep water	pg/L	12000	12000	1000	12000	12000	1000	12000	47000	47000	47000	1000
Initial [ ] in the AS below the surface water	ng/g dw	11.0	5.60	9.32	15.7	13.0	18.0	15.0	19.0	120	76.9	-
Initial [ ] in the AS below the deep water	ng/g dw	11.0	5.60	9.32	15.7	13.0	18.0	15.0	19.0	120	76.9	-
External load to the surface water layer *	kg/yr	2.402	2.997	22.67	13.60	0.000	35.37	129.6	22.80	10.12	2.637	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	0.2517	0.06835	0.1200	0.6003	0.1508	0.2531	0.4159	0.2080	0.2290	0.06143	-

Table F-6 (continued). Contaminant data inputs used for the fate and transport model.

Model Input	Units	Admiralty Inlet	Hood North	Hood South	Main Basin	The Narrows	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes Inlet	SJF/SOG
Pyrene												
Initial [ ] in surface water	pg/L	2350	2550	900	2550	2550	900	2350	7850	7850	7850	900
Initial [ ] in deep water	pg/L	2350	2350	950	2350	2350	900	2350	4700	4700	4700	900
Initial [ ] in the AS below the surface water	ng/g dw	29.0	38.0	14.5	49.0	45.0	52.0	42.0	92.8	364	156	-
Initial [ ] in the AS below the deep water	ng/g dw	29.0	38.0	14.5	49.0	45.0	52.0	42.0	92.8	364	156	-
External load to the surface water layer *	kg/yr	2.516	3.134	23.39	17.17	0.000	37.57	134.3	24.33	11.16	3.001	-
External load to the deep water layer	kg/yr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-
Atmospheric load to the surface water layer	kg/yr	0.7205	0.2307	0.4050	2.388	0.5237	1.135	1.587	0.7226	0.7957	0.3599	-

[ ] (brackets) = Concentration.
AS = Active sediment.
cPAH = Carcinogenic polycyclic aromatic hydrocarbon.
DOC = Dissolved organic carbon.
HPAH = High molecular weight polycyclic aromatic hydrocarbon.
LPAH = Low molecular weight polycyclic aromatic hydrocarbon.
PAH = Polycyclic aromatic hydrocarbon.
PBDE = Polybrominated diphenyl ether.
PCB = Polychlorinated biphenyl.
POC = Particulate organic carbon.
POTW = Publicly owned treatment works.
TOC = Total organic carbon.
TSS = Total suspended solids.

* The external load to the surface water layer was set as the sum of the loading estimates for the surface runoff, POTWs, and direct groundwater pathways. However, for PAH class totals and individual PAH compounds the direct groundwater discharge pathway was excluded due to problems with the estimation method used (see Appendix A).

Appendix G. Sensitivity and Uncertainty Analyses for the Fate and Transport Model

Table G-1. Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Copper in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Copper in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						5.24E+06	2.64E+06	2.00E+06			
Initial salinity in the water column	Boundary	PSU	30.87 / 31.59	27.78 / 28.43	-10%	5.24E+06	2.64E+06	2.00E+06	0.0%	0.0%	0.0%
				33.95 / 34.75	+10%	5.24E+06	2.64E+06	2.00E+06	0.0%	0.0%	0.0%
Concentration of dry solids in the active sediments	Regional	kg/L	0.8285 / 0.7831	0.7457 / 0.7048	-10%	4.72E+06	2.39E+06	1.84E+06	-9.9%	-9.6%	-7.8%
				0.9114 / 0.8614	+10%	5.75E+06	2.89E+06	2.15E+06	9.9%	9.5%	7.5%
Density of organic carbon	Global	kg/L	0.90	0.81	-10%	5.24E+06	2.64E+06	2.00E+06	0.0%	0.0%	0.0%
				0.99	+10%	5.24E+06	2.64E+06	2.00E+06	0.0%	0.0%	0.0%
Water-sediment diffusion coefficient for the active sediments	Global	m/d	0.0024	0.0022	-10%	5.24E+06	2.64E+06	2.00E+06	0.0%	0.0%	0.0%
				0.0026	+10%	5.24E+06	2.64E+06	2.00E+06	0.0%	0.0%	0.0%
Solids resuspension velocity of the active sediments	Regional	m/d	4x / 2x burial	2x / 1x burial	-50%	5.24E+06	2.68E+06	1.96E+06	0.0%	1.7%	-1.9%
				3.6x / 1.8x burial	-10%	5.24E+06	2.64E+06	1.99E+06	0.0%	0.0%	-0.6%
				4.4x / 2.2x burial	+10%	5.24E+06	2.64E+06	2.01E+06	0.0%	0.1%	0.6%
				8x / 4x burial	+100%	5.24E+06	2.73E+06	2.15E+06	0.0%	3.4%	7.5%
TSS-water partition coefficient for metals	Global	L/kg	4.47	3.1	lowest A&A [c]	5.24E+06	3.65E+05	1.33E+05	0.0%	-86.2%	-93.3%
				4.27	-10%	5.24E+06	2.51E+06	1.88E+06	0.0%	-4.7%	-6.0%
				5.21	+10%	5.24E+06	2.75E+06	2.11E+06	0.0%	4.2%	5.5%
				6.1	highest A&A [c]	5.24E+06	4.53E+06	4.19E+06	0.0%	71.9%	109.9%
Sediment-porewater partition coefficient for metals	Global	L/kg	4.20	0.7	lowest A&A [3]	5.24E+06	3.83E+05	3.78E+05	0.0%	-85.5%	-81.1%
				3.78	-10%	5.24E+06	2.64E+06	2.00E+06	0.0%	0.0%	0.0%
				4.62	+10%	5.24E+06	2.64E+06	2.00E+06	0.0%	0.0%	0.0%
				6.2	highest A&A [c]	5.24E+06	2.64E+06	2.00E+06	0.0%	0.2%	0.2%
DOC-water partition coefficient for metals	Global	L/kg	5.09	2.5	lowest A&A [c]	5.24E+06	2.77E+06	2.13E+06	0.0%	5.0%	6.5%
				4.58	-10%	5.24E+06	2.65E+06	2.01E+06	0.0%	0.5%	0.6%
				5.60	+10%	5.24E+06	2.62E+06	1.99E+06	0.0%	-0.5%	-0.6%
				7.0	highest A&A [c]	5.24E+06	7.10E+05	3.80E+05	0.0%	-73.1%	-81.0%
Initial contaminant concentration in the water column	Boundary	ng/L	380 / 280	270 / 240	25th %tile	5.24E+06	2.47E+06	1.79E+06	0.0%	-6.3%	-10.3%
				440 / 410	75th %tile	5.24E+06	3.18E+06	2.66E+06	0.0%	20.6%	33.3%
External load to the surface water column layer [d]	Regional	kg/yr	5501	3556	25th %tile	5.24E+06	2.55E+06	1.89E+06	0.0%	-3.3%	-5.4%
				9884	75th %tile	5.24E+06	2.86E+06	2.27E+06	0.0%	8.4%	13.7%
Initial contaminant concentration in the water column	Regional	ng/L	420 / 410	400 / 335	25th %tile	5.23E+06	2.64E+06	2.00E+06	-0.1%	0.0%	0.0%
				430 / 425	75th %tile	5.25E+06	2.64E+06	2.00E+06	0.2%	0.1%	0.0%
Initial contaminant concentration in the active sediments	Regional	ng/g dw	33000	14600	25th %tile	2.89E+06	2.10E+06	1.91E+06	-44.7%	-20.3%	-4.7%
				43650	75th %tile	9.12E+06	3.49E+06	2.15E+06	74.1%	32.5%	7.4%
TOC fraction in the active sediments	Regional	dim'less	0.0181	0.0057	25th %tile	5.24E+06	2.64E+06	2.00E+06	0.0%	0.0%	0.0%
				0.0279	75th %tile	5.24E+06	2.64E+06	2.00E+06	0.0%	0.0%	0.0%
Concentration of POC in the water column	Regional	mg/L	0.082 / 0.082	0.0493 / 0.0493	25th %tile	5.24E+06	2.64E+06	2.00E+06	0.0%	0.0%	0.0%
				0.132 / 0.132	75th %tile	5.24E+06	2.64E+06	2.00E+06	0.0%	0.0%	0.0%

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Table G-1 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Copper in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Copper in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						5.24E+06	2.64E+06	2.00E+06			
Concentration of DOC in the water column	Regional	mg/L	0.821 / 0.821	0.805 / 0.805	25th %tile	5.24E+06	2.66E+06	2.02E+06	0.0%	0.7%	0.9%
				0.834 / 0.834	75th %tile	5.24E+06	2.61E+06	1.98E+06	0.0%	-0.9%	-1.2%
Concentration of TSS in the water column	Regional	mg/L	6.5 / 4.0	5.0 / 1.6	25th %tile	5.24E+06	2.70E+06	2.06E+06	0.0%	2.5%	3.3%
				8.0 / 5.0	75th %tile	5.24E+06	2.55E+06	1.92E+06	0.0%	-3.2%	-4.1%
Sediment burial velocity in the active sediments [e]	Regional	m/d	1.096E-05	4.658E-06	25th %tile	5.24E+06	3.46E+06	2.67E+06	0.0%	31.2%	33.7%
				2.219E-05	75th %tile	5.24E+06	1.70E+06	1.39E+06	0.0%	-35.5%	-30.5%

A&A = Allison and Allison (2005).
DOC = Dissolved organic carbon.
POC = Particulate organic carbon.
POTW = Publicly owned treatment works.
TOC = Total organic carbon.
TSS = Total suspended solids.

[a] Parameters associated with the water column are given for "surface / deep" water layers. Parameters associated with the active sediments are given for sediments below the "surface / deep" water layers. Region-specific parameters show the value(s) from the South Sound in the table.
[b] Initial condition describes the total mass at the first time step in 2006. Predicted masses after 25 years (2030) and 55 years (2060) are annual averages.
[c] Metals partition coefficients are from the range of values given in Allison and Allison (2005).
[d] External loads to the surface water column layer include the following pathways: atmospheric deposition, surface runoff, POTWs, and direct groundwater discharges.
[e] The sediment burial velocities (m/d) converted to cm/year are as follows (converted values in parentheses): 4.658E-05 (0.17 cm/year), 1.096E-05 (0.40 cm/year), and 2.219E-05 (0.81 cm/year).

Table G-2. Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Lead in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Lead in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						2.29E+06	1.74E+06	1.49E+06			
Initial salinity in the water column	Boundary	PSU	30.87 / 31.59	27.78 / 28.43	-10%	2.29E+06	1.74E+06	1.49E+06	0.0%	0.0%	0.0%
				33.95 / 34.75	+10%	2.29E+06	1.74E+06	1.49E+06	0.0%	0.0%	0.0%
Concentration of dry solids in the active sediments	Regional	kg/L	0.8285 / 0.7831	0.7457 / 0.7048	-10%	2.06E+06	1.63E+06	1.44E+06	-10.0%	-6.2%	-3.7%
				0.9114 / 0.8614	+10%	2.52E+06	1.85E+06	1.55E+06	10.0%	6.0%	3.5%
Density of organic carbon	Global	kg/L	0.90	0.81	-10%	2.29E+06	1.74E+06	1.49E+06	0.0%	0.0%	0.0%
				0.99	+10%	2.29E+06	1.74E+06	1.49E+06	0.0%	0.0%	0.0%
Water-sediment diffusion coefficient for the active sediments	Global	m/d	0.0024	0.0022	-10%	2.29E+06	1.74E+06	1.49E+06	0.0%	0.0%	0.0%
				0.0026	+10%	2.29E+06	1.74E+06	1.49E+06	0.0%	0.0%	0.0%
Solids resuspension velocity of the active sediments	Regional	m/d	4x / 2x burial	2x / 1x burial	-50%	2.29E+06	1.71E+06	1.45E+06	0.0%	-1.7%	-2.7%
				3.6x / 1.8x burial	-10%	2.29E+06	1.74E+06	1.49E+06	0.0%	-0.3%	-0.5%
				4.4x / 2.2x burial	+10%	2.29E+06	1.75E+06	1.50E+06	0.0%	0.3%	0.5%
				8x / 4x burial	+100%	2.29E+06	1.79E+06	1.55E+06	0.0%	2.6%	4.0%
TSS-water partition coefficient for metals	Global	L/kg	6.19	3.4	lowest A&A [c]	2.29E+06	1.73E+05	6.10E+04	0.0%	-90.1%	-95.9%
				5.57	-10%	2.29E+06	1.58E+06	1.29E+06	0.0%	-9.5%	-13.5%
				6.81	+10%	2.29E+06	1.79E+06	1.55E+06	0.0%	2.6%	3.8%
				6.5	highest A&A [c]	2.29E+06	1.77E+06	1.53E+06	0.0%	1.7%	2.5%
Sediment-porewater partition coefficient for metals	Global	L/kg	5.10	2.0	lowest A&A [c]	2.29E+06	1.67E+06	1.41E+06	0.0%	-4.0%	-5.7%
				4.69	-10%	2.29E+06	1.74E+06	1.49E+06	0.0%	0.0%	0.0%
				5.61	+10%	2.29E+06	1.74E+06	1.49E+06	0.0%	0.0%	0.0%
				7.0	highest A&A [c]	2.29E+06	1.74E+06	1.49E+06	0.0%	0.0%	0.0%
DOC-water partition coefficient for metals	Global	L/kg	5.60	3.8	lowest A&A [c]	2.29E+06	1.76E+06	1.52E+06	0.0%	1.0%	1.4%
				5.04	-10%	2.29E+06	1.75E+06	1.51E+06	0.0%	0.7%	1.0%
				6.16	+10%	2.29E+06	1.70E+06	1.44E+06	0.0%	-2.5%	-3.6%
				5.6	highest A&A [c]	2.29E+06	1.74E+06	1.49E+06	0.0%	0.0%	0.0%
Initial contaminant concentration in the water column	Boundary	ng/L	43 / 108	11 / 70	25th %tile	2.29E+06	1.45E+06	1.10E+06	0.0%	-16.6%	-26.6%
				48 / 116	75th %tile	2.29E+06	1.80E+06	1.58E+06	0.0%	3.5%	5.6%
External load to the surface water column layer [d]	Regional	kg/yr	980	393	25th %tile	2.29E+06	1.70E+06	1.44E+06	0.0%	-2.2%	-3.6%
				1712	75th %tile	2.29E+06	1.79E+06	1.56E+06	0.0%	2.9%	4.7%
Initial contaminant concentration in the water column	Regional	ng/L	31 / 42	16.75 / 22.25	25th %tile	2.29E+06	1.74E+06	1.49E+06	-0.1%	-0.1%	0.0%
				35 / 46	75th %tile	2.29E+06	1.74E+06	1.49E+06	0.2%	0.1%	0.0%
Initial contaminant concentration in the active sediments	Regional	ng/g dw	12000	5610	25th %tile	1.23E+06	1.34E+06	1.37E+06	-46.5%	-23.1%	-8.4%
				17575	75th %tile	3.50E+06	2.19E+06	1.63E+06	52.6%	25.6%	9.2%
TOC fraction in the active sediments	Regional	dim'less	0.0181	0.0057	25th %tile	2.29E+06	1.74E+06	1.49E+06	0.0%	0.0%	0.0%
				0.0279	75th %tile	2.29E+06	1.74E+06	1.49E+06	0.0%	0.0%	0.0%
Concentration of POC in the water column	Regional	mg/L	0.082 / 0.082	0.0493 / 0.0493	25th %tile	2.29E+06	1.74E+06	1.49E+06	0.0%	0.0%	0.0%
				0.132 / 0.132	75th %tile	2.29E+06	1.74E+06	1.49E+06	0.0%	0.0%	0.0%

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Table G-2 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Lead in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Lead in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						2.29E+06	1.74E+06	1.49E+06			
Concentration of DOC in the water column	Regional	mg/L	0.821 / 0.821	0.805 / 0.805	25th %tile	2.29E+06	1.75E+06	1.50E+06	0.0%	0.2%	0.3%
				0.834 / 0.834	75th %tile	2.29E+06	1.74E+06	1.49E+06	0.0%	-0.3%	-0.4%
Concentration of TSS in the water column	Regional	mg/L	6.5 / 4.0	5.0 / 1.6	25th %tile	2.29E+06	1.81E+06	1.59E+06	0.0%	4.1%	6.1%
				8.0 / 5.0	75th %tile	2.29E+06	1.67E+06	1.40E+06	0.0%	-4.2%	-6.1%
Sediment burial velocity in the active sediments [e]	Regional	m/d	1.096E-05	4.658E-06	25th %tile	2.29E+06	2.38E+06	2.43E+06	0.0%	36.4%	62.9%
				2.219E-05	75th %tile	2.29E+06	9.57E+05	7.69E+05	0.0%	-45.1%	-48.5%

A&A = Allison and Allison (2005).
DOC = Dissolved organic carbon.
POC = Particulate organic carbon.
POTW = Publicly owned treatment works.
TOC = Total organic carbon.
TSS = Total suspended solids.

[a] Parameters associated with the water column are given for "surface / deep" water layers. Parameters associated with the active sediments are given for sediments below the "surface / deep" water layers. Region-specific parameters show the value(s) from the South Sound in the table.
[b] Initial condition describes the total mass at the first time step in 2006. Predicted masses after 25 years (2030) and 55 years (2060) are annual averages.
[c] Metals partition coefficients are from the range of values given in Allison and Allison (2005).
[d] External loads to the surface water column layer include the following pathways: atmospheric deposition, surface runoff, POTWs, and direct groundwater discharges.
[e] The sediment burial velocities (m/d) converted to cm/year are as follows (converted values in parentheses): 4.658E-05 (0.17 cm/year), 1.096E-05 (0.40 cm/year), and 2.219E-05 (0.81 cm/year).

Table G-3. Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Zinc in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Zinc in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						1.21E+07	7.45E+06	6.19E+06			
Initial salinity in the water column	Boundary	PSU	30.87 / 31.59	27.78 / 28.43	-10%	1.21E+07	7.45E+06	6.19E+06	0.0%	0.0%	0.0%
				33.95 / 34.75	+10%	1.21E+07	7.45E+06	6.19E+06	0.0%	0.0%	0.0%
Concentration of dry solids in the active sediments	Regional	kg/L	0.8285 / 0.7831	0.7457 / 0.7048	-10%	1.09E+07	6.81E+06	5.75E+06	-9.9%	-8.6%	-7.1%
				0.9114 / 0.8614	+10%	1.33E+07	8.08E+06	6.60E+06	9.9%	8.4%	6.7%
Density of organic carbon	Global	kg/L	0.90	0.81	-10%	1.21E+07	7.45E+06	6.19E+06	0.0%	0.0%	0.0%
				0.99	+10%	1.21E+07	7.45E+06	6.19E+06	0.0%	0.0%	0.0%
Water-sediment diffusion coefficient for the active sediments	Global	m/d	0.0024	0.0022	-10%	1.21E+07	7.46E+06	6.19E+06	0.0%	0.0%	0.1%
				0.0026	+10%	1.21E+07	7.45E+06	6.18E+06	0.0%	0.0%	-0.1%
Solids resuspension velocity of the active sediments	Regional	m/d	4x / 2x burial	2x / 1x burial	-50%	1.21E+07	7.38E+06	5.96E+06	0.0%	-1.0%	-3.7%
				3.6x / 1.8x burial	-10%	1.21E+07	7.42E+06	6.14E+06	0.0%	-0.4%	-0.8%
				4.4x / 2.2x burial	+10%	1.21E+07	7.48E+06	6.24E+06	0.0%	0.4%	0.8%
				8x / 4x burial	+100%	1.21E+07	7.84E+06	6.71E+06	0.0%	5.3%	8.5%
TSS-water partition coefficient for metals	Global	L/kg	4.84	3.5	lowest A&A [c]	1.21E+07	1.27E+06	6.47E+05	0.0%	-82.9%	-89.5%
				4.36	-10%	1.21E+07	4.27E+06	3.06E+06	0.0%	-42.7%	-50.5%
				5.32	+10%	1.21E+07	9.92E+06	9.07E+06	0.0%	33.1%	46.6%
				6.9	highest A&A [c]	1.21E+07	1.17E+07	1.14E+07	0.0%	57.1%	84.9%
Sediment-porewater partition coefficient for metals	Global	L/kg	3.70	1.5	lowest A&A [c]	1.21E+07	4.25E+06	3.45E+06	0.0%	-42.9%	-44.2%
				3.33	-10%	1.21E+07	7.41E+06	6.14E+06	0.0%	-0.6%	-0.7%
				4.07	+10%	1.21E+07	7.47E+06	6.21E+06	0.0%	0.3%	0.3%
				6.2	highest A&A [c]	1.21E+07	7.49E+06	6.22E+06	0.0%	0.5%	0.6%
DOC-water partition coefficient for metals	Global	L/kg	4.60	4.6	lowest A&A [c]	1.21E+07	7.45E+06	6.19E+06	0.0%	0.0%	0.0%
				4.14	-10%	1.21E+07	7.52E+06	6.26E+06	0.0%	0.9%	1.2%
				5.06	+10%	1.21E+07	7.26E+06	5.98E+06	0.0%	-2.6%	-3.4%
				6.4	highest A&A [c]	1.21E+07	4.14E+06	2.96E+06	0.0%	-44.4%	-52.1%
Initial contaminant concentration in the water column	Boundary	ng/L	580 / 680	455 / 530	25th %tile	1.21E+07	6.74E+06	5.30E+06	0.0%	-9.6%	-14.4%
				735 / 880	75th %tile	1.21E+07	8.40E+06	7.38E+06	0.0%	12.7%	19.2%
External load to the surface water column layer [d]	Regional	kg/yr	20312	15408	25th %tile	1.21E+07	7.24E+06	5.92E+06	0.0%	-2.8%	-4.3%
				25429	75th %tile	1.21E+07	7.69E+06	6.48E+06	0.0%	3.1%	4.8%
Initial contaminant concentration in the water column	Regional	ng/L	690 / 530	665 / 505	25th %tile	1.21E+07	7.45E+06	6.19E+06	-0.1%	0.0%	0.0%
				710 / 650	75th %tile	1.22E+07	7.46E+06	6.19E+06	0.4%	0.2%	0.0%
Initial contaminant concentration in the active sediments	Regional	ng/g dw	65000	38950	25th %tile	8.56E+06	6.55E+06	6.01E+06	-29.4%	-12.1%	-2.9%
				81900	75th %tile	1.82E+07	8.88E+06	6.46E+06	50.5%	19.1%	4.4%
TOC fraction in the active sediments	Regional	dim'less	0.0181	0.0057	25th %tile	1.21E+07	7.45E+06	6.19E+06	0.0%	0.0%	0.0%
				0.0279	75th %tile	1.21E+07	7.45E+06	6.19E+06	0.0%	0.0%	0.0%
Concentration of POC in the water column	Regional	mg/L	0.082 / 0.082	0.0493 / 0.0493	25th %tile	1.21E+07	7.45E+06	6.19E+06	0.0%	0.0%	0.0%
				0.132 / 0.132	75th %tile	1.21E+07	7.45E+06	6.19E+06	0.0%	0.0%	0.0%

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Table G-3 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Zinc in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Zinc in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						1.21E+07	7.45E+06	6.19E+06			
Concentration of DOC in the water column	Regional	mg/L	0.821 / 0.821	0.805 / 0.805	25th %tile	1.21E+07	7.47E+06	6.21E+06	0.0%	0.2%	0.3%
				0.834 / 0.834	75th %tile	1.21E+07	7.43E+06	6.16E+06	0.0%	-0.3%	-0.4%
Concentration of TSS in the water column	Regional	mg/L	6.5 / 4.0	5.0 / 1.6	25th %tile	1.21E+07	7.66E+06	6.41E+06	0.0%	2.8%	3.7%
				8.0 / 5.0	75th %tile	1.21E+07	7.19E+06	5.90E+06	0.0%	-3.6%	-4.6%
Sediment burial velocity in the active sediments [e]	Regional	m/d	1.096E-05	4.658E-06	25th %tile	1.21E+07	9.39E+06	8.11E+06	0.0%	26.0%	31.1%
				2.219E-05	75th %tile	1.21E+07	4.88E+06	4.16E+06	0.0%	-34.5%	-32.7%

A&A = Allison and Allison (2005).
DOC = Dissolved organic carbon.
POC = Particulate organic carbon.
POTW = Publicly owned treatment works.
TOC = Total organic carbon.
TSS = Total suspended solids.

[a] Parameters associated with the water column are given for "surface / deep" water layers. Parameters associated with the active sediments are given for sediments below the "surface / deep" water layers. Region-specific parameters show the value(s) from the South Sound in the table.
[b] Initial condition describes the total mass at the first time step in 2006. Predicted masses after 25 years (2030) and 55 years (2060) are annual averages.
[c] Metals partition coefficients are from the range of values given in Allison and Allison (2005).
[d] External loads to the surface water column layer include the following pathways: atmospheric deposition, surface runoff, POTWs, and direct groundwater discharges.
[e] The sediment burial velocities (m/d) converted to cm/year are as follows (converted values in parentheses): 4.658E-05 (0.17 cm/year), 1.096E-05 (0.40 cm/year), and 2.219E-05 (0.81 cm/year).

Table G-4. Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Total PCBs in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Total PCBs in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						532	245	193			
Initial salinity in the water column	Boundary	PSU	30.87 / 31.59	27.78 / 28.43	-10%	532	245	193	0.0%	0.0%	0.0%
				33.95 / 34.75	+10%	532	245	193	0.0%	0.0%	0.0%
Concentration of dry solids in the active sediments	Region-specific	kg/L	0.8285 / 0.7831	0.7457 / 0.7048	-10%	480	223	179	-9.9%	-9.0%	-7.1%
				0.9114 / 0.8614	+10%	585	266	206	9.9%	8.9%	6.7%
Density of organic carbon	Global	kg/L	0.90	0.81	-10%	532	245	193	0.0%	0.0%	0.0%
				0.99	+10%	532	245	193	0.0%	0.0%	0.0%
Water-sediment diffusion coefficient for the active sediments	Global	m/d	0.0024	0.0022	-10%	532	245	193	0.0%	0.0%	0.0%
				0.0026	+10%	532	245	193	0.0%	0.0%	0.0%
				0.00024	Davis (2004)	532	245	193	0.0%	0.0%	0.0%
				0.0012	Davis (2004)	532	245	193	0.0%	0.0%	0.0%
				0.0048	Davis (2004)	532	245	193	0.0%	0.0%	0.0%
				0.024	Davis (2004)	532	244	192	0.0%	-0.2%	-0.2%
Solids resuspension velocity of the active sediments	Region-specific	m/d	4x / 2x burial	2x / 1x burial	-50%	532	250	185	0.0%	2.2%	-3.8%
				3.6x / 1.8x burial	-10%	532	247	191	0.0%	1.2%	-0.9%
				4.4x / 2.2x burial	+10%	532	247	194	0.0%	1.1%	0.9%
				8x / 4x burial	+100%	532	252	210	0.0%	3.2%	9.3%
Proportionality constant for POC phase partitioning	Global	dim'less	0.35	0.1400	-60%	532	146	105	0.0%	-40.3%	-45.4%
				0.3150	-10%	532	232	181	0.0%	-5.0%	-5.8%
				0.3850	+10%	532	256	203	0.0%	4.5%	5.3%
				0.5250	+150%	532	290	236	0.0%	18.7%	22.7%
Proportionality constant for DOC phase partitioning	Global	dim'less	0.08	0.0320	-60%	532	282	227	0.0%	15.2%	18.0%
				0.0720	-10%	532	250	198	0.0%	2.2%	2.6%
				0.0880	+10%	532	239	188	0.0%	-2.1%	-2.5%
				0.1200	+150%	532	221	171	0.0%	-9.6%	-11.1%
Setschenow proportionality constant for HOC tracer partitioning	Global	L/cm^3	0.0018	0.00162	-10%	532	242	190	0.0%	-1.3%	-1.5%
				0.00198	+10%	532	248	195	0.0%	1.2%	1.5%
Henry's Law constant for HOC tracer	Global	Pa m^3 / mol	10.82	9.7389	-10%	532	245	193	0.0%	0.1%	0.1%
				11.9031	+10%	532	244	192	0.0%	-0.1%	-0.1%
				25.4	Davis (2004)	532	243	191	0.0%	-0.5%	-0.6%
				12.2	Davis (2004)	532	244	192	0.0%	-0.1%	-0.1%
				3.94	Davis (2004)	532	247	195	0.0%	0.9%	1.0%
				2.43	Davis (2004)	532	248	196	0.0%	1.3%	1.5%
				1.01	Davis (2004)	532	250	197	0.0%	2.0%	2.3%
Enthalpy of air-water phase change for HOC tracer	Global	J/mol	65200	58680	-10%	532	244	192	0.0%	-0.1%	-0.1%
				71720	+10%	532	245	193	0.0%	0.1%	0.1%
Enthalpy of octanol-water phase change for HOC tracer	Global	J/mol	-24500	-22050	-10%	532	242	190	0.0%	-1.3%	-1.5%
				-26950	+10%	532	248	195	0.0%	1.2%	1.5%

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Table G-4 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Total PCBs in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Total PCBs in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						532	245	193			
Octanol-water partition coefficient for HOC tracer	Global	dim'less	6.65	5.985	-10%	532	130	91	0.0%	-47.0%	-52.8%
				7.315	+10%	532	306	252	0.0%	24.9%	31.0%
				5.6	Davis (2004)	532	77	48	0.0%	-68.7%	-75.1%
				8.7	Davis (2004)	532	327	274	0.0%	33.6%	42.2%
				4.61	lowest congener	532	26	11	0.0%	-89.5%	-94.4%
				7.76	highest congener	532	319	266	0.0%	30.6%	38.3%
Degradation rate in the surface water column layer [c]	Global	day^-1	0.000034	0.0000306	-10%	532	245	193	0.0%	0.0%	0.0%
				0.0000674	+10%	532	245	193	0.0%	0.0%	0.0%
Degradation rate in the deep water column layer [c]	Global	day^-1	0.000034	0.0000306	-10%	532	245	193	0.0%	0.0%	0.0%
				0.0000674	+10%	532	245	193	0.0%	0.0%	0.0%
Degradation rate in the water column [c]	Global	day^-1	0.000034	0.0034	Davis (2004)	532	203	154	0.0%	-17.0%	-20.2%
				0.00034	Davis (2004)	532	240	188	0.0%	-1.9%	-2.3%
				0.0000034	Davis (2004)	532	245	193	0.0%	0.2%	0.2%
				0	Davis (2004)	532	245	193	0.0%	0.2%	0.3%
Degradation rate in the active sediments below the surface layer [c]	Global	day^-1	0.000034	0.0000306	-10%	532	246	193	0.0%	0.6%	0.4%
				0.0000674	+10%	532	243	192	0.0%	-0.6%	-0.4%
Degradation rate in the active sediments below the deep layer [c]	Global	day^-1	0.000034	0.0000306	-10%	532	247	195	0.0%	1.1%	1.4%
				0.0000674	+10%	532	242	190	0.0%	-1.1%	-1.3%
Degradation rate in the active sediments [c]	Global	day^-1	0.000034	0.0034	Davis (2004)	532	14	14	0.0%	-94.5%	-92.9%
				0.00034	Davis (2004)	532	83	79	0.0%	-65.9%	-59.2%
				0.0000034	Davis (2004)	532	260	200	0.0%	6.3%	4.0%
				0	Davis (2004)	532	293	233	0.0%	19.7%	20.8%
Degradation rate in the water column and active sediments [c]	Global	day^-1	0.000034	0.0000306	-10%	532	249	196	0.0%	1.8%	1.8%
				0.0000674	+10%	532	240	189	0.0%	-1.7%	-1.7%
				0	zero degradation	532	294	233	0.0%	20.0%	21.1%
Daily wind speed at standard height of 10 m	Region-specific	m/s	monthly averages	0.5x	-50%	532	250	197	0.0%	2.0%	2.3%
				0.9x	-10%	532	246	194	0.0%	0.5%	0.5%
				1.1x	+10%	532	243	192	0.0%	-0.5%	-0.5%
				1.5x	+50%	532	239	187	0.0%	-2.5%	-2.8%
Congener-specific parameterization	Global	NA	PCB-118	all parameters	PCB-105	532	262	209	0.0%	7.1%	8.6%
				all parameters	PCB-153	532	274	221	0.0%	12.1%	14.8%
				all parameters	PCB-138	532	298	245	0.0%	21.8%	27.0%
				all parameters	PCB-101	532	191	143	0.0%	-21.9%	-25.5%
				all parameters	PCB-061	532	157	114	0.0%	-35.7%	-40.8%
Initial contaminant concentration in the water column	Boundary	pg/L	18.2 / 32.3	13.4 / 23.4	25th %tile	532	211	153	0.0%	-13.9%	-20.4%
				19.5 / 38.0	75th %tile	532	266	218	0.0%	8.9%	13.2%
				43.5 / 40.3	P&M (2009)	532	275	228	0.0%	12.5%	18.3%

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Table G-4 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Total PCBs in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Total PCBs in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						532	245	193			
External load to the surface water column layer [d]	Region-specific	kg/yr	0.757	0.000	zero loading	532	210	153	0.0%	-14.1%	-20.7%
				0.347	25th %tile	532	226	171	0.0%	-7.4%	-10.9%
				2.283	75th %tile	532	319	279	0.0%	30.4%	44.7%
				15.439	P&M (2009)	532	1027	1098	0.0%	320.0%	470.3%
Initial contaminant concentration in the water column	Region-specific	pg/L	28.8 / 41.6	28.2 / 37.0	25th %tile	531	244	193	-0.3%	-0.1%	0.0%
				30.1 / 44.5	75th %tile	533	245	193	0.2%	0.1%	0.0%
				43.5 / 40.3	P&M (2009)	532	245	193	0.0%	0.0%	0.0%
Initial contaminant concentration in the active sediments	Region-specific	ng/g dw	0.910	0.500	25th %tile	249	198	187	-53.1%	-19.1%	-2.7%
				4.393	75th %tile	1180	347	204	121.7%	41.9%	5.9%
				3.550	P&M (2009)	1444	379	207	171.5%	54.8%	7.3%
TOC fraction in the active sediments	Region-specific	dim'less	0.0181	0.0057	25th %tile	532	244	192	0.0%	-0.1%	-0.1%
				0.0279	75th %tile	532	245	193	0.0%	0.0%	0.0%
				0.0095	P&M (2009)	532	245	193	0.0%	0.0%	0.0%
Concentration of POC in the water column	Region-specific	mg/L	0.082 / 0.082	0.0493 / 0.0493	25th %tile	532	206	157	0.0%	-15.6%	-18.2%
				0.132 / 0.132	75th %tile	532	307	251	0.0%	25.5%	30.3%
				0.000 / 0.000	P&M (2009)	532	25	7	0.0%	-89.7%	-96.4%
Concentration of DOC in the water column	Region-specific	mg/L	0.821 / 0.821	0.805 / 0.805	25th %tile	532	253	200	0.0%	3.4%	4.0%
				0.834 / 0.834	75th %tile	532	234	182	0.0%	-4.4%	-5.3%
				1.00 / 1.00	P&M (2009)	532	246	191	0.0%	0.7%	-0.6%
Concentration of TSS in the water column	Region-specific	mg/L	6.50 / 4.00	5.00 / 1.60	25th %tile	532	313	262	0.0%	27.9%	36.2%
				8.00 / 5.00	75th %tile	532	198	149	0.0%	-19.1%	-22.5%
				2.40 / 2.40	P&M (2009)	532	261	204	0.0%	6.7%	5.8%
Sediment burial velocity in the active sediments [e]	Region-specific	m/d	1.096E-05	4.658E-06	25th %tile	532	282	214	0.0%	15.2%	11.2%
				2.219E-05	75th %tile	532	169	151	0.0%	-30.8%	-21.7%

P&M = Pelletier and Mohamedali.
See Appendix R for other acronyms.

[a] Parameters associated with the water column are given for "surface / deep" water layers. Parameters associated with the active sediments are given for sediments below the "surface / deep" water layers. Region-specific parameters show the value(s) from the South Sound in the table.

[b] Initial condition describes the total mass at the first time step in 2006. Predicted masses after 25 years (2030) and 55 years (2060) are annual averages.

[c] The degradation rates (day^-1) tested correspond to the following first-order half-lives (values in parentheses): 0.0034 (204 days), 0.00034 (5.6 years), 0.0000306 (28 years), 0.000034 (56 years), 0.0000674 (62 years), and 0.0000034 (560 years).

[d] External loads to the surface water column layer include the following pathways: atmospheric deposition, surface runoff, POTWs, and direct groundwater discharges. The test value from Pelletier and Mohamedali (2009) includes atmospheric deposition, which was derived from the atmospheric flux (ng/m^2/year) by multiplying by the regional surface area.

[e] The sediment burial velocities (m/d) converted to cm/year are as follows (converted values in parentheses): 4.658E-05 (0.17 cm/year), 1.096E-05 (0.40 cm/year), and 2.219E-05 (0.81 cm/year).

Table G-5. Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Total PBDEs in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Total PBDEs in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						98.8	23.8	23.7			
Initial salinity in the water column	Boundary	PSU	30.87 / 31.59	27.78 / 28.43	-10%	98.8	23.8	23.7	0.0%	0.0%	0.0%
				33.95 / 34.75	+10%	98.8	23.8	23.7	0.0%	0.0%	0.0%
Concentration of dry solids in the active sediments	Region-specific	kg/L	0.8285 / 0.7831	0.7457 / 0.7048	-10%	89.3	22.5	22.5	-9.7%	-5.3%	-5.4%
				0.9114 / 0.8614	+10%	108.4	24.9	24.9	9.7%	5.0%	5.0%
Density of organic carbon	Global	kg/L	0.90	0.81	-10%	98.8	23.8	23.7	0.0%	0.0%	0.0%
				0.99	+10%	98.8	23.8	23.7	0.0%	0.0%	0.0%
Water-sediment diffusion coefficient for the active sediments	Global	m/d	0.0024	0.0022	-10%	98.8	23.8	23.7	0.0%	0.0%	0.0%
				0.0026	+10%	98.8	23.8	23.7	0.0%	0.0%	0.0%
Solids resuspension velocity of the active sediments	Region-specific	m/d	4x / 2x burial	2x / 1x burial	-50%	98.8	19.9	19.8	0.0%	-16.4%	-16.6%
				3.6x / 1.8x burial	-10%	98.8	23.1	23.1	0.0%	-2.8%	-2.9%
				4.4x / 2.2x burial	+10%	98.8	24.4	24.4	0.0%	2.7%	2.7%
				8x / 4x burial	+100%	98.8	28.7	28.7	0.0%	20.9%	21.0%
Proportionality constant for POC phase partitioning	Global	dim'less	0.35	0.1400	-60%	98.8	14.9	14.8	0.0%	-37.3%	-37.7%
				0.3150	-10%	98.8	22.6	22.5	0.0%	-4.9%	-5.0%
				0.3850	+10%	98.8	24.8	24.8	0.0%	4.5%	4.6%
				0.5250	+150%	98.8	28.4	28.4	0.0%	19.7%	19.9%
Proportionality constant for DOC phase partitioning	Global	dim'less	0.08	0.0320	-60%	98.8	25.8	25.8	0.0%	8.4%	8.6%
				0.0720	-10%	98.8	24.1	24.0	0.0%	1.3%	1.3%
				0.0880	+10%	98.8	23.5	23.4	0.0%	-1.2%	-1.3%
				0.1200	+150%	98.8	22.4	22.3	0.0%	-5.8%	-5.9%
Setschenow proportionality constant for HOC tracer partitioning	Global	L/cm^3	0.0018	0.00162	-10%	98.8	23.4	23.3	0.0%	-1.7%	-1.7%
				0.00198	+10%	98.8	24.2	24.1	0.0%	1.7%	1.7%
Henry's Law constant for HOC tracer	Global	Pa m^3 / mol	1.7329	1.5596	-10%	98.8	23.8	23.8	0.0%	0.1%	0.1%
				1.9062	+10%	98.8	23.7	23.7	0.0%	-0.1%	-0.1%
Enthalpy of air-water phase change for HOC tracer	Global	J/mol	73900	66510	-10%	98.8	23.7	23.7	0.0%	-0.2%	-0.2%
				81290	+10%	98.8	23.8	23.8	0.0%	0.2%	0.2%
Octanol-water partition coefficient for HOC tracer	Global	dim'less	6.28	5.652	-10%	98.8	12.7	12.5	0.0%	-46.7%	-47.2%
				6.908	+10%	98.8	33.2	33.2	0.0%	39.9%	39.8%
				4.89	lowest homolog	98.8	6.6	6.4	0.0%	-72.1%	-72.9%
				9.08	highest homolog	98.8	38.4	38.3	0.0%	61.8%	61.5%
Enthalpy of octanol-water phase change for HOC tracer	Global	J/mol	-20000	-18000	-10%	98.8	23.4	23.4	0.0%	-1.4%	-1.4%
				-22000	+10%	98.8	24.1	24.1	0.0%	1.4%	1.4%
Degradation rate in the surface water column layer [c]	Global	day^-1	0.0046	0.00414	-10%	98.8	23.9	23.9	0.0%	0.8%	0.8%
				0.00506	+10%	98.8	23.6	23.6	0.0%	-0.7%	-0.7%
Degradation rate in the deep water column layer [c]	Global	day^-1	0.0046	0.00414	-10%	98.8	24.1	24.1	0.0%	1.4%	1.4%
				0.00506	+10%	98.8	23.4	23.4	0.0%	-1.4%	-1.4%

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Table G-5 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Total PBDEs in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Total PBDEs in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						98.8	23.8	23.7			
Degradation rate in the active sediments below the surface layer [c]	Global	day^-1	0.0012	0.00108	-10%	98.8	24.4	24.4	0.0%	2.8%	2.8%
				0.00132	+10%	98.8	23.2	23.2	0.0%	-2.4%	-2.4%
Degradation rate in the active sediments below the deep layer [c]	Global	day^-1	0.0012	0.00108	-10%	98.8	24.9	24.9	0.0%	4.9%	5.0%
				0.00132	+10%	98.8	22.8	22.7	0.0%	-4.2%	-4.2%
Degradation rate in the water column and active sediments [c]	Global	day^-1	0.0046 / 0.0012	0.00414 / 0.00108	-10%	98.8	26.2	26.2	0.0%	10.2%	10.2%
				0.00506 / 0.00132	+10%	98.8	21.7	21.7	0.0%	-8.5%	-8.6%
				0	zero degradation	98.8	163.0	174.1	0.0%	585.9%	633.5%
				0.000034	56yr half-life	98.8	145.0	151.0	0.0%	510.2%	536.1%
				0.000047	40yr half-life	98.8	139.0	143.6	0.0%	484.8%	505.3%
				0.000063	30yr half-life	98.8	132.1	135.5	0.0%	456.0%	471.2%
				0.000095	20yr half-life	98.8	120.1	121.8	0.0%	405.2%	413.4%
				0.000190	10yr half-life	98.8	93.7	93.8	0.0%	294.4%	295.4%
				0.000380	5yr half-life	98.8	64.7	64.6	0.0%	172.1%	172.3%
				0.000950	2yr half-life	98.8	34.0	34.0	0.0%	43.0%	43.2%
				0.001899	1yr half-life	98.8	19.5	19.4	0.0%	-17.9%	-18.1%
Daily wind speed at standard height of 10 m	Region-specific	m/s	monthly averages	0.5x	-50%	98.8	24.0	24.0	0.0%	1.0%	1.0%
				0.9x	-10%	98.8	23.8	23.8	0.0%	0.2%	0.2%
				1.1x	+10%	98.8	23.7	23.7	0.0%	-0.2%	-0.2%
				1.5x	+50%	98.8	23.5	23.5	0.0%	-0.9%	-0.9%
Homolog-specific parameterization	Global	NA	Tetra-BDE	all parameters	Di-BDE	98.8	9.4	9.1	0.0%	-60.3%	-61.8%
				all parameters	Tri-BDE	98.8	19.9	19.5	0.0%	-16.4%	-17.9%
				all parameters	Penta-BDE	98.8	31.8	31.7	0.0%	33.7%	33.6%
				all parameters	Hexa-BDE	98.8	36.0	35.9	0.0%	51.3%	51.1%
				all parameters	Deca-BDE	98.8	38.5	38.3	0.0%	61.8%	61.5%
External load to the surface water column layer [d]	Region-specific	kg/yr	2.274	0	zero loading	98.8	7.3	7.3	0.0%	-69.3%	-69.0%
				1.670	25th %tile	98.8	19.1	19.1	0.0%	-19.5%	-19.4%
				4.097	75th %tile	98.8	37.6	37.5	0.0%	58.3%	58.1%
Initial contaminant concentration in the water column	Region-specific	pg/L	23.41 / 14.84	17.558 / 11.130	-25%	98.1	23.8	23.7	-0.8%	0.0%	0.0%
				593.1 / 125.0	G&O (2009)	120.6	23.8	23.7	22.0%	0.0%	0.0%
Initial contaminant concentration in the active sediments	Region-specific	ng/g dw	0.285	0.175	25th %tile	48.1	23.8	23.7	-51.3%	0.0%	0.0%
				0.808	75th %tile	212.7	23.8	23.7	115.2%	0.0%	0.0%

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Table G-5 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Total PBDEs in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Total PBDEs in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						98.8	23.8	23.7			
TOC fraction in the active sediments	Region-specific	dim'less	0.0181	0.0057	25th %tile	98.8	23.8	23.7	0.0%	-0.1%	-0.1%
				0.0279	75th %tile	98.8	23.8	23.7	0.0%	0.0%	0.0%
Concentration of POC in the water column	Region-specific	mg/L	0.082 / 0.082	0.0493 / 0.0493	25th %tile	98.8	19.7	19.6	0.0%	-17.2%	-17.4%
				0.132 / 0.132	75th %tile	98.8	30.2	30.2	0.0%	27.1%	27.3%
Concentration of DOC in the water column	Region-specific	mg/L	0.821 / 0.821	0.805 / 0.805	25th %tile	98.8	24.3	24.3	0.0%	2.4%	2.5%
				0.834 / 0.834	75th %tile	98.8	23.1	23.0	0.0%	-2.8%	-2.9%
Concentration of TSS in the water column	Region-specific	mg/L	6.5 / 4.0	5.0 / 1.6	25th %tile	98.8	30.7	30.7	0.0%	29.2%	29.5%
				8.0 / 5.0	75th %tile	98.8	19.5	19.5	0.0%	-17.7%	-17.9%
Sediment burial velocity in the active sediments [e]	Region-specific	m/d	1.096E-05	4.658E-06	25th %tile	98.8	16.5	16.4	0.0%	-30.5%	-30.8%
				2.219E-05	75th %tile	98.8	29.1	29.1	0.0%	22.5%	22.7%

DOC = Dissolved organic carbon.
G&O = Gries and Osterberg.
HOC = Hydrophobic organic contaminant.
PBDE = Polybrominated diphenyl ether.
POC = Particulate organic carbon.
POTW = Publicly owned treatment works.
TOC = Total organic carbon.
TSS = Total suspended solids.

[a] Parameters associated with the water column are given for "surface / deep" water layers. Parameters associated with the active sediments are given for sediments below the "surface / deep" water layers. Region-specific parameters show the value(s) from the South Sound in the table.
[b] Initial condition describes the total mass at the first time step in 2006. Predicted masses after 25 years (2030) and 55 years (2060) are annual averages.
[c] The degradation rates (day^-1) tested correspond to the following first-order half-lives (values in parentheses): 0.00414 (136 days), 0.0046 (151 days), 0.00506 (167 days), 0.001899 (1 year), 0.00132 (1.4 years), 0.0012 (1.6 years), 0.00108 (1.8 years), 0.00095 (2 years), 0.00038 (5 years), 0.00019 (10 years), 0.000095 (20 years), 0.000063 (30 years), 0.000047 (40 years), and 0.000034 (56 years).
[d] External loads to the surface water column layer include the following pathways: atmospheric deposition, surface runoff, POTWs, and direct groundwater discharges.
[e] The sediment burial velocities (m/d) converted to cm/year are as follows (converted values in parentheses): 4.658E-05 (0.17 cm/year), 1.096E-05 (0.40 cm/year), and 2.219E-05 (0.81 cm/year).

Table G-6. Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Total PAHs in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Total PAHs in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						59485	753	754			
Initial salinity in the water column	Boundary	PSU	30.87 / 31.59	27.78 / 28.43	-10%	59485	753	754	0.0%	0.0%	0.0%
				33.95 / 34.75	+10%	59485	753	754	0.0%	0.0%	0.0%
Concentration of dry solids in the active sediments	Region-specific	kg/L	0.8285 / 0.7831	0.7457 / 0.7048	-10%	53729	740	741	-9.7%	-1.7%	-1.7%
				0.9114 / 0.8614	+10%	65241	766	766	9.7%	1.7%	1.7%
Density of organic carbon	Global	kg/L	0.90	0.81	-10%	59485	753	754	0.0%	0.0%	0.0%
				0.99	+10%	59485	753	753	0.0%	0.0%	0.0%
Water-sediment diffusion coefficient for the active sediments	Global	m/d	0.0024	0.0022	-10%	59485	753	753	0.0%	-0.1%	-0.1%
				0.0026	+10%	59485	754	754	0.0%	0.1%	0.1%
Solids resuspension velocity of the active sediments	Region-specific	m/d	4x / 2x burial	2x / 1x burial	-50%	59485	714	714	0.0%	-5.2%	-5.3%
				3.6x / 1.8x burial	-10%	59485	746	746	0.0%	-1.0%	-1.0%
				4.4x / 2.2x burial	+10%	59485	761	761	0.0%	1.0%	1.0%
				8x / 4x burial	+100%	59485	818	819	0.0%	8.6%	8.7%
Proportionality constant for POC phase partitioning	Global	dim'less	0.35	0.1400	-60%	59485	675	674	0.0%	-10.5%	-10.5%
				0.3150	-10%	59485	740	741	0.0%	-1.7%	-1.7%
				0.3850	+10%	59485	766	766	0.0%	1.7%	1.7%
				0.5250	+150%	59485	816	816	0.0%	8.3%	8.3%
Proportionality constant for DOC phase partitioning	Global	dim'less	0.08	0.0320	-60%	59485	754	754	0.0%	0.1%	0.1%
				0.0720	-10%	59485	753	754	0.0%	0.0%	0.0%
				0.0880	+10%	59485	753	753	0.0%	0.0%	0.0%
				0.1200	+150%	59485	753	753	0.0%	-0.1%	-0.1%
Setschenow proportionality constant for HOC tracer partitioning	Global	L/cm^3	0.0018	0.00162	-10%	59485	749	750	0.0%	-0.5%	-0.5%
				0.00198	+10%	59485	757	758	0.0%	0.5%	0.5%
Henry's Law constant for HOC tracer	Global	Pa m^3 / mol	1.33	1.1982	-10%	59485	756	756	0.0%	0.3%	0.3%
				1.4644	+10%	59485	751	751	0.0%	-0.3%	-0.3%
				0.011	G&D (2005)	59485	788	788	0.0%	4.6%	4.6%
				0.033	G&D (2005)	59485	787	787	0.0%	4.5%	4.5%
				0.59	G&D (2005)	59485	769	769	0.0%	2.0%	2.0%
				2.04	G&D (2005)	59485	743	743	0.0%	-1.4%	-1.3%
				24.3	G&D (2005)	59485	687	689	0.0%	-8.7%	-8.5%
Octanol-water partition coefficient for HOC tracer	Global	dim'less	4.97	4.473	-10%	59485	662	662	0.0%	-12.1%	-12.1%
				5.467	+10%	59485	994	996	0.0%	31.9%	32.2%
				3.4	G&D (2005)	59485	620	619	0.0%	-17.7%	-17.8%
				6.4	G&D (2005)	59485	2010	2021	0.0%	166.9%	168.2%
				7.1	G&D (2005)	59485	2572	2583	0.0%	241.5%	242.8%
				3.40	lowest compound	59485	620	619	0.0%	-17.7%	-17.8%
				6.63	highest compound	59485	2251	2262	0.0%	198.8%	200.2%

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Table G-6 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Total PAHs in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Total PAHs in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						59485	753	754			
Enthalpy of air-water phase change for HOC tracer	Global	J/mol	54907	49416.3	-10%	59485	751	751	0.0%	-0.3%	-0.3%
				60397.7	+10%	59485	756	756	0.0%	0.3%	0.3%
Enthalpy of octanol-water phase change for HOC tracer	Global	J/mol	-20800	-18720	-10%	59485	748	748	0.0%	-0.7%	-0.7%
				-22880	+10%	59485	759	759	0.0%	0.7%	0.7%
Degradation rate in the surface water column layer [c]	Global	day^-1	0.002	0.0018	-10%	59485	757	757	0.0%	0.5%	0.5%
				0.0022	+10%	59485	749	750	0.0%	-0.5%	-0.5%
Degradation rate in the deep water column layer [c]	Global	day^-1	0.002	0.0018	-10%	59485	763	763	0.0%	1.3%	1.3%
				0.0022	+10%	59485	744	744	0.0%	-1.3%	-1.2%
Degradation rate in the water column [c]	Global	day^-1	0.002	0	G&D (2005)	59485	920	918	0.0%	22.2%	21.8%
				0.0003	G&D (2005)	59485	890	889	0.0%	18.2%	17.9%
				0.01	G&D (2005)	59485	443	446	0.0%	-41.2%	-40.8%
				0.03	G&D (2005)	59485	225	227	0.0%	-70.1%	-69.8%
Degradation rate in the active sediments below the surface layer [c]	Global	day^-1	0.002	0.0018	-10%	59485	759	759	0.0%	0.7%	0.7%
				0.0022	+10%	59485	749	749	0.0%	-0.6%	-0.6%
Degradation rate in the active sediments below the deep layer [c]	Global	day^-1	0.002	0.0018	-10%	59485	764	764	0.0%	1.4%	1.4%
				0.0022	+10%	59485	745	745	0.0%	-1.2%	-1.2%
Degradation rate in the active Sediments [c]	Global	day^-1	0.002	0	G&D (2005)	59485	3774	1693	0.0%	401.0%	124.7%
				0.0003	G&D (2005)	59485	1321	1173	0.0%	75.4%	55.7%
				0.01	G&D (2005)	59485	620	620	0.0%	-17.7%	-17.7%
				0.03	G&D (2005)	59485	593	594	0.0%	-21.2%	-21.2%
Degradation rate in the water column and active sediments [c]	Global	day^-1	0.002	0.0018	-10%	59485	783	783	0.0%	4.0%	3.9%
				0.0022	+10%	59485	727	727	0.0%	-3.5%	-3.5%
				0	zero degradation	59485	4225	2069	0.0%	460.8%	174.6%
Daily wind speed at standard height of 10 m	Region-specific	m/s	monthly averages	0.5x	-50%	59485	772	773	0.0%	2.5%	2.5%
				0.9x	-10%	59485	757	757	0.0%	0.5%	0.5%
				1.1x	+10%	59485	750	750	0.0%	-0.5%	-0.5%
				1.5x	+50%	59485	736	736	0.0%	-2.3%	-2.3%
Initial contaminant concentration in the water column	Boundary	pg/L	4250 / 4250	1200 / 1250	25th %tile	59485	303	299	0.0%	-59.8%	-60.3%
				15500 / 16000	75th %tile	59485	2518	2532	0.0%	234.2%	236.0%
External load to the surface water column layer [d]	Region-specific	kg/yr	58.6	0	zero loading	59485	638	643	0.0%	-15.3%	-14.6%
				42.9	25th %tile	59485	720	721	0.0%	-4.5%	-4.3%
				70.2	75th %tile	59485	774	774	0.0%	2.8%	2.7%
Initial contaminant concentration in the water column	Region-specific	pg/L	4450 / 4400	2800 / 2800	25th %tile	59205	753	754	-0.5%	0.0%	0.0%
				9975 / 10200	75th %tile	61472	753	754	3.3%	0.0%	0.0%
Initial contaminant concentration in the active sediments	Region-specific	ng/g dw	302.6	44.3	25th %tile	12091	753	754	-79.7%	0.0%	0.0%
				717	75th %tile	164987	753	754	177.4%	0.0%	0.0%

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Table G-6 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Total PAHs in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Total PAHs in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						59485	753	754			
Compound-specific parameterization	Global	NA	Fluoranthene	all parameters	Pyrene	59485	755	755	0.0%	0.2%	0.2%
				all parameters	Phenanthrene	59485	346	349	0.0%	-54.0%	-53.6%
				all parameters	Chrysene	59485	1236	1240	0.0%	64.0%	64.6%
				all parameters	B(b)fluoranthene	59485	5484	5139	0.0%	628.0%	582.0%
				all parameters	B(a)anthracene	59485	1398	1404	0.0%	85.6%	86.3%
				all parameters	B(a)pyrene	59485	6884	6469	0.0%	813.8%	758.5%
				all parameters	B(k)fluoranthene	59485	5487	5142	0.0%	628.4%	582.4%
				all parameters	I(123-cd)pyrene	59485	10682	10051	0.0%	1318.1%	1233.9%
				all parameters	B(ghi)perylene	59485	10999	10348	0.0%	1360.1%	1273.3%
				all parameters	Anthracene	59485	347	350	0.0%	-54.0%	-53.5%
				all parameters	Naphthalene	59485	170	172	0.0%	-77.5%	-77.2%
TOC fraction in the active sediments	Region-specific	dim'less	0.0181	0.0057	25th %tile	59485	751	751	0.0%	-0.3%	-0.3%
				0.0279	75th %tile	59485	754	754	0.0%	0.1%	0.1%
Concentration of POC in the water column	Region-specific	mg/L	0.082 / 0.082	0.0493 / 0.0493	25th %tile	59485	715	714	0.0%	-5.1%	-5.2%
				0.132 / 0.132	75th %tile	59485	849	850	0.0%	12.7%	12.8%
Concentration of DOC in the water column	Region-specific	mg/L	0.821 / 0.821	0.805 / 0.805	25th %tile	59485	753	754	0.0%	0.0%	0.0%
				0.834 / 0.834	75th %tile	59485	753	753	0.0%	-0.1%	-0.1%
Concentration of TSS in the water column	Region-specific	mg/L	6.5 / 4.0	5.0 / 1.6	25th %tile	59485	850	851	0.0%	12.8%	12.9%
				8.0 / 5.0	75th %tile	59485	714	714	0.0%	-5.2%	-5.2%
Sediment burial velocity in the active sediments [e]	Region-specific	m/d	1.096E-05	4.658E-06	25th %tile	59485	685	685	0.0%	-9.0%	-9.1%
				2.219E-05	75th %tile	59485	843	844	0.0%	11.9%	12.0%

G&D = Greenfield and Davis.
See Appendix R for other acronyms.

[a] Parameters associated with the water column are given for "surface / deep" water layers. Parameters associated with the active sediments are given for sediments below the "surface / deep" water layers. Region-specific parameters show the value(s) from the South Sound in the table.
[b] Initial condition describes the total mass at the first time step in 2006. Predicted masses after 25 years (2030) and 55 years (2060) are annual averages.
[c] The degradation rates (day^-1) tested correspond to the following first-order half-lives (values in parentheses): 0.03 (23 days), 0.01 (69 days), 0.0022 (315 days), 0.002 (347 days), 0.0018 (1.1 years), and 0.0003 (6.3 years).
[d] External loads to the surface water column layer include the following pathways: atmospheric deposition, surface runoff, and POTWs; direct groundwater discharges were excluded.
[e] The sediment burial velocities (m/d) converted to cm/year are as follows (converted values in parentheses): 4.658E-05 (0.17 cm/year), 1.096E-05 (0.40 cm/year), and 2.219E-05 (0.81 cm/year).

Table G-7. Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Benzo(a)anthracene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of B(a)anth in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						4739	210	210			
Initial salinity in the water column	Boundary	PSU	30.87 / 31.59	27.78 / 28.43	-10%	4739	210	210	0.0%	0.0%	0.0%
				33.95 / 34.75	+10%	4739	210	210	0.0%	0.0%	0.0%
Concentration of dry solids in the active sediments	Region-specific	kg/L	0.8285 / 0.7831	0.7457 / 0.7048	-10%	4353	201	201	-8.2%	-4.2%	-4.3%
				0.9114 / 0.8614	+10%	5126	218	218	8.2%	4.0%	4.1%
Density of organic carbon	Global	kg/L	0.90	0.81	-10%	4739	210	210	0.0%	0.0%	0.0%
				0.99	+10%	4739	210	210	0.0%	0.0%	0.0%
Water-sediment diffusion coefficient for the active sediments	Global	m/d	0.0024	0.0022	-10%	4739	210	210	0.0%	0.0%	0.0%
				0.0026	+10%	4739	210	210	0.0%	0.0%	0.0%
Solids resuspension velocity of the active sediments	Region-specific	m/d	4x / 2x burial	3.6x / 1.8x burial	-50%	4739	181	180	0.0%	-13.7%	-13.9%
				4.4x / 2.2x burial	+100%	4739	251	251	0.0%	19.6%	19.9%
Proportionality constant for POC phase partitioning	Global	dim'less	0.35	0.1400	-60%	4739	150	149	0.0%	-28.4%	-28.9%
				0.3150	-10%	4739	201	201	0.0%	-4.1%	-4.1%
				0.3850	+10%	4739	218	218	0.0%	3.9%	3.9%
				0.5250	+150%	4739	247	247	0.0%	17.5%	17.8%
Proportionality constant for DOC phase partitioning	Global	dim'less	0.08	0.0320	-60%	4739	216	216	0.0%	2.8%	2.9%
				0.0720	-10%	4739	211	211	0.0%	0.4%	0.5%
				0.0880	+10%	4739	209	209	0.0%	-0.4%	-0.5%
				0.1200	+150%	4739	205	205	0.0%	-2.1%	-2.2%
Setschenow proportionality constant for HOC tracer partitioning	Global	L/cm^3	0.0018	0.00162	-10%	4739	207	207	0.0%	-1.5%	-1.5%
				0.00198	+10%	4739	213	213	0.0%	1.5%	1.5%
Henry's Law constant for HOC tracer	Global	Pa m^3 / mol	0.6372	0.5735	-10%	4739	210	210	0.0%	0.1%	0.1%
				0.7009	+10%	4739	210	209	0.0%	-0.1%	-0.1%
Enthalpy of air-water phase change for HOC tracer	Global	J/mol	66400	59760	-10%	4739	210	209	0.0%	-0.2%	-0.2%
				73040	+10%	4739	210	210	0.0%	0.2%	0.2%
Octanol-water partition coefficient for HOC tracer	Global	dim'less	5.83	5.247	-10%	4739	136	135	0.0%	-35.3%	-35.8%
				6.413	+10%	4739	315	316	0.0%	50.3%	50.7%
Enthalpy of octanol-water phase change for HOC tracer	Global	J/mol	-23300	-20970	-10%	4739	206	206	0.0%	-1.6%	-1.7%
				-25630	+10%	4739	213	213	0.0%	1.7%	1.7%
Degradation rate in the surface water column layer [c]	Global	day^-1	0.002	0.0018	-10%	4739	211	211	0.0%	0.4%	0.4%
				0.0022	+10%	4739	209	209	0.0%	-0.4%	-0.4%
Degradation rate in the deep water column layer [c]	Global	day^-1	0.002	0.0018	-10%	4739	212	212	0.0%	1.0%	1.0%
				0.0022	+10%	4739	208	208	0.0%	-1.0%	-1.0%
Degradation rate in the water column [c]	Global	day^-1	0.002	0	G&D (2005)	4739	244	244	0.0%	16.4%	16.5%
				0.0003	G&D (2005)	4739	238	238	0.0%	13.6%	13.6%
				0.01	G&D (2005)	4739	136	136	0.0%	-35.2%	-35.3%
				0.03	G&D (2005)	4739	74	74	0.0%	-64.7%	-64.7%

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Table G-7 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Benzo(a)anthracene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of B(a)anth in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						4739	210	210			
Degradation rate in the active sediments below the surface layer [c]	Global	day^-1	0.002	0.0018	-10%	4739	215	214	0.0%	2.2%	2.2%
				0.0022	+10%	4739	206	206	0.0%	-1.9%	-1.9%
Degradation rate in the active sediments below the deep layer [c]	Global	day^-1	0.002	0.0018	-10%	4739	219	218	0.0%	4.2%	4.2%
				0.0022	+10%	4739	203	202	0.0%	-3.5%	-3.5%
Degradation rate in the active Sediments [c]	Global	day^-1	0.002	0	G&D (2005)	4739	1402	1177	0.0%	567.9%	461.4%
				0.0003	G&D (2005)	4739	627	609	0.0%	198.6%	190.2%
				0.01	G&D (2005)	4739	101	100	0.0%	-52.0%	-52.4%
				0.03	G&D (2005)	4739	80	79	0.0%	-61.9%	-62.4%
Degradation rate in the water column and active sediments [c]	Global	day^-1	0.002	0.0018	-10%	4739	226	226	0.0%	7.9%	7.9%
				0.0022	+10%	4739	196	196	0.0%	-6.6%	-6.7%
				0	zero degradation	4739	1669	1437	0.0%	694.9%	585.1%
Daily wind speed at standard height of 10 m	Region-specific	m/s	monthly averages	0.5x	-50%	4739	212	211	0.0%	0.8%	0.8%
				0.9x	-10%	4739	210	210	0.0%	0.1%	0.1%
				1.1x	+10%	4739	210	209	0.0%	-0.1%	-0.1%
				1.5x	+50%	4739	209	208	0.0%	-0.7%	-0.7%
Initial contaminant concentration in the water column	Boundary	pg/L	450 / 450	450 / 450	25th %tile	4739	210	210	0.0%	0.0%	0.0%
				500 / 500	75th %tile	4739	224	224	0.0%	6.6%	6.7%
External load to the surface water column layer [d]	Region-specific	kg/yr	24.8	0	zero loading	4739	125	126	0.0%	-40.3%	-39.8%
				24.5	25th %tile	4739	209	209	0.0%	-0.4%	-0.4%
				25.0	75th %tile	4739	211	210	0.0%	0.4%	0.4%
Initial contaminant concentration in the water column	Region-specific	pg/L	450 / 450	450 / 450	25th %tile	4578	210	210	-3.4%	0.0%	0.0%
				475 / 475	75th %tile	4970	210	210	4.9%	0.0%	0.0%
Initial contaminant concentration in the active sediments	Region-specific	ng/g dw	16.9	2.9	25th %tile	1848	210	210	-61.0%	0.0%	0.0%
				38.2	75th %tile	10693	210	210	125.6%	0.0%	0.0%
TOC fraction in the active sediments	Region-specific	dim'less	0.0181	0.0057	25th %tile	4739	210	210	0.0%	-0.1%	-0.1%
				0.0279	75th %tile	4739	210	210	0.0%	0.0%	0.0%
Concentration of POC in the water column	Region-specific	mg/L	0.082 / 0.082	0.0493 / 0.0493	25th %tile	4739	183	182	0.0%	-13.0%	-13.3%
				0.132 / 0.132	75th %tile	4739	270	271	0.0%	28.7%	29.0%
Concentration of DOC in the water column	Region-specific	mg/L	0.821 / 0.821	0.805 / 0.805	25th %tile	4739	211	211	0.0%	0.7%	0.8%
				0.834 / 0.834	75th %tile	4739	208	207	0.0%	-1.1%	-1.1%
Concentration of TSS in the water column	Region-specific	mg/L	6.5 / 4.0	5.0 / 1.6	25th %tile	4739	264	264	0.0%	25.7%	26.1%
				8.0 / 5.0	75th %tile	4739	181	180	0.0%	-13.8%	-14.0%
Sediment burial velocity in the active sediments [e]	Region-specific	m/d	1.096E-05	4.658E-06	25th %tile	4739	158	157	0.0%	-24.6%	-25.0%
				2.219E-05	75th %tile	4739	261	261	0.0%	24.3%	24.7%

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Table G-7 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Benzo(a)anthracene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

G&D = Greenfield and Davis.
See Appendix R for other acronyms.

[a] Parameters associated with the water column are given for "surface / deep" water layers. Parameters associated with the active sediments are given for sediments below the "surface / deep" water layers. Region-specific parameters show the value(s) from the South Sound in the table.
[b] Initial condition describes the total mass at the first time step in 2006. Predicted masses after 25 years (2030) and 55 years (2060) are annual averages.
[c] The degradation rates (day^-1) tested correspond to the following first-order half-lives (values in parentheses): 0.03 (23 days), 0.01 (69 days), 0.0022 (315 days), 0.002 (347 days), 0.0018 (1.1 years), and 0.0003 (6.3 years).
[d] External loads to the surface water column layer include the following pathways: atmospheric deposition, surface runoff, and POTWs; direct groundwater discharges were excluded.
[e] The sediment burial velocities (m/d) converted to cm/year are as follows (converted values in parentheses): 4.658E-05 (0.17 cm/year), 1.096E-05 (0.40 cm/year), and 2.219E-05 (0.81 cm/year).

Table G-8. Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Benzo(b)fluoranthene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of B(b)fluor in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						6033	861	829			
Initial salinity in the water column	Boundary	PSU	30.87 / 31.59	27.78 / 28.43	-10%	6033	861	829	0.0%	0.0%	0.0%
				33.95 / 34.75	+10%	6033	861	829	0.0%	0.0%	0.0%
Concentration of dry solids in the active sediments	Region-specific	kg/L	0.8285 / 0.7831	0.7457 / 0.7048	-10%	5465	800	773	-9.4%	-7.1%	-6.8%
				0.9114 / 0.8614	+10%	6601	920	883	9.4%	6.9%	6.5%
Density of organic carbon	Global	kg/L	0.90	0.81	-10%	6033	861	829	0.0%	0.0%	0.0%
				0.99	+10%	6033	861	829	0.0%	0.0%	0.0%
Water-sediment diffusion coefficient for the active sediments	Global	m/d	0.0024	0.0022	-10%	6033	861	829	0.0%	0.0%	0.0%
				0.0026	+10%	6033	861	829	0.0%	0.0%	0.0%
Solids resuspension velocity of the active sediments	Region-specific	m/d	4x / 2x burial	3.6x / 1.8x burial	-50%	6033	776	717	0.0%	-9.9%	-13.6%
				4.4x / 2.2x burial	+100%	6033	983	970	0.0%	14.2%	17.0%
Proportionality constant for POC phase partitioning	Global	dim'less	0.35	0.1400	-60%	6033	480	456	0.0%	-44.3%	-45.0%
				0.3150	-10%	6033	805	775	0.0%	-6.5%	-6.6%
				0.3850	+10%	6033	914	881	0.0%	6.1%	6.2%
				0.5250	+150%	6033	1102	1064	0.0%	28.0%	28.4%
Proportionality constant for DOC phase partitioning	Global	dim'less	0.08	0.0320	-60%	6033	906	873	0.0%	5.2%	5.3%
				0.0720	-10%	6033	868	836	0.0%	0.8%	0.8%
				0.0880	+10%	6033	854	822	0.0%	-0.8%	-0.8%
				0.1200	+150%	6033	828	796	0.0%	-3.9%	-3.9%
Setschenow proportionality constant for HOC tracer partitioning	Global	L/cm^3	0.0018	0.00162	-10%	6033	839	808	0.0%	-2.6%	-2.6%
				0.00198	+10%	6033	883	851	0.0%	2.6%	2.6%
Henry's Law constant for HOC tracer	Global	Pa m^3 / mol	0.0652	0.0587	-10%	6033	861	829	0.0%	0.0%	0.0%
				0.0717	+10%	6033	861	829	0.0%	0.0%	0.0%
Enthalpy of air-water phase change for HOC tracer	Global	J/mol	45300	40770	-10%	6033	861	829	0.0%	0.0%	0.0%
				49830	+10%	6033	861	829	0.0%	0.0%	0.0%
Octanol-water partition coefficient for HOC tracer	Global	dim'less	5.86	5.274	-10%	6033	389	368	0.0%	-54.8%	-55.6%
				6.446	+10%	6033	1541	1490	0.0%	79.0%	79.8%
Enthalpy of octanol-water phase change for HOC tracer	Global	J/mol	-24663	-22197	-10%	6033	838	806	0.0%	-2.7%	-2.8%
				-27130	+10%	6033	885	853	0.0%	2.8%	2.9%
Degradation rate in the surface water column layer [c]	Global	day^-1	0.0003	0.00027	-10%	6033	862	830	0.0%	0.1%	0.1%
				0.00033	+10%	6033	860	828	0.0%	-0.1%	-0.1%
Degradation rate in the deep water column layer [c]	Global	day^-1	0.0003	0.00027	-10%	6033	863	831	0.0%	0.2%	0.2%
				0.00033	+10%	6033	859	827	0.0%	-0.2%	-0.2%
Degradation rate in the water column [c]	Global	day^-1	0.0003	0	G&D (2005)	6033	885	852	0.0%	2.8%	2.8%
				0.002	G&D (2005)	6033	748	719	0.0%	-13.1%	-13.3%
				0.01	G&D (2005)	6033	472	449	0.0%	-45.1%	-45.8%
				0.03	G&D (2005)	6033	257	238	0.0%	-70.2%	-71.3%

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Table G-8 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Benzo(b)fluoranthene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of B(b)fluor in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						6033	861	829			
Degradation rate in the active sediments below the surface layer [c]	Global	day^-1	0.0003	0.00027	-10%	6033	875	840	0.0%	1.6%	1.3%
				0.00033	+10%	6033	848	819	0.0%	-1.5%	-1.2%
Degradation rate in the active sediments below the deep layer [c]	Global	day^-1	0.0003	0.00027	-10%	6033	898	859	0.0%	4.3%	3.6%
				0.00033	+10%	6033	829	802	0.0%	-3.8%	-3.3%
Degradation rate in the active Sediments [c]	Global	day^-1	0.0003	0	G&D (2005)	6033	2074	1689	0.0%	140.8%	103.7%
				0.002	G&D (2005)	6033	272	272	0.0%	-68.4%	-67.2%
				0.01	G&D (2005)	6033	125	124	0.0%	-85.5%	-85.1%
				0.03	G&D (2005)	6033	97	96	0.0%	-88.7%	-88.4%
Degradation rate in the water column and active sediments [c]	Global	day^-1	0.0003	0.00027	-10%	6033	915	873	0.0%	6.2%	5.3%
				0.00033	+10%	6033	814	790	0.0%	-5.5%	-4.7%
				0	zero degradation	6033	2133	1746	0.0%	147.8%	110.6%
Daily wind speed at standard height of 10 m	Region-specific	m/s	monthly averages	0.5x	-50%	6033	862	830	0.0%	0.1%	0.1%
				0.9x	-10%	6033	861	829	0.0%	0.0%	0.0%
				1.1x	+10%	6033	861	829	0.0%	0.0%	0.0%
				1.5x	+50%	6033	860	828	0.0%	-0.1%	-0.1%
Initial contaminant concentration in the water column	Boundary	pg/L	500 / 500	500 / 500	25th %tile	6033	861	829	0.0%	0.0%	0.0%
				550 / 550	75th %tile	6033	861	829	0.0%	0.0%	0.0%
External load to the surface water column layer [d]	Region-specific	kg/yr	25.4	0	zero loading	6033	548	514	0.0%	-36.3%	-38.0%
				24.9	25th %tile	6033	853	821	0.0%	-0.9%	-0.9%
				26.2	75th %tile	6033	871	839	0.0%	1.2%	1.2%
Initial contaminant concentration in the water column	Region-specific	pg/L	550 / 500	525 / 500	25th %tile	5980	861	829	-0.9%	0.0%	0.0%
				550 / 525	75th %tile	6129	861	829	1.6%	0.0%	0.0%
Initial contaminant concentration in the active sediments	Region-specific	ng/g dw	30.0	4.7	25th %tile	1656	830	829	-72.6%	-3.6%	0.0%
				63.9	75th %tile	14459	918	829	139.7%	6.6%	0.0%
TOC fraction in the active sediments	Region-specific	dim'less	0.0181	0.0057	25th %tile	6033	857	826	0.0%	-0.4%	-0.4%
				0.0279	75th %tile	6033	863	830	0.0%	0.2%	0.2%
Concentration of POC in the water column	Region-specific	mg/L	0.082 / 0.082	0.0493 / 0.0493	25th %tile	6033	691	662	0.0%	-19.8%	-20.2%
				0.132 / 0.132	75th %tile	6033	1215	1176	0.0%	41.2%	41.8%
Concentration of DOC in the water column	Region-specific	mg/L	0.821 / 0.821	0.805 / 0.805	25th %tile	6033	873	841	0.0%	1.3%	1.4%
				0.834 / 0.834	75th %tile	6033	845	813	0.0%	-1.8%	-1.9%
Concentration of TSS in the water column	Region-specific	mg/L	6.5 / 4.0	5.0 / 1.6	25th %tile	6033	1227	1187	0.0%	42.5%	43.2%
				8.0 / 5.0	75th %tile	6033	677	649	0.0%	-21.4%	-21.8%
Sediment burial velocity in the active sediments [e]	Region-specific	m/d	1.096E-05	4.658E-06	25th %tile	6033	714	618	0.0%	-17.1%	-25.5%
				2.219E-05	75th %tile	6033	935	933	0.0%	8.6%	12.6%

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Table G-8 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Benzo(b)fluoranthene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

G&D = Greenfield and Davis.
See Appendix R for other acronyms.

[a] Parameters associated with the water column are given for "surface / deep" water layers. Parameters associated with the active sediments are given for sediments below the "surface / deep" water layers. Region-specific parameters show the value(s) from the South Sound in the table.
[b] Initial condition describes the total mass at the first time step in 2006. Predicted masses after 25 years (2030) and 55 years (2060) are annual averages.
[c] The degradation rates (day^-1) tested correspond to the following first-order half-lives (values in parentheses): 0.03 (23 days), 0.01 (69 days), 0.002 (347 days), 0.00033 (5.8 years), 0.0003 (6.3 years), and 0.00027 (7 years).
[d] External loads to the surface water column layer include the following pathways: atmospheric deposition, surface runoff, and POTWs; direct groundwater discharges were excluded.
[e] The sediment burial velocities (m/d) converted to cm/year are as follows (converted values in parentheses): 4.658E-05 (0.17 cm/year), 1.096E-05 (0.40 cm/year), and 2.219E-05 (0.81 cm/year).

Table G-9. Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Chrysene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Chrysene in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						6656	188	187			
Initial salinity in the water column	Boundary	PSU	30.87 / 31.59	27.78 / 28.43	-10%	6656	188	187	0.0%	0.0%	0.0%
				33.95 / 34.75	+10%	6656	188	187	0.0%	0.0%	0.0%
Concentration of dry solids in the active sediments	Region-specific	kg/L	0.8285 / 0.7831	0.7457 / 0.7048	-10%	6078	180	180	-8.7%	-3.9%	-4.0%
				0.9114 / 0.8614	+10%	7235	195	194	8.7%	3.8%	3.9%
Density of organic carbon	Global	kg/L	0.90	0.81	-10%	6656	188	187	0.0%	0.0%	0.0%
				0.99	+10%	6656	188	187	0.0%	0.0%	0.0%
Water-sediment diffusion coefficient for the active sediments	Global	m/d	0.0024	0.0022	-10%	6656	188	187	0.0%	0.0%	0.0%
				0.0026	+10%	6656	188	187	0.0%	0.0%	0.0%
Solids resuspension velocity of the active sediments	Region-specific	m/d	4x / 2x burial	3.6x / 1.8x burial	-50%	6656	164	163	0.0%	-12.6%	-12.9%
				4.4x / 2.2x burial	+100%	6656	223	223	0.0%	18.7%	19.1%
Proportionality constant for POC phase partitioning	Global	dim'less	0.35	0.1400	-60%	6656	139	138	0.0%	-25.8%	-26.3%
				0.3150	-10%	6656	181	180	0.0%	-3.8%	-3.9%
				0.3850	+10%	6656	195	194	0.0%	3.7%	3.8%
				0.5250	+150%	6656	220	220	0.0%	17.0%	17.3%
Proportionality constant for DOC phase partitioning	Global	dim'less	0.08	0.0320	-60%	6656	191	191	0.0%	1.9%	2.0%
				0.0720	-10%	6656	188	188	0.0%	0.3%	0.3%
				0.0880	+10%	6656	187	187	0.0%	-0.3%	-0.3%
				0.1200	+150%	6656	185	184	0.0%	-1.5%	-1.5%
Setschenow proportionality constant for HOC tracer partitioning	Global	L/cm^3	0.0018	0.00162	-10%	6656	185	184	0.0%	-1.5%	-1.5%
				0.00198	+10%	6656	191	190	0.0%	1.5%	1.5%
Henry's Law constant for HOC tracer	Global	Pa m^3 / mol	0.375	0.3377	-10%	6656	188	187	0.0%	0.1%	0.1%
				0.4127	+10%	6656	188	187	0.0%	-0.1%	-0.1%
Enthalpy of air-water phase change for HOC tracer	Global	J/mol	100900	90810	-10%	6656	188	187	0.0%	-0.1%	-0.1%
				110990	+10%	6656	188	187	0.0%	0.1%	0.1%
Octanol-water partition coefficient for HOC tracer	Global	dim'less	5.67	5.103	-10%	6656	128	127	0.0%	-31.6%	-32.1%
				6.237	+10%	6656	289	289	0.0%	53.7%	54.4%
Enthalpy of octanol-water phase change for HOC tracer	Global	J/mol	-22700	-20430	-10%	6656	185	184	0.0%	-1.6%	-1.6%
				-24970	+10%	6656	191	190	0.0%	1.6%	1.7%
Degradation rate in the surface water column layer [c]	Global	day^-1	0.002	0.0018	-10%	6656	189	188	0.0%	0.5%	0.5%
				0.0022	+10%	6656	187	186	0.0%	-0.5%	-0.5%
Degradation rate in the deep water column layer [c]	Global	day^-1	0.002	0.0018	-10%	6656	190	189	0.0%	1.1%	1.1%
				0.0022	+10%	6656	186	185	0.0%	-1.0%	-1.0%
Degradation rate in the water column [c]	Global	day^-1	0.002	0	G&D (2005)	6656	222	221	0.0%	18.2%	18.3%
				0.0003	G&D (2005)	6656	216	215	0.0%	15.1%	15.1%
				0.01	G&D (2005)	6656	118	117	0.0%	-37.2%	-37.3%
				0.03	G&D (2005)	6656	63	62	0.0%	-66.6%	-66.7%

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Table G-9 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Chrysene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Chrysene in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						6656	188	187			
Degradation rate in the active sediments below the surface layer [c]	Global	day^-1	0.002	0.0018	-10%	6656	191	191	0.0%	2.0%	2.0%
				0.0022	+10%	6656	185	184	0.0%	-1.7%	-1.7%
Degradation rate in the active sediments below the deep layer [c]	Global	day^-1	0.002	0.0018	-10%	6656	195	194	0.0%	3.6%	3.6%
				0.0022	+10%	6656	182	182	0.0%	-3.0%	-3.0%
Degradation rate in the active Sediments [c]	Global	day^-1	0.002	0	G&D (2005)	6656	1243	908	0.0%	561.7%	385.2%
				0.0003	G&D (2005)	6656	517	492	0.0%	175.5%	162.7%
				0.01	G&D (2005)	6656	102	100	0.0%	-45.9%	-46.4%
				0.03	G&D (2005)	6656	85	84	0.0%	-54.7%	-55.3%
Degradation rate in the water column and active sediments [c]	Global	day^-1	0.002	0.0018	-10%	6656	201	201	0.0%	7.2%	7.3%
				0.0022	+10%	6656	176	176	0.0%	-6.1%	-6.2%
				0	zero degradation	6656	1474	1116	0.0%	685.2%	496.1%
Daily wind speed at standard height of 10 m	Region-specific	m/s	monthly averages	0.5x	-50%	6656	188	188	0.0%	0.3%	0.3%
				0.9x	-10%	6656	188	187	0.0%	0.0%	0.0%
				1.1x	+10%	6656	188	187	0.0%	0.0%	0.0%
				1.5x	+50%	6656	187	187	0.0%	-0.2%	-0.2%
Initial contaminant concentration in the water column	Boundary	pg/L	450 / 450	450 / 450	25th %tile	6656	188	187	0.0%	0.0%	0.0%
				450 / 450	75th %tile	6656	188	187	0.0%	0.0%	0.0%
External load to the surface water column layer [d]	Region-specific	kg/yr	25.4	0	zero loading	6656	111	112	0.0%	-41.0%	-40.4%
				24.8	25th %tile	6656	186	185	0.0%	-0.9%	-0.9%
				25.9	75th %tile	6656	190	189	0.0%	1.0%	1.0%
Initial contaminant concentration in the water column	Region-specific	pg/L	450 / 450	425 / 450	25th %tile	6494	188	187	-2.4%	0.0%	0.0%
				450 / 450	75th %tile	6886	188	187	3.5%	0.0%	0.0%
Initial contaminant concentration in the active sediments	Region-specific	ng/g dw	27.0	4.4	25th %tile	2201	188	187	-66.9%	0.0%	0.0%
				65.0	75th %tile	16202	188	187	143.4%	0.0%	0.0%
TOC fraction in the active sediments	Region-specific	dim'less	0.0181	0.0057	25th %tile	6656	188	187	0.0%	-0.1%	-0.1%
				0.0279	75th %tile	6656	188	187	0.0%	0.0%	0.0%
Concentration of POC in the water column	Region-specific	mg/L	0.082 / 0.082	0.0493 / 0.0493	25th %tile	6656	165	164	0.0%	-12.1%	-12.4%
				0.132 / 0.132	75th %tile	6656	241	241	0.0%	28.2%	28.6%
Concentration of DOC in the water column	Region-specific	mg/L	0.821 / 0.821	0.805 / 0.805	25th %tile	6656	189	188	0.0%	0.5%	0.5%
				0.834 / 0.834	75th %tile	6656	186	186	0.0%	-0.8%	-0.8%
Concentration of TSS in the water column	Region-specific	mg/L	6.5 / 4.0	5.0 / 1.6	25th %tile	6656	235	235	0.0%	25.1%	25.6%
				8.0 / 5.0	75th %tile	6656	164	163	0.0%	-12.6%	-12.8%
Sediment burial velocity in the active sediments [e]	Region-specific	m/d	1.096E-05	4.658E-06	25th %tile	6656	146	145	0.0%	-22.4%	-22.8%
				2.219E-05	75th %tile	6656	233	233	0.0%	23.8%	24.3%

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Table G-9 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Chrysene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

G&D = Greenfield and Davis.
See Appendix R for other acronyms.

[a] Parameters associated with the water column are given for "surface / deep" water layers. Parameters associated with the active sediments are given for sediments below the "surface / deep" water layers. Region-specific parameters show the value(s) from the South Sound in the table.
[b] Initial condition describes the total mass at the first time step in 2006. Predicted masses after 25 years (2030) and 55 years (2060) are annual averages.
[c] The degradation rates (day^-1) tested correspond to the following first-order half-lives (values in parentheses): 0.03 (23 days), 0.01 (69 days), 0.0022 (315 days), 0.002 (347 days), 0.0018 (1.1 years), and 0.0003 (6.3 years).
[d] External loads to the surface water column layer include the following pathways: atmospheric deposition, surface runoff, and POTWs; direct groundwater discharges were excluded.
[e] The sediment burial velocities (m/d) converted to cm/year are as follows (converted values in parentheses): 4.658E-05 (0.17 cm/year), 1.096E-05 (0.40 cm/year), and 2.219E-05 (0.81 cm/year).

Table G-10. Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Fluoranthene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Fluoranthene in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						10367	162	161			
Initial salinity in the water column	Boundary	PSU	30.87 / 31.59	27.78 / 28.43	-10%	10367	162	161	0.0%	0.0%	0.0%
				33.95 / 34.75	+10%	10367	162	161	0.0%	0.0%	0.0%
Concentration of dry solids in the active sediments	Region-specific	kg/L	0.8285 / 0.7831	0.7457 / 0.7048	-10%	9368	160	158	-9.6%	-1.7%	-1.7%
				0.9114 / 0.8614	+10%	11366	165	164	9.6%	1.7%	1.7%
Density of organic carbon	Global	kg/L	0.90	0.81	-10%	10367	162	161	0.0%	0.0%	0.0%
				0.99	+10%	10367	162	161	0.0%	0.0%	0.0%
Water-sediment diffusion coefficient for the active sediments	Global	m/d	0.0024	0.0022	-10%	10367	162	161	0.0%	-0.1%	-0.1%
				0.0026	+10%	10367	162	161	0.0%	0.1%	0.1%
Solids resuspension velocity of the active sediments	Region-specific	m/d	4x / 2x burial	3.6x / 1.8x burial	-50%	10367	154	153	0.0%	-5.2%	-5.3%
				4.4x / 2.2x burial	+100%	10367	176	175	0.0%	8.6%	8.7%
Proportionality constant for POC phase partitioning	Global	dim'less	0.35	0.1400	-60%	10367	145	144	0.0%	-10.4%	-10.6%
				0.3150	-10%	10367	160	158	0.0%	-1.7%	-1.7%
				0.3850	+10%	10367	165	164	0.0%	1.7%	1.7%
				0.5250	+150%	10367	176	175	0.0%	8.2%	8.4%
Proportionality constant for DOC phase partitioning	Global	dim'less	0.08	0.0320	-60%	10367	163	161	0.0%	0.1%	0.1%
				0.0720	-10%	10367	162	161	0.0%	0.0%	0.0%
				0.0880	+10%	10367	162	161	0.0%	0.0%	0.0%
				0.1200	+150%	10367	162	161	0.0%	-0.1%	-0.1%
Setschenow proportionality constant for HOC tracer partitioning	Global	L/cm^3	0.0018	0.00162	-10%	10367	162	160	0.0%	-0.5%	-0.5%
				0.00198	+10%	10367	163	162	0.0%	0.5%	0.5%
Henry's Law constant for HOC tracer	Global	Pa m^3 / mol	1.331	1.1982	-10%	10367	163	162	0.0%	0.3%	0.3%
				1.4644	+10%	10367	162	161	0.0%	-0.3%	-0.3%
Enthalpy of air-water phase change for HOC tracer	Global	J/mol	54907	49416	-10%	10367	162	161	0.0%	-0.3%	-0.3%
				60398	+10%	10367	163	162	0.0%	0.3%	0.3%
Octanol-water partition coefficient for HOC tracer	Global	dim'less	4.97	4.473	-10%	10367	143	141	0.0%	-12.0%	-12.2%
				5.467	+10%	10367	214	213	0.0%	31.9%	32.4%
Enthalpy of octanol-water phase change for HOC tracer	Global	J/mol	-20800	-18720	-10%	10367	161	160	0.0%	-0.7%	-0.7%
				-22880	+10%	10367	164	162	0.0%	0.7%	0.7%
Degradation rate in the surface water column layer [c]	Global	day^-1	0.002	0.0018	-10%	10367	163	162	0.0%	0.5%	0.5%
				0.0022	+10%	10367	162	160	0.0%	-0.5%	-0.5%
Degradation rate in the deep water column layer [c]	Global	day^-1	0.002	0.0018	-10%	10367	164	163	0.0%	1.2%	1.2%
				0.0022	+10%	10367	160	159	0.0%	-1.2%	-1.2%
Degradation rate in the water column [c]	Global	day^-1	0.002	0	G&D (2005)	10367	198	196	0.0%	21.9%	21.7%
				0.0003	G&D (2005)	10367	192	190	0.0%	18.0%	17.8%
				0.01	G&D (2005)	10367	96	96	0.0%	-40.8%	-40.6%
				0.03	G&D (2005)	10367	49	49	0.0%	-69.8%	-69.7%

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Table G-10 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Fluoranthene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Fluoranthene in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						10367	162	161			
Degradation rate in the active sediments below the surface layer [c]	Global	day^-1	0.002	0.0018	-10%	10367	164	162	0.0%	0.7%	0.7%
				0.0022	+10%	10367	161	160	0.0%	-0.6%	-0.6%
Degradation rate in the active sediments below the deep layer [c]	Global	day^-1	0.002	0.0018	-10%	10367	165	163	0.0%	1.3%	1.3%
				0.0022	+10%	10367	161	159	0.0%	-1.1%	-1.1%
Degradation rate in the active Sediments [c]	Global	day^-1	0.002	0	G&D (2005)	10367	710	358	0.0%	337.0%	122.4%
				0.0003	G&D (2005)	10367	277	251	0.0%	70.6%	55.7%
				0.01	G&D (2005)	10367	134	133	0.0%	-17.6%	-17.7%
				0.03	G&D (2005)	10367	128	127	0.0%	-21.1%	-21.3%
Degradation rate in the water column and active sediments [c]	Global	day^-1	0.002	0.0018	-10%	10367	169	167	0.0%	3.9%	3.9%
				0.0022	+10%	10367	157	156	0.0%	-3.5%	-3.5%
				0	zero degradation	10367	802	439	0.0%	393.8%	172.1%
Daily wind speed at standard height of 10 m	Region-specific	m/s	monthly averages	0.5x	-50%	10367	167	165	0.0%	2.7%	2.7%
				0.9x	-10%	10367	163	162	0.0%	0.5%	0.5%
				1.1x	+10%	10367	162	160	0.0%	-0.5%	-0.5%
				1.5x	+50%	10367	159	157	0.0%	-2.4%	-2.4%
Initial contaminant concentration in the water column	Boundary	pg/L	750 / 750	500 / 550	25th %tile	10367	132	131	0.0%	-18.5%	-18.8%
				750 / 800	75th %tile	10367	170	169	0.0%	4.6%	4.7%
External load to the surface water column layer [d]	Region-specific	kg/yr	26.8	0	zero loading	10367	113	114	0.0%	-30.6%	-29.6%
				25.8	25th %tile	10367	160	159	0.0%	-1.3%	-1.3%
				28.3	75th %tile	10367	165	164	0.0%	1.6%	1.5%
Initial contaminant concentration in the water column	Region-specific	pg/L	750 / 800	625 / 660	25th %tile	10306	162	161	-0.6%	0.0%	0.0%
				775 / 800	75th %tile	10520	162	161	1.5%	0.0%	0.0%
Initial contaminant concentration in the active sediments	Region-specific	ng/g dw	51.1	7.57	25th %tile	2444	162	161	-76.4%	0.0%	0.0%
				102.9	75th %tile	24843	162	161	139.6%	0.0%	0.0%
TOC fraction in the active sediments	Region-specific	dim'less	0.0181	0.0057	25th %tile	10367	162	161	0.0%	-0.3%	-0.3%
				0.0279	75th %tile	10367	163	161	0.0%	0.1%	0.1%
Concentration of POC in the water column	Region-specific	mg/L	0.082 / 0.082	0.0493 / 0.0493	25th %tile	10367	154	153	0.0%	-5.2%	-5.3%
				0.132 / 0.132	75th %tile	10367	184	183	0.0%	13.6%	13.7%
Concentration of DOC in the water column	Region-specific	mg/L	0.821 / 0.821	0.805 / 0.805	25th %tile	10367	162	161	0.0%	0.0%	0.0%
				0.834 / 0.834	75th %tile	10367	162	161	0.0%	-0.1%	-0.1%
Concentration of TSS in the water column	Region-specific	mg/L	6.5 / 4.0	5.0 / 1.6	25th %tile	10367	183	182	0.0%	12.6%	12.8%
				8.0 / 5.0	75th %tile	10367	154	153	0.0%	-5.2%	-5.3%
Sediment burial velocity in the active sediments [e]	Region-specific	m/d	1.096E-05	4.658E-06	25th %tile	10367	148	146	0.0%	-9.0%	-9.1%
				2.219E-05	75th %tile	10367	182	181	0.0%	11.8%	12.1%

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Table G-10 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Fluoranthene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

G&D = Greenfield and Davis.
See Appendix R for other acronyms.

[a] Parameters associated with the water column are given for "surface / deep" water layers. Parameters associated with the active sediments are given for sediments below the "surface / deep" water layers. Region-specific parameters show the value(s) from the South Sound in the table.
[b] Initial condition describes the total mass at the first time step in 2006. Predicted masses after 25 years (2030) and 55 years (2060) are annual averages.
[c] The degradation rates (day^-1) tested correspond to the following first-order half-lives (values in parentheses): 0.03 (23 days), 0.01 (69 days), 0.0022 (315 days), 0.002 (347 days), 0.0018 (1.1 years), and 0.0003 (6.3 years).
[d] External loads to the surface water column layer include the following pathways: atmospheric deposition, surface runoff, and POTWs; direct groundwater discharges were excluded.
[e] The sediment burial velocities (m/d) converted to cm/year are as follows (converted values in parentheses): 4.658E-05 (0.17 cm/year), 1.096E-05 (0.40 cm/year), and 2.219E-05 (0.81 cm/year).

Table G-11. Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Naphthalene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Naphthalene in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						3342	31	30			
Initial salinity in the water column	Boundary	PSU	30.87 / 31.59	27.78 / 28.43	-10%	3342	31	30	0.0%	0.0%	0.0%
				33.95 / 34.75	+10%	3342	31	30	0.0%	0.0%	0.0%
Concentration of dry solids in the active sediments	Region-specific	kg/L	0.8285 / 0.7831	0.7457 / 0.7048	-10%	3095	31	30	-7.4%	0.0%	0.0%
				0.9114 / 0.8614	+10%	3588	31	30	7.4%	0.0%	0.0%
Density of organic carbon	Global	kg/L	0.90	0.81	-10%	3342	31	30	0.0%	0.0%	0.0%
				0.99	+10%	3342	31	30	0.0%	0.0%	0.0%
Water-sediment diffusion coefficient for the active sediments	Global	m/d	0.0024	0.0022	-10%	3342	31	30	0.0%	0.0%	0.0%
				0.0026	+10%	3342	31	30	0.0%	0.0%	0.0%
Solids resuspension velocity of the active sediments	Region-specific	m/d	4x / 2x burial	3.6x / 1.8x burial	-50%	3342	31	30	0.0%	0.0%	0.0%
				4.4x / 2.2x burial	+100%	3342	31	30	0.0%	0.0%	0.0%
Proportionality constant for POC phase partitioning	Global	dim'less	0.35	0.1400	-60%	3342	31	30	0.0%	0.0%	0.0%
				0.3150	-10%	3342	31	30	0.0%	0.0%	0.0%
				0.3850	+10%	3342	31	30	0.0%	0.0%	0.0%
				0.5250	+150%	3342	31	30	0.0%	0.0%	0.0%
Proportionality constant for DOC phase partitioning	Global	dim'less	0.08	0.0320	-60%	3342	31	30	0.0%	0.0%	0.0%
				0.0720	-10%	3342	31	30	0.0%	0.0%	0.0%
				0.0880	+10%	3342	31	30	0.0%	0.0%	0.0%
				0.1200	+150%	3342	31	30	0.0%	0.0%	0.0%
Setschenow proportionality constant for HOC tracer partitioning	Global	L/cm^3	0.0018	0.00162	-10%	3342	31	30	0.0%	0.0%	0.0%
				0.00198	+10%	3342	31	30	0.0%	0.0%	0.0%
Henry's Law constant for HOC tracer	Global	Pa m^3 / mol	46.16	41.54	-10%	3342	31	30	0.0%	0.0%	0.0%
				50.78	+10%	3342	31	30	0.0%	0.0%	0.0%
Enthalpy of air-water phase change for HOC tracer	Global	J/mol	44646	40181	-10%	3342	31	30	0.0%	0.0%	0.0%
				49111	+10%	3342	31	30	0.0%	0.0%	0.0%
Octanol-water partition coefficient for HOC tracer	Global	dim'less	3.40	3.06	-10%	3342	31	30	0.0%	0.0%	0.0%
				3.74	+10%	3342	31	30	0.0%	0.0%	0.0%
Enthalpy of octanol-water phase change for HOC tracer	Global	J/mol	-15700	-14130	-10%	3342	31	30	0.0%	0.0%	0.0%
				-17270	+10%	3342	31	30	0.0%	0.0%	0.0%
Degradation rate in the surface water column layer [c]	Global	day^-1	0.03	0.027	-10%	3342	31	31	0.0%	2.4%	2.4%
				0.033	+10%	3342	30	30	0.0%	-2.3%	-2.2%
Degradation rate in the deep water column layer [c]	Global	day^-1	0.03	0.027	-10%	3342	32	32	0.0%	4.9%	5.0%
				0.033	+10%	3342	29	29	0.0%	-4.4%	-4.4%
Degradation rate in the water column [c]	Global	day^-1	0.03	0	G&D (2005)	3342	115	114	0.0%	275.4%	274.8%
				0.0003	G&D (2005)	3342	112	111	0.0%	264.3%	263.7%
				0.002	G&D (2005)	3342	96	95	0.0%	212.5%	212.4%
				0.01	G&D (2005)	3342	58	58	0.0%	90.9%	91.2%

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Table G-11 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Naphthalene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Naphthalene in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						3342	31	30			
Degradation rate in the active sediments below the surface layer [c]	Global	day^-1	0.03	0.027	-10%	3342	31	30	0.0%	0.0%	0.0%
				0.033	+10%	3342	31	30	0.0%	0.0%	0.0%
Degradation rate in the active sediments below the deep layer [c]	Global	day^-1	0.03	0.027	-10%	3342	31	30	0.0%	0.0%	0.0%
				0.033	+10%	3342	31	30	0.0%	0.0%	0.0%
Degradation rate in the active Sediments [c]	Global	day^-1	0.03	0	G&D (2005)	3342	32	31	0.0%	4.2%	3.6%
				0.0003	G&D (2005)	3342	32	31	0.0%	2.9%	2.8%
				0.002	G&D (2005)	3342	31	31	0.0%	1.3%	1.3%
				0.01	G&D (2005)	3342	31	30	0.0%	0.3%	0.3%
Degradation rate in the water column and active sediments [c]	Global	day^-1	0.03	0.027	-10%	3342	33	33	0.0%	7.5%	7.6%
				0.033	+10%	3342	29	28	0.0%	-6.5%	-6.5%
				0	zero degradation	3342	120	119	0.0%	291.2%	290.0%
Daily wind speed at standard height of 10 m	Region-specific	m/s	monthly averages	0.5x	-50%	3342	32	32	0.0%	4.4%	4.1%
				0.9x	-10%	3342	31	31	0.0%	1.0%	1.0%
				1.1x	+10%	3342	30	30	0.0%	-1.1%	-1.0%
				1.5x	+50%	3342	29	29	0.0%	-5.7%	-5.4%
Initial contaminant concentration in the water column	Boundary	pg/L	550 / 600	550 / 550	25th %tile	3342	29	29	0.0%	-5.5%	-5.7%
				15500 / 16000	75th %tile	3342	550	563	0.0%	1695.1%	1752.5%
External load to the surface water column layer [d]	Region-specific	kg/yr	24.37	0	zero loading	3342	20	21	0.0%	-34.0%	-31.7%
				24.2	25th %tile	3342	31	30	0.0%	-0.2%	-0.2%
				33.6	75th %tile	3342	35	34	0.0%	12.9%	12.0%
Initial contaminant concentration in the water column	Region-specific	pg/L	600 / 550	575 / 550	25th %tile	3218	31	30	-3.7%	0.0%	0.0%
				8050 / 8275	75th %tile	3975	31	30	18.9%	0.0%	0.0%
Initial contaminant concentration in the active sediments	Region-specific	ng/g dw	11.1	4.25	25th %tile	1645	31	30	-50.8%	0.0%	0.0%
				41.85	75th %tile	8640	31	30	158.5%	0.0%	0.0%
TOC fraction in the active sediments	Region-specific	dim'less	0.0181	0.0057	25th %tile	3342	31	30	0.0%	0.0%	0.0%
				0.0279	75th %tile	3342	31	30	0.0%	0.0%	0.0%
Concentration of POC in the water column	Region-specific	mg/L	0.082 / 0.082	0.0493 / 0.0493	25th %tile	3342	31	30	0.0%	0.0%	0.0%
				0.132 / 0.132	75th %tile	3342	31	30	0.0%	0.0%	0.0%
Concentration of DOC in the water column	Region-specific	mg/L	0.821 / 0.821	0.805 / 0.805	25th %tile	3342	31	30	0.0%	0.0%	0.0%
				0.834 / 0.834	75th %tile	3342	31	30	0.0%	0.0%	0.0%
Concentration of TSS in the water column	Region-specific	mg/L	6.5 / 4.0	5.0 / 1.6	25th %tile	3342	31	30	0.0%	0.0%	0.0%
				8.0 / 5.0	75th %tile	3342	31	30	0.0%	0.0%	0.0%
Sediment burial velocity in the active sediments [e]	Region-specific	m/d	1.096E-05	4.658E-06	25th %tile	3342	31	30	0.0%	0.0%	0.0%
				2.219E-05	75th %tile	3342	31	30	0.0%	0.0%	0.0%

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Table G-11 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Naphthalene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

G&D = Greenfield and Davis.
See Appendix R for other acronyms.

[a] Parameters associated with the water column are given for "surface / deep" water layers. Parameters associated with the active sediments are given for sediments below the "surface / deep" water layers. Region-specific parameters show the value(s) from the South Sound in the table.
[b] Initial condition describes the total mass at the first time step in 2006. Predicted masses after 25 years (2030) and 55 years (2060) are annual averages.
[c] The degradation rates (day^-1) tested correspond to the following first-order half-lives (values in parentheses): 0.033 (21 days), 0.03 (23 days), 0.027 (26 days), 0.01 (69 days), 0.002 (347 days), and 0.0003 (6.3 years).
[d] External loads to the surface water column layer include the following pathways: atmospheric deposition, surface runoff, and POTWs; direct groundwater discharges were excluded.
[e] The sediment burial velocities (m/d) converted to cm/year are as follows (converted values in parentheses): 4.658E-05 (0.17 cm/year), 1.096E-05 (0.40 cm/year), and 2.219E-05 (0.81 cm/year).

Table G-12. Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Phenanthrene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Phenanthr in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						7216	229	232			
Initial salinity in the water column	Boundary	PSU	30.87 / 31.59	27.78 / 28.43	-10%	7216	229	232	0.0%	0.0%	0.0%
				33.95 / 34.75	+10%	7216	229	232	0.0%	0.0%	0.0%
Concentration of dry solids in the active sediments	Region-specific	kg/L	0.8285 / 0.7831	0.7457 / 0.7048	-10%	6539	229	232	-9.4%	-0.1%	-0.1%
				0.9114 / 0.8614	+10%	7894	229	232	9.4%	0.1%	0.1%
Density of organic carbon	Global	kg/L	0.90	0.81	-10%	7216	229	232	0.0%	0.0%	0.0%
				0.99	+10%	7216	229	232	0.0%	0.0%	0.0%
Water-sediment diffusion coefficient for the active sediments	Global	m/d	0.0024	0.0022	-10%	7216	229	232	0.0%	0.0%	0.0%
				0.0026	+10%	7216	229	232	0.0%	0.0%	0.0%
Solids resuspension velocity of the active sediments	Region-specific	m/d	4x / 2x burial	3.6x / 1.8x burial	-50%	7216	228	231	0.0%	-0.4%	-0.4%
				4.4x / 2.2x burial	+100%	7216	231	234	0.0%	0.7%	0.7%
Proportionality constant for POC phase partitioning	Global	dim'less	0.35	0.1400	-60%	7216	227	231	0.0%	-0.7%	-0.7%
				0.3150	-10%	7216	229	232	0.0%	-0.1%	-0.1%
				0.3850	+10%	7216	229	232	0.0%	0.1%	0.1%
				0.5250	+150%	7216	230	233	0.0%	0.5%	0.5%
Proportionality constant for DOC phase partitioning	Global	dim'less	0.08	0.0320	-60%	7216	229	232	0.0%	0.0%	0.0%
				0.0720	-10%	7216	229	232	0.0%	0.0%	0.0%
				0.0880	+10%	7216	229	232	0.0%	0.0%	0.0%
				0.1200	+150%	7216	229	232	0.0%	0.0%	0.0%
Setschenow proportionality constant for HOC tracer partitioning	Global	L/cm^3	0.0018	0.00162	-10%	7216	229	232	0.0%	0.0%	0.0%
				0.00198	+10%	7216	229	232	0.0%	0.0%	0.0%
Henry's Law constant for HOC tracer	Global	Pa m^3 / mol	4.308	3.877	-10%	7216	230	233	0.0%	0.2%	0.2%
				4.739	+10%	7216	228	232	0.0%	-0.2%	-0.2%
Enthalpy of air-water phase change for HOC tracer	Global	J/mol	51900	46710	-10%	7216	228	232	0.0%	-0.2%	-0.2%
				57090	+10%	7216	229	233	0.0%	0.2%	0.2%
Octanol-water partition coefficient for HOC tracer	Global	dim'less	4.47	4.023	-10%	7216	227	231	0.0%	-0.7%	-0.7%
				4.917	+10%	7216	233	237	0.0%	2.0%	2.0%
Enthalpy of octanol-water phase change for HOC tracer	Global	J/mol	-19000	-17100	-10%	7216	229	232	0.0%	0.0%	0.0%
				-20900	+10%	7216	229	232	0.0%	0.0%	0.0%
Degradation rate in the surface water column layer [c]	Global	day^-1	0.01	0.009	-10%	7216	232	235	0.0%	1.4%	1.4%
				0.011	+10%	7216	226	229	0.0%	-1.4%	-1.4%
Degradation rate in the deep water column layer [c]	Global	day^-1	0.01	0.009	-10%	7216	237	241	0.0%	3.7%	3.7%
				0.011	+10%	7216	221	224	0.0%	-3.5%	-3.4%
Degradation rate in the water column [c]	Global	day^-1	0.01	0	G&D (2005)	7216	474	474	0.0%	107.0%	104.1%
				0.0003	G&D (2005)	7216	459	459	0.0%	100.3%	97.7%
				0.002	G&D (2005)	7216	388	390	0.0%	69.6%	68.0%
				0.03	G&D (2005)	7216	117	119	0.0%	-48.9%	-48.8%

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Table G-12 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Phenanthrene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Phenanthr in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						7216	229	232			
Degradation rate in the active sediments below the surface layer [c]	Global	day^-1	0.01	0.009	-10%	7216	229	232	0.0%	0.1%	0.1%
				0.011	+10%	7216	229	232	0.0%	-0.1%	-0.1%
Degradation rate in the active sediments below the deep layer [c]	Global	day^-1	0.01	0.009	-10%	7216	229	233	0.0%	0.2%	0.2%
				0.011	+10%	7216	229	232	0.0%	-0.1%	-0.1%
Degradation rate in the active Sediments [c]	Global	day^-1	0.01	0	G&D (2005)	7216	481	344	0.0%	109.9%	48.1%
				0.0003	G&D (2005)	7216	303	296	0.0%	32.3%	27.6%
				0.002	G&D (2005)	7216	246	249	0.0%	7.3%	7.2%
				0.03	G&D (2005)	7216	226	229	0.0%	-1.5%	-1.5%
Degradation rate in the water column and active sediments [c]	Global	day^-1	0.01	0.009	-10%	7216	242	245	0.0%	5.5%	5.5%
				0.011	+10%	7216	218	221	0.0%	-4.9%	-4.9%
				0	zero degradation	7216	851	706	0.0%	271.8%	204.0%
Daily wind speed at standard height of 10 m	Region-specific	m/s	monthly averages	0.5x	-50%	7216	237	240	0.0%	3.5%	3.4%
				0.9x	-10%	7216	231	234	0.0%	0.7%	0.7%
				1.1x	+10%	7216	227	231	0.0%	-0.7%	-0.7%
				1.5x	+50%	7216	221	224	0.0%	-3.5%	-3.5%
Initial contaminant concentration in the water column	Boundary	pg/L	3000 / 3000	1200 / 1250	25th %tile	7216	109	109	0.0%	-52.5%	-53.0%
				3050 / 3050	75th %tile	7216	232	236	0.0%	1.5%	1.5%
External load to the surface water column layer [d]	Region-specific	kg/yr	24.85	0	zero loading	7216	206	211	0.0%	-10.0%	-9.2%
				24.69	25th %tile	7216	228	231	0.0%	-0.5%	-0.5%
				27.58	75th %tile	7216	231	234	0.0%	0.8%	0.8%
Initial contaminant concentration in the water column	Region-specific	pg/L	3000 / 3100	2075 / 2150	25th %tile	7166	229	232	-0.7%	0.0%	0.0%
				3075 / 3100	75th %tile	7414	229	232	2.7%	0.0%	0.0%
Initial contaminant concentration in the active sediments	Region-specific	ng/g dw	28.0	4.15	25th %tile	1728	229	232	-76.0%	0.0%	0.0%
				64.2	75th %tile	17659	229	232	144.7%	0.0%	0.0%
TOC fraction in the active sediments	Region-specific	dim'less	0.0181	0.0057	25th %tile	7216	229	232	0.0%	0.0%	0.0%
				0.0279	75th %tile	7216	229	232	0.0%	0.0%	0.0%
Concentration of POC in the water column	Region-specific	mg/L	0.082 / 0.082	0.0493 / 0.0493	25th %tile	7216	228	231	0.0%	-0.3%	-0.3%
				0.132 / 0.132	75th %tile	7216	231	235	0.0%	1.1%	1.0%
Concentration of DOC in the water column	Region-specific	mg/L	0.821 / 0.821	0.805 / 0.805	25th %tile	7216	229	232	0.0%	0.0%	0.0%
				0.834 / 0.834	75th %tile	7216	229	232	0.0%	0.0%	0.0%
Concentration of TSS in the water column	Region-specific	mg/L	6.5 / 4.0	5.0 / 1.6	25th %tile	7216	231	234	0.0%	0.8%	0.8%
				8.0 / 5.0	75th %tile	7216	228	231	0.0%	-0.3%	-0.3%
Sediment burial velocity in the active sediments [e]	Region-specific	m/d	1.096E-05	4.658E-06	25th %tile	7216	228	231	0.0%	-0.6%	-0.6%
				2.219E-05	75th %tile	7216	231	235	0.0%	1.0%	1.0%

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Table G-12 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Phenanthrene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

G&D = Greenfield and Davis.
See Appendix R for other acronyms.

[a] Parameters associated with the water column are given for "surface / deep" water layers. Parameters associated with the active sediments are given for sediments below the "surface / deep" water layers. Region-specific parameters show the value(s) from the South Sound in the table.
[b] Initial condition describes the total mass at the first time step in 2006. Predicted masses after 25 years (2030) and 55 years (2060) are annual averages.
[c] The degradation rates (day^-1) tested correspond to the following first-order half-lives (values in parentheses): 0.03 (23 days), 0.011 (63 days), 0.01 (69 days), 0.009 (77 days), 0.002 (347 days), and 0.0003 (6.3 years).
[d] External loads to the surface water column layer include the following pathways: atmospheric deposition, surface runoff, and POTWs; direct groundwater discharges were excluded.
[e] The sediment burial velocities (m/d) converted to cm/year are as follows (converted values in parentheses): 4.658E-05 (0.17 cm/year), 1.096E-05 (0.40 cm/year), and 2.219E-05 (0.81 cm/year).

Table G-13. Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Pyrene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Pyrene in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						9905	207	205			
Initial salinity in the water column	Boundary	PSU	30.87 / 31.59	27.78 / 28.43	-10%	9905	207	205	0.0%	0.0%	0.0%
				33.95 / 34.75	+10%	9905	207	205	0.0%	0.0%	0.0%
Concentration of dry solids in the active sediments	Region-specific	kg/L	0.8285 / 0.7831	0.7457 / 0.7048	-10%	8951	204	202	-9.6%	-1.8%	-1.8%
				0.9114 / 0.8614	+10%	10858	211	209	9.6%	1.8%	1.8%
Density of organic carbon	Global	kg/L	0.90	0.81	-10%	9905	207	205	0.0%	0.0%	0.0%
				0.99	+10%	9905	207	205	0.0%	0.0%	0.0%
Water-sediment diffusion coefficient for the active sediments	Global	m/d	0.0024	0.0022	-10%	9905	207	205	0.0%	-0.1%	-0.1%
				0.0026	+10%	9905	207	205	0.0%	0.1%	0.1%
Solids resuspension velocity of the active sediments	Region-specific	m/d	4x / 2x burial	3.6x / 1.8x burial	-50%	9905	196	194	0.0%	-5.4%	-5.5%
				4.4x / 2.2x burial	+100%	9905	226	224	0.0%	8.9%	9.1%
Proportionality constant for POC phase partitioning	Global	dim'less	0.35	0.1400	-60%	9905	185	183	0.0%	-10.8%	-11.1%
				0.3150	-10%	9905	204	202	0.0%	-1.8%	-1.8%
				0.3850	+10%	9905	211	209	0.0%	1.7%	1.8%
				0.5250	+150%	9905	225	223	0.0%	8.6%	8.7%
Proportionality constant for DOC phase partitioning	Global	dim'less	0.08	0.0320	-60%	9905	208	206	0.0%	0.1%	0.1%
				0.0720	-10%	9905	207	205	0.0%	0.0%	0.0%
				0.0880	+10%	9905	207	205	0.0%	0.0%	0.0%
				0.1200	+150%	9905	207	205	0.0%	-0.1%	-0.1%
Setschenow proportionality constant for HOC tracer partitioning	Global	L/cm^3	0.0018	0.00162	-10%	9905	206	204	0.0%	-0.5%	-0.5%
				0.00198	+10%	9905	208	206	0.0%	0.5%	0.6%
Henry's Law constant for HOC tracer	Global	Pa m^3 / mol	1.331	1.198	-10%	9905	208	206	0.0%	0.3%	0.3%
				1.464	+10%	9905	207	205	0.0%	-0.3%	-0.3%
Enthalpy of air-water phase change for HOC tracer	Global	J/mol	42900	38610	-10%	9905	207	205	0.0%	-0.3%	-0.3%
				47190	+10%	9905	208	206	0.0%	0.3%	0.3%
Octanol-water partition coefficient for HOC tracer	Global	dim'less	5.01	4.509	-10%	9905	181	179	0.0%	-12.6%	-12.8%
				5.511	+10%	9905	277	275	0.0%	33.4%	34.1%
Enthalpy of octanol-water phase change for HOC tracer	Global	J/mol	-19200	-17280	-10%	9905	206	204	0.0%	-0.7%	-0.7%
				-21120	+10%	9905	209	207	0.0%	0.7%	0.7%
Degradation rate in the surface water column layer [c]	Global	day^-1	0.002	0.0018	-10%	9905	208	206	0.0%	0.5%	0.5%
				0.0022	+10%	9905	206	204	0.0%	-0.5%	-0.5%
Degradation rate in the deep water column layer [c]	Global	day^-1	0.002	0.0018	-10%	9905	210	208	0.0%	1.2%	1.2%
				0.0022	+10%	9905	205	203	0.0%	-1.2%	-1.2%
Degradation rate in the water column [c]	Global	day^-1	0.002	0	G&D (2005)	9905	252	249	0.0%	21.6%	21.4%
				0.0003	G&D (2005)	9905	244	242	0.0%	17.7%	17.6%
				0.01	G&D (2005)	9905	123	122	0.0%	-40.5%	-40.4%
				0.03	G&D (2005)	9905	63	63	0.0%	-69.5%	-69.5%

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Table G-13 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Pyrene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

Parameter	Application	Units	Default Value [a]	Test Value	Test Basis	Mass (kg) of Pyrene in Puget Sound [b]			Percent difference (%) from Default		
						Initial Condition	Year 25	Year 55	Initial Condition	Year 25	Year 55
Default best estimates for all inputs						9905	207	205			
Degradation rate in the active sediments below the surface layer [c]	Global	day^-1	0.002	0.0018	-10%	9905	209	207	0.0%	0.8%	0.8%
				0.0022	+10%	9905	206	204	0.0%	-0.7%	-0.7%
Degradation rate in the active sediments below the deep layer [c]	Global	day^-1	0.002	0.0018	-10%	9905	210	208	0.0%	1.4%	1.4%
				0.0022	+10%	9905	205	203	0.0%	-1.2%	-1.2%
Degradation rate in the active Sediments [c]	Global	day^-1	0.002	0	G&D (2005)	9905	803	464	0.0%	287.4%	126.2%
				0.0003	G&D (2005)	9905	350	324	0.0%	69.0%	58.0%
				0.01	G&D (2005)	9905	170	167	0.0%	-18.2%	-18.4%
				0.03	G&D (2005)	9905	162	160	0.0%	-21.8%	-22.1%
Degradation rate in the water column and active sediments [c]	Global	day^-1	0.002	0.0018	-10%	9905	216	214	0.0%	4.0%	4.0%
				0.0022	+10%	9905	200	198	0.0%	-3.5%	-3.5%
				0	zero degradation	9905	918	568	0.0%	342.7%	176.5%
Daily wind speed at standard height of 10 m	Region-specific	m/s	monthly averages	0.5x	-50%	9905	214	212	0.0%	3.2%	3.2%
				0.9x	-10%	9905	209	207	0.0%	0.6%	0.6%
				1.1x	+10%	9905	206	204	0.0%	-0.6%	-0.6%
				1.5x	+50%	9905	201	199	0.0%	-2.9%	-2.9%
Initial contaminant concentration in the water column	Boundary	pg/L	900 / 900	900 / 900	25th %tile	9905	207	205	0.0%	0.0%	0.0%
				1000 / 1000	75th %tile	9905	222	220	0.0%	7.3%	7.4%
External load to the surface water column layer [d]	Region-specific	kg/yr	38.7	0	zero loading	9905	135	137	0.0%	-34.7%	-33.5%
				37.6	25th %tile	9905	205	203	0.0%	-1.1%	-1.0%
				39.8	75th %tile	9905	209	207	0.0%	0.8%	0.7%
Initial contaminant concentration in the water column	Region-specific	pg/L	900 / 900	900 / 900	25th %tile	9856	207	205	-0.5%	0.0%	0.0%
				925 / 950	75th %tile	10028	207	205	1.2%	0.0%	0.0%
Initial contaminant concentration in the active sediments	Region-specific	ng/g dw	52.0	7.62	25th %tile	2494	207	205	-74.8%	0.0%	0.0%
				110.0	75th %tile	25155	207	205	154.0%	0.0%	0.0%
TOC fraction in the active sediments	Region-specific	dim'less	0.0181	0.0057	25th %tile	9905	207	205	0.0%	-0.3%	-0.3%
				0.0279	75th %tile	9905	208	206	0.0%	0.1%	0.1%
Concentration of POC in the water column	Region-specific	mg/L	0.082 / 0.082	0.0493 / 0.0493	25th %tile	9905	196	194	0.0%	-5.4%	-5.5%
				0.132 / 0.132	75th %tile	9905	237	235	0.0%	14.4%	14.6%
Concentration of DOC in the water column	Region-specific	mg/L	0.821 / 0.821	0.805 / 0.805	25th %tile	9905	207	205	0.0%	0.0%	0.0%
				0.834 / 0.834	75th %tile	9905	207	205	0.0%	-0.1%	-0.1%
Concentration of TSS in the water column	Region-specific	mg/L	6.5 / 4.0	5.0 / 1.6	25th %tile	9905	234	233	0.0%	13.1%	13.3%
				8.0 / 5.0	75th %tile	9905	196	194	0.0%	-5.4%	-5.5%
Sediment burial velocity in the active sediments [e]	Region-specific	m/d	1.096E-05	4.658E-06	25th %tile	9905	188	186	0.0%	-9.4%	-9.6%
				2.219E-05	75th %tile	9905	233	231	0.0%	12.3%	12.6%

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Table G-13 (continued). Results of the Sensitivity and Uncertainty runs to predict the total mass (kg) of Pyrene in Puget Sound sediments and waters after 25 and 55 years. The total mass comparisons are expressed in terms of percent difference from the default run predictions.

G&D = Greenfield and Davis.
See Appendix R for other acronyms.

[a] Parameters associated with the water column are given for "surface / deep" water layers. Parameters associated with the active sediments are given for sediments below the "surface / deep" water layers. Region-specific parameters show the value(s) from the South Sound in the table.
[b] Initial condition describes the total mass at the first time step in 2006. Predicted masses after 25 years (2030) and 55 years (2060) are annual averages.
[c] The degradation rates (day^-1) tested correspond to the following first-order half-lives (values in parentheses): 0.03 (23 days), 0.01 (69 days), 0.0022 (315 days), 0.002 (347 days), 0.0018 (1.1 years), and 0.0003 (6.3 years).
[d] External loads to the surface water column layer include the following pathways: atmospheric deposition, surface runoff, and POTWs; direct groundwater discharges were excluded.
[e] The sediment burial velocities (m/d) converted to cm/year are as follows (converted values in parentheses): 4.658E-05 (0.17 cm/year), 1.096E-05 (0.40 cm/year), and 2.219E-05 (0.81 cm/year).

Appendix H. Fate and Transport Model Results for "Hindcast" and "Best-Estimate" Runs

Table H-1. Hindcast run predictions of the mass buildup of contaminants in sediments with watershed loads set to best-estimate values and to zero.

Contaminant	Best-Estimate Watershed Load (kg/yr)	Predicted Mass In Sediments After 100 Years (kg)	Zero Watershed Load (kg/yr)	Predicted Mass In Sediments After 100 Years (kg)
Copper	3.38E+04	1.82E+06	0.00E+00	1.47E+06
Lead	4.92E+03	1.35E+06	0.00E+00	1.24E+06
Zinc	1.24E+05	5.75E+06	0.00E+00	4.23E+06
Total PCBs [a]	4.49E+00	1.81E+02	0.00E+00	1.45E+02
Total PBDEs [b]	1.45E+01	1.93E+01	0.00E+00	8.09E+00
Total PAHs [c]	3.65E+02	1.69E+02	0.00E+00	1.48E+02
Benzo(a)pyrene	2.42E+02	1.51E+03	0.00E+00	1.01E+03
Benzo(b)fluoranthene	1.68E+02	7.28E+02	0.00E+00	4.61E+02
Fluoranthene	1.71E+02	3.61E+01	0.00E+00	2.62E+01
Benzo(a)anthracene	1.67E+02	1.38E+02	0.00E+00	8.41E+01
Pyrene	2.57E+02	4.78E+01	0.00E+00	3.24E+01
Phenanthrene	1.69E+02	5.13E+00	0.00E+00	4.67E+00
Dibenzo(a,h)anthracene	2.47E+02	2.15E+03	0.00E+00	1.31E+03
Naphthalene	1.65E+02	4.96E-02	0.00E+00	3.20E-02

[a] Total PCBs were simulated using the parameters of congener PCB-118.
[b] Total PBDEs were simulated using the parameters of homolog Tetra-BDE and concentrations in the boundary waters set to median values from Frouin et al. (2013).
[c] Total PAHs were simulated using the parameters of Fluoranthene; direct groundwater loading estimates were excluded from watershed loads due to high uncertainties.

Table H-2. Hindcast run predictions of the watershed loads required to accumulate empirical inventories of contaminant mass in Puget Sound sediments.

Contaminant	25th %tile Mass in Sediments (kg)	Load Predicted To Accumulate 25th %tile Mass in Sediments (kg/yr)	Predicted Scalar Increase from Best Estimate Load	Median Mass In Sediments (kg)	Load Predicted To Accumulate Median Mass in Sediments (kg/yr)	Predicted Scalar Increase from Best Estimate Load	75th %tile Mass In Sediments (kg)	Load Predicted To Accumulate 75th %tile Mass in Sediments (kg/yr)	Predicted Scalar Increase from Best Estimate Load
Copper	2.82E+06	1.35E+05	4	5.17E+06	3.55E+05	10.5	9.05E+06	7.28E+05	21.5
Lead	1.22E+06	0.00E+00	0	2.28E+06	4.92E+04	10	3.49E+06	1.03E+05	21
Zinc	8.45E+06	3.72E+05	3	1.20E+07	6.20E+05	5	1.81E+07	1.12E+06	9
Total PCBs	2.42E+02	1.35E+01	3	5.25E+02	4.71E+01	10.5	1.17E+03	1.26E+02	28
Total PBDEs	4.51E+01	4.70E+01	3.25	9.58E+01	1.16E+02	8	2.10E+02	2.60E+02	18
Total PAHs	1.02E+04	1.83E+05	500	5.76E+04	1.02E+06	2800	1.63E+05	2.85E+06	7800
B(a)pyrene	1.00E+03	0.00E+00	0	4.45E+03	1.69E+03	7	1.11E+04	4.84E+03	20
B(b)fluoranth	1.30E+03	5.05E+02	3	5.68E+03	3.36E+03	20	1.41E+04	8.58E+03	51
Fluoranthene	2.07E+03	3.43E+04	200	9.99E+03	1.71E+05	1000	2.45E+04	4.28E+05	2500
B(a)anthracene	9.74E+02	2.83E+03	17	5.68E+03	1.17E+04	70	9.82E+03	3.00E+04	180
Pyrene	2.12E+03	3.59E+04	140	9.53E+03	1.54E+05	600	2.48E+04	4.11E+05	1600
Phenanthrene	1.28E+03	4.24E+05	2500	6.77E+03	2.54E+06	15000	1.72E+04	6.78E+06	40000
D(a,h)anthr	4.53E+02	NC	< 0	1.01E+03	NC	< 0	2.29E+03	2.84E+02	1.15
Naphthalene	7.67E+02	8.27E+06	50000	2.46E+03	2.48E+07	150000	7.76E+03	8.27E+07	500000

NC = Not calculated.

Table H-3. Hindcast run predictions of the mass buildup of contaminants in sediments with deep boundary water concentrations (BWC) set to best-estimate values and to zero.

Contaminant	Best-Estimate BWC (pg/L)	Predicted Mass In Sediments After 100 Years (kg)	Zero Boundary Water Conc. (pg/L)	Predicted Mass In Sediments After 100 Years (kg)
Copper	280000	1.82E+06	0	3.66E+05
Lead	108000	1.35E+06	0	1.20E+05
Zinc	680000	5.75E+06	0	1.61E+06
Total PCBs [a]	32.32	1.81E+02	0	3.96E+01
Total PBDEs [b]	12.32	1.93E+01	0	1.40E+01
Total PAHs [c]	4250	1.69E+02	0	2.47E+01
Benzo(a)pyrene	850	1.51E+03	0	5.09E+02
Benzo(b)fluoranthene	500	7.28E+02	0	2.75E+02
Fluoranthene	750	3.61E+01	0	1.07E+01
Benzo(a)anthracene	450	1.38E+02	0	5.46E+01
Pyrene	900	4.78E+01	0	1.60E+01
Phenanthrene	3000	5.13E+00	0	4.82E-01
Dibenzo(a,h)anthracene	700	2.15E+03	0	8.40E+02
Naphthalene	600	4.96E-02	0	1.76E-02

[a] Total PCBs were simulated using the parameters of congener PCB-118.
[b] Total PBDEs were simulated using the parameters of homolog Tetra-BDE and concentrations in the boundary waters set to median values from Frouin et al. (2013).
[c] Total PAHs were simulated using the parameters of Fluoranthene.

Table H-4. Hindcast run predictions of the deep boundary water concentrations required to accumulate empirical inventories of contaminant mass in Puget Sound sediments.

Contaminant	25th %tile Mass in Sediments (kg)	BWC Predicted To Accumulate 25th %tile Mass in Sediments (pg/L)	Predicted Scalar Increase from Best Estimate BWC	Median Mass In Sediments (kg)	BWC Predicted To Accumulate Median Mass in Sediments (pg/L)	Predicted Scalar Increase from Best Estimate BWC	75th %tile Mass In Sediments (kg)	BWC Predicted To Accumulate 75th %tile Mass in Sediments (pg/L)	Predicted Scalar Increase from Best Estimate BWC
Copper	2.82E+06	490000	1.75	5.17E+06	910000	3.25	9.05E+06	1680000	6
Lead	1.22E+06	97200	0.9	2.28E+06	189000	1.75	3.49E+06	297000	2.75
Zinc	8.45E+06	1190000	1.75	1.20E+07	1700000	2.5	1.81E+07	2720000	4
Total PCBs	2.42E+02	48.48	1.5	5.25E+02	113.12	3.5	1.17E+03	258.56	8
Total PBDEs	4.51E+01	73.92	6	9.58E+01	190.96	15.5	2.10E+02	455.84	37
Total PAHs	1.02E+04	297500	70	5.76E+04	1700000	400	1.63E+05	4781250	1125
B(a)pyrene	1.00E+03	425	0.5	4.45E+03	3400	4	1.11E+04	8925	10.5
B(b)fluoranth	1.30E+03	1000	2	5.68E+03	6000	12	1.41E+04	15250	30.5
Fluoranthene	2.07E+03	63750	85	9.99E+03	300000	400	2.45E+04	712500	950
B(a)anthracene	9.74E+02	4500	10	5.68E+03	20250	45	9.82E+03	52650	117
Pyrene	2.12E+03	67500	75	9.53E+03	270000	300	2.48E+04	702000	780
Phenanthrene	1.28E+03	900000	300	6.77E+03	4350000	1450	1.72E+04	11400000	3800
D(a,h)anthr	4.53E+02	NC	< 0	1.01E+03	87.5	0.125	2.29E+03	770	1.1
Naphthalene	7.67E+02	15000000	25000	2.46E+03	45000000	75000	7.76E+03	150000000	250000

BWC = Boundary water concentration (i.e., contaminant concentration in the deep layer of the boundary waters).
NC = Not calculated.

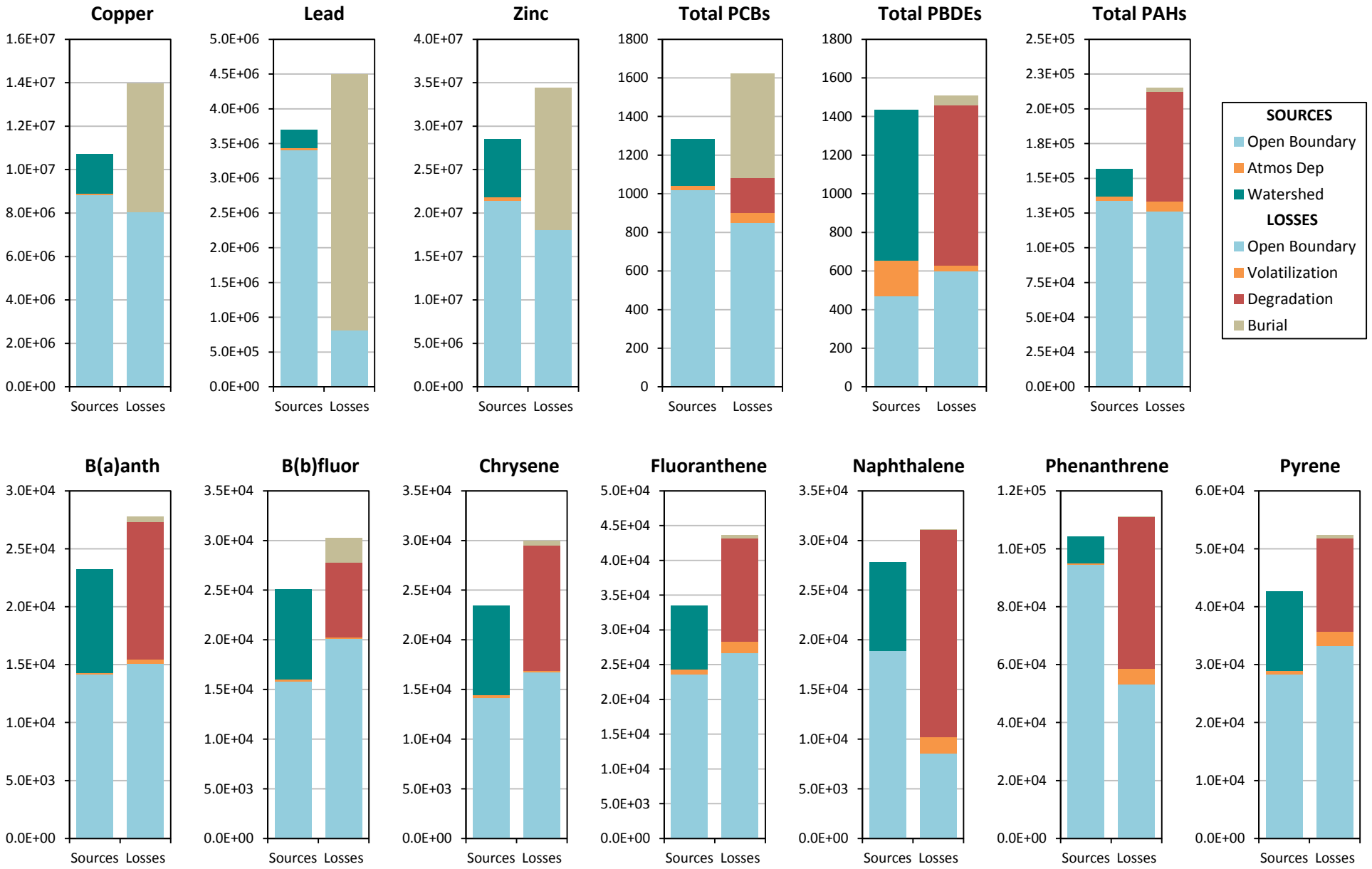

Figure H-1. Comparison of the magnitudes of cumulative mass sources and losses (kg) predicted for each contaminant after 55 years.

Table H-5. Predicted cumulative mass gains and losses (kg) via various pathways after 55 years.

Contaminant	Initial Mass (kg)	Year 55 Mean Mass (kg)	Cumulative Mass Sources (kg)				Cumulative Mass Losses (kg)				
			Ocean Boundary	Atmospheric Deposition	Watershed	Total Sources	Ocean Boundary	Volatil-ization	Degrad-ation	Burial	Total Losses
Copper	5236095	1998495	8827511	69974	1821328	10718813	8031850	0	0	5922466	13954317
Lead	2290383	1494070	3404897	28235	264504	3697636	811869	0	0	3680738	4492607
Zinc	12123905	6187070	21438241	373997	6672448	28484686	18108788	0	0	16310546	34419334
Total PCBs	532	193	1019	23	242	1283	848	53	183	540	1623
Total PBDEs	98.8	23.7	468	188	778	1434	601	26	832	49	1510
Total PAHs	59485	754	133989	2910	19648	156546	126229	7183	79035	2846	215293
Benzo(a)anthracene	4739	210	14187	81	8973	23241	15103	378	11815	476	27772
Benzo(b)fluoranthene	6033	829	15763	263	9053	25079	20140	99	7584	2463	30285
Chrysene	6656	187	14187	266	9030	23483	16714	160	12582	497	29953
Fluoranthene	10367	161	23645	641	9217	33503	26714	1597	14885	513	43709
Naphthalene	3342	30.4	18916	0	8904	27820	8594	1578	20951	8	31132
Phenanthrene	7216	232	94580	495	9117	104193	53259	5251	52613	79	111202
Pyrene	9905	205	28374	478	13807	42659	33286	2341	16216	514	52358

Table H-6. Predicted contribution (%) of various pathways to the total cumulative mass gains and losses from Puget Sound after 55 years.

Contaminant	Source Pathways			Loss Pathways			
	Ocean Boundary	Atmospheric Deposition	Watershed	Ocean Boundary	Volatil-ization	Degrad-ation	Burial
Copper	82.4%	0.7%	17.0%	57.6%	0.0%	0.0%	42.4%
Lead	92.1%	0.8%	7.2%	18.1%	0.0%	0.0%	81.9%
Zinc	75.3%	1.3%	23.4%	52.6%	0.0%	0.0%	47.4%
Total PCBs	79.4%	1.8%	18.8%	52.3%	3.2%	11.2%	33.2%
Total PBDEs	32.6%	13.1%	54.3%	39.8%	1.7%	55.1%	3.3%
Total PAHs	85.6%	1.9%	12.6%	58.6%	3.3%	36.7%	1.3%
Benzo(a)anthracene	61.0%	0.3%	38.6%	54.4%	1.4%	42.5%	1.7%
Benzo(b)fluoranthene	62.9%	1.0%	36.1%	66.5%	0.3%	25.0%	8.1%
Chrysene	60.4%	1.1%	38.5%	55.8%	0.5%	42.0%	1.7%
Fluoranthene	70.6%	1.9%	27.5%	61.1%	3.7%	34.1%	1.2%
Naphthalene	68.0%	0.0%	32.0%	27.6%	5.1%	67.3%	0.0%
Phenanthrene	90.8%	0.5%	8.8%	47.9%	4.7%	47.3%	0.1%
Pyrene	66.5%	1.1%	32.4%	63.6%	4.5%	31.0%	1.0%

Table H-7. Cumulative contaminant mass gains and losses (kg) predicted over a 55-year simulation period with all model inputs set to their best-estimate values.

	Copper	Lead	Zinc	Total PCBs	Total PBDEs	Total PAHs	Benzo(a) anthracene	Benzo(b) fluoranth.	Chrysene	Fluor-anthene	Naph-thalene	Phen-anthrene	Pyrene
Starting mass	5236095	2290383	12123905	532	99	59485	4739	6033	6656	10367	3342	7216	9905
Inflow at the ocean boundary	8827511	3404897	21438241	1019	468	133989	14187	15763	14187	23645	18916	94580	28374
Watershed loading	1821328	264504	6672448	242	778	19648	8973	9053	9030	9217	8904	9117	13807
Atmospheric deposition	69974	28235	373997	23	188	2910	81	263	266	641	0	495	478
Total mass sources	10718813	3697636	28484686	1283	1434	156546	23241	25079	23483	33503	27820	104193	42659
Outflow at the ocean boundary	8031850	811869	18108788	848	601	126229	15103	20140	16714	26714	8594	53259	33286
Burial	5922466	3680738	16310546	540	49	2846	476	2463	497	513	8	79	514
Degradation	0	0	0	183	832	79035	11815	7584	12582	14885	20951	52613	16216
Volatilization	0	0	0	53	26	7183	378	99	160	1597	1578	5251	2341
Total mass losses	13954317	4492607	34419334	1623	1510	215293	27772	30285	29953	43709	31132	111202	52358
Average mass in year 55	1998495	1494070	6187070	193	24	754	210	829	187	161	30	232	205
% of initial mass lost	61.8%	34.8%	49.0%	63.8%	76.0%	98.7%	95.6%	86.3%	97.2%	98.4%	99.1%	96.8%	97.9%
Time to 50% of initial mass	25 yr	>55 yr	>55 yr	20 yr	2.2 yr	1.0 yr	<1.0 yr	4.2 yr	<1.0 yr	<1.0 yr	<0.5 yr	<0.5 yr	<1.0 yr

Appendix I. Bioaccumulation Model Inputs for Environmental Conditions and Contaminant Concentrations

Table I-1. Bioaccumulation model inputs for regional environmental conditions and contaminant concentrations.

Median regional values from the observed data were generally used for all inputs; values used for water concentrations were median values from the entire water column (including data from both surface and deep layers). Numbers in italics are the final, post-calibration values; see Table M-1 for details.

Matrix	Model Input	Units	Admrl. Inlet	Hood North	Hood South	Main Basin	South Sound	Whidb. Basin	Comm. Bay	Elliott Bay	Sinclr./ Dyes
Air	Air temp.	℃	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3
Water	Water temp.	℃	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
	TSS	mg/L	2.50	*2.00*	*2.00*	2.00	6.00	2.40	5.00	1.90	*4.25*
	DOC	mg/L	0.81	0.81	0.73	1.14	0.82	0.89	1.80	1.80	1.80
	POC	mg/L	0.07	0.07	0.08	0.06	0.08	0.06	0.05	0.05	0.05
	Total PCBs	pg/L	33.26	*26.13*	26.13	34.19	31.91	*33.26*	80.40	*98.37*	*50.00*
	Total PBDEs	pg/L	25.24	*7.00*	*5.00*	*15.00*	*13.55*	*12.00*	25.24	*60.00*	25.24
Sediment	TOC	%	1.15	2.46	2.12	*1.30*	1.81	1.74	1.26	1.78	2.60
	Total PCBs	ng/g dw	1.11	0.47	1.26	1.39	0.91	1.11	*34.18*	43.48	31.28
	Total PBDEs	ng/g dw	0.42	0.20	0.33	0.68	0.29	0.33	4.19	4.93	0.52

DOC = Dissolved organic carbon.
dw = Dry weight basis.
POC = Particulate organic carbon.
Temp. = Temperature.
TOC = Total organic carbon.
TSS = Total suspended solids.

Table I-2. Bioaccumulation model inputs for the concentration of each modeled PCB congener in regional sediments (ng/g dw).

The Total PCBs value listed at the bottom of the table is the median concentration from the observed data set. Individual congener concentrations were derived by multiplying the average contribution of the congener to the "sum of the 20 modeled congeners" by the regional median Total PCB concentration from the observed data. Numbers in italics are the final, post-calibration values; see Table M-1 for details.

PCB congener	Average Fraction of Sum of 20 Congeners	PCB Congener Concentration in Regional Sediments (ng/g dw)								
		Admiralty Inlet	Hood North	Hood South	Main Basin	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes
PCB-008	0.0080	8.90E-03	3.74E-03	1.01E-02	1.12E-02	7.30E-03	8.90E-03	2.74E-01	3.49E-01	2.51E-01
PCB-018	0.0034	3.81E-03	1.60E-03	4.31E-03	4.77E-03	3.12E-03	3.81E-03	1.17E-01	1.49E-01	1.07E-01
PCB-028	0.0325	3.60E-02	1.51E-02	4.08E-02	4.51E-02	2.95E-02	3.60E-02	1.11E+00	1.41E+00	1.02E+00
PCB-044	0.0176	1.95E-02	8.19E-03	2.21E-02	2.44E-02	1.60E-02	1.95E-02	6.01E-01	7.64E-01	5.50E-01
PCB-052	0.0336	3.73E-02	1.57E-02	4.22E-02	4.67E-02	3.06E-02	3.73E-02	1.15E+00	1.46E+00	1.05E+00
PCB-066	0.0397	4.41E-02	1.85E-02	4.99E-02	5.52E-02	3.61E-02	4.41E-02	1.36E+00	1.73E+00	1.24E+00
PCB-077	0.0277	3.08E-02	1.29E-02	3.48E-02	3.86E-02	2.52E-02	3.08E-02	9.48E-01	1.21E+00	8.68E-01
PCB-101	0.1078	1.20E-01	5.02E-02	1.35E-01	1.50E-01	9.81E-02	1.20E-01	3.68E+00	4.69E+00	3.37E+00
PCB-105	0.0394	4.37E-02	1.84E-02	4.95E-02	5.48E-02	3.58E-02	4.37E-02	1.35E+00	1.71E+00	1.23E+00
PCB-118	0.1011	1.12E-01	4.71E-02	1.27E-01	1.40E-01	9.19E-02	1.12E-01	3.45E+00	4.39E+00	3.16E+00
PCB-126	0.0010	1.14E-03	4.77E-04	1.29E-03	1.42E-03	9.32E-04	1.14E-03	3.50E-02	4.46E-02	3.21E-02
PCB-128	0.0197	2.18E-02	9.16E-03	2.47E-02	2.73E-02	1.79E-02	2.18E-02	6.72E-01	8.55E-01	6.15E-01
PCB-138	0.1675	1.86E-01	7.80E-02	2.10E-01	2.33E-01	1.52E-01	1.86E-01	5.72E+00	7.28E+00	5.24E+00
PCB-153	0.1514	1.68E-01	7.06E-02	1.90E-01	2.11E-01	1.38E-01	1.68E-01	5.18E+00	6.59E+00	4.74E+00
PCB-170	0.0458	5.08E-02	2.13E-02	5.76E-02	6.37E-02	4.17E-02	5.08E-02	1.57E+00	1.99E+00	1.43E+00
PCB-180	0.0822	9.12E-02	3.83E-02	1.03E-01	1.14E-01	7.48E-02	9.12E-02	2.81E+00	3.58E+00	2.57E+00
PCB-187	0.0586	6.50E-02	2.73E-02	7.36E-02	8.15E-02	5.33E-02	6.50E-02	2.00E+00	2.55E+00	1.83E+00
PCB-195	0.0055	6.05E-03	2.54E-03	6.86E-03	7.59E-03	4.96E-03	6.05E-03	1.87E-01	2.37E-01	1.71E-01
PCB-206	0.0338	3.75E-02	1.58E-02	4.25E-02	4.70E-02	3.08E-02	3.75E-02	1.16E+00	1.47E+00	1.06E+00
PCB-209	0.0236	2.62E-02	1.10E-02	2.96E-02	3.28E-02	2.14E-02	2.62E-02	8.06E-01	1.03E+00	7.38E-01
Total PCBs	1.0000	1.11	0.47	1.26	1.39	0.91	1.11	*34.18*	43.48	31.28

Table I-3. Bioaccumulation model inputs for the concentration of each modeled PCB congener in regional waters (pg/L).

The Total PCBs value listed at the bottom of the table is the median concentration from the observed data set. Individual congener concentrations were derived by multiplying the average contribution of the congener to the "sum of the 20 modeled congeners" by the regional median Total PCB concentration from the observed data (including both water column layers). Numbers in italics are the final, post-calibration values; see Table M-1 for details.

PCB congener	Average Fraction of Sum of 20 Congeners	PCB Congener Concentration in Regional Waters (pg/L)								
		Admiralty Inlet	Hood North	Hood South	Main Basin	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes
PCB-008	0.0080	2.67E-01	2.10E-01	2.10E-01	2.74E-01	2.56E-01	2.67E-01	6.45E-01	7.89E-01	4.01E-01
PCB-018	0.0034	1.14E-01	8.97E-02	8.97E-02	1.17E-01	1.10E-01	1.14E-01	2.76E-01	3.38E-01	1.72E-01
PCB-028	0.0325	1.08E+00	8.49E-01	8.49E-01	1.11E+00	1.04E+00	1.08E+00	2.61E+00	3.20E+00	1.62E+00
PCB-044	0.0176	5.85E-01	4.59E-01	4.59E-01	6.01E-01	5.61E-01	5.85E-01	1.41E+00	1.73E+00	8.79E-01
PCB-052	0.0336	1.12E+00	8.78E-01	8.78E-01	1.15E+00	1.07E+00	1.12E+00	2.70E+00	3.31E+00	1.68E+00
PCB-066	0.0397	1.32E+00	1.04E+00	1.04E+00	1.36E+00	1.27E+00	1.32E+00	3.19E+00	3.91E+00	1.99E+00
PCB-077	0.0277	9.23E-01	7.25E-01	7.25E-01	9.48E-01	8.85E-01	9.23E-01	2.23E+00	2.73E+00	1.39E+00
PCB-101	0.1078	3.59E+00	2.82E+00	2.82E+00	3.69E+00	3.44E+00	3.59E+00	8.67E+00	1.06E+01	5.39E+00
PCB-105	0.0394	1.31E+00	1.03E+00	1.03E+00	1.35E+00	1.26E+00	1.31E+00	3.17E+00	3.88E+00	1.97E+00
PCB-118	0.1011	3.36E+00	2.64E+00	2.64E+00	3.46E+00	3.22E+00	3.36E+00	8.12E+00	9.94E+00	5.05E+00
PCB-126	0.0010	3.41E-02	2.68E-02	2.68E-02	3.50E-02	3.27E-02	3.41E-02	8.24E-02	1.01E-01	5.12E-02
PCB-128	0.0197	6.54E-01	5.14E-01	5.14E-01	6.73E-01	6.28E-01	6.54E-01	1.58E+00	1.94E+00	9.84E-01
PCB-138	0.1675	5.57E+00	4.38E+00	4.38E+00	5.73E+00	5.34E+00	5.57E+00	1.35E+01	1.65E+01	8.37E+00
PCB-153	0.1514	5.04E+00	3.96E+00	3.96E+00	5.18E+00	4.83E+00	5.04E+00	1.22E+01	1.49E+01	7.57E+00
PCB-170	0.0458	1.52E+00	1.20E+00	1.20E+00	1.57E+00	1.46E+00	1.52E+00	3.68E+00	4.51E+00	2.29E+00
PCB-180	0.0822	2.74E+00	2.15E+00	2.15E+00	2.81E+00	2.62E+00	2.74E+00	6.61E+00	8.09E+00	4.11E+00
PCB-187	0.0586	1.95E+00	1.53E+00	1.53E+00	2.00E+00	1.87E+00	1.95E+00	4.71E+00	5.77E+00	2.93E+00
PCB-195	0.0055	1.82E-01	1.43E-01	1.43E-01	1.87E-01	1.74E-01	1.82E-01	4.39E-01	5.37E-01	2.73E-01
PCB-206	0.0338	1.12E+00	8.83E-01	8.83E-01	1.16E+00	1.08E+00	1.12E+00	2.72E+00	3.33E+00	1.69E+00
PCB-209	0.0236	7.84E-01	6.16E-01	6.16E-01	8.06E-01	7.53E-01	7.84E-01	1.90E+00	2.32E+00	1.18E+00
Total PCBs	1.0000	33.26	*26.13*	26.13	34.19	31.91	*33.26*	80.40	*98.37*	*50.00*

Table I-4. Bioaccumulation model inputs for the concentration of each modeled PBDE congener in regional sediments (ng/g dw).

The Total PBDEs value listed at the bottom of the table is the median concentration from the observed data set. Individual congener concentrations were derived by multiplying the average contribution of the congener to the "sum of the 17 modeled congeners" by the regional median Total PBDE concentration from the observed data. Numbers in italics are the final, post-calibration values; see Table M-1 for details.

PBDE congener	Average Fraction of Sum of 17 Congeners	PBDE Congener Concentration in Regional Sediments (ng/g dw)								
		Admiralty Inlet	Hood North	Hood South	Main Basin	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes
PBDE-017	0.00428	1.80E-03	8.56E-04	1.42E-03	2.90E-03	1.22E-03	1.41E-03	1.79E-02	2.11E-02	2.23E-03
PBDE-028	0.00053	2.24E-04	1.07E-04	1.78E-04	3.62E-04	1.52E-04	1.76E-04	2.23E-03	2.63E-03	2.78E-04
PBDE-047	0.13714	5.76E-02	2.74E-02	4.56E-02	9.29E-02	3.91E-02	4.53E-02	5.74E-01	6.76E-01	7.13E-02
PBDE-049	0.05781	2.43E-02	1.16E-02	1.92E-02	3.91E-02	1.65E-02	1.91E-02	2.42E-01	2.85E-01	3.01E-02
PBDE-066	0.00052	2.18E-04	1.04E-04	1.73E-04	3.51E-04	1.48E-04	1.71E-04	2.17E-03	2.56E-03	2.70E-04
PBDE-071	0.00592	2.49E-03	1.18E-03	1.97E-03	4.01E-03	1.69E-03	1.95E-03	2.48E-02	2.92E-02	3.08E-03
PBDE-085	0.00230	9.67E-04	4.60E-04	7.66E-04	1.56E-03	6.56E-04	7.60E-04	9.64E-03	1.13E-02	1.20E-03
PBDE-099	0.07021	2.95E-02	1.40E-02	2.33E-02	4.75E-02	2.00E-02	2.32E-02	2.94E-01	3.46E-01	3.65E-02
PBDE-100	0.01073	4.51E-03	2.15E-03	3.57E-03	7.27E-03	3.06E-03	3.54E-03	4.49E-02	5.29E-02	5.58E-03
PBDE-138	0.00449	1.89E-03	8.99E-04	1.49E-03	3.04E-03	1.28E-03	1.48E-03	1.88E-02	2.21E-02	2.34E-03
PBDE-153	0.01079	4.53E-03	2.16E-03	3.59E-03	7.30E-03	3.07E-03	3.56E-03	4.51E-02	5.31E-02	5.61E-03
PBDE-154	0.00617	2.59E-03	1.23E-03	2.05E-03	4.18E-03	1.76E-03	2.04E-03	2.58E-02	3.04E-02	3.21E-03
PBDE-183	0.00900	3.78E-03	1.80E-03	2.99E-03	6.09E-03	2.56E-03	2.97E-03	3.77E-02	4.43E-02	4.68E-03
PBDE-184	0.00000	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PBDE-190	0.00803	3.37E-03	1.61E-03	2.67E-03	5.44E-03	2.29E-03	2.65E-03	3.36E-02	3.95E-02	4.17E-03
PBDE-191	0.00000	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PBDE-209	0.67209	2.82E-01	1.34E-01	2.23E-01	4.55E-01	1.92E-01	2.22E-01	2.81E+00	3.31E+00	3.49E-01
Total PBDEs	1.00000	0.42	0.20	0.33	0.68	0.29	0.33	4.19	4.93	0.52

Table I-5. Bioaccumulation model inputs for the concentration of each modeled PBDE congener in regional waters (pg/L).

The Total PBDEs value listed at the bottom of the table is the median concentration from the observed data set. Individual congener concentrations were derived by multiplying the average contribution of the congener to the "sum of the 17 modeled congeners" by the regional median Total PBDE concentration from the observed data (including both water column layers). Numbers in italics are the final, post-calibration values; see Table M-1 for details.

PBDE congener	Average Fraction of Sum of 17 Congeners	PBDE Congener Concentration in Regional Waters (pg/L)								
		Admiralty Inlet	Hood North	Hood South	Main Basin	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes
PBDE-017	0.00428	1.08E-01	3.00E-02	2.14E-02	6.42E-02	5.80E-02	5.14E-02	1.08E-01	2.57E-01	1.08E-01
PBDE-028	0.00053	1.35E-02	3.74E-03	2.67E-03	8.01E-03	7.24E-03	6.41E-03	1.35E-02	3.20E-02	1.35E-02
PBDE-047	0.13714	3.46E+00	9.60E-01	6.86E-01	2.06E+00	1.86E+00	1.65E+00	3.46E+00	8.23E+00	3.46E+00
PBDE-049	0.05781	1.46E+00	4.05E-01	2.89E-01	8.67E-01	7.83E-01	6.94E-01	1.46E+00	3.47E+00	1.46E+00
PBDE-066	0.00052	1.31E-02	3.63E-03	2.59E-03	7.78E-03	7.03E-03	6.23E-03	1.31E-02	3.11E-02	1.31E-02
PBDE-071	0.00592	1.50E-01	4.15E-02	2.96E-02	8.89E-02	8.03E-02	7.11E-02	1.50E-01	3.55E-01	1.50E-01
PBDE-085	0.00230	5.81E-02	1.61E-02	1.15E-02	3.45E-02	3.12E-02	2.76E-02	5.81E-02	1.38E-01	5.81E-02
PBDE-099	0.07021	1.77E+00	4.91E-01	3.51E-01	1.05E+00	9.51E-01	8.42E-01	1.77E+00	4.21E+00	1.77E+00
PBDE-100	0.01073	2.71E-01	7.51E-02	5.37E-02	1.61E-01	1.45E-01	1.29E-01	2.71E-01	6.44E-01	2.71E-01
PBDE-138	0.00449	1.13E-01	3.15E-02	2.25E-02	6.74E-02	6.09E-02	5.39E-02	1.13E-01	2.70E-01	1.13E-01
PBDE-153	0.01079	2.72E-01	7.55E-02	5.39E-02	1.62E-01	1.46E-01	1.29E-01	2.72E-01	6.47E-01	2.72E-01
PBDE-154	0.00617	1.56E-01	4.32E-02	3.08E-02	9.25E-02	8.36E-02	7.40E-02	1.56E-01	3.70E-01	1.56E-01
PBDE-183	0.00900	2.27E-01	6.30E-02	4.50E-02	1.35E-01	1.22E-01	1.08E-01	2.27E-01	5.40E-01	2.27E-01
PBDE-184	0.00000	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PBDE-190	0.00803	2.03E-01	5.62E-02	4.01E-02	1.20E-01	1.09E-01	9.63E-02	2.03E-01	4.82E-01	2.03E-01
PBDE-191	0.00000	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PBDE-209	0.67209	1.70E+01	4.70E+00	3.36E+00	1.01E+01	9.11E+00	8.07E+00	1.70E+01	4.03E+01	1.70E+01
Total PBDEs	1.00000	25.24	*7.00*	*5.00*	*15.00*	*13.55*	*12.00*	25.24	*60.00*	25.24

Appendix J. Food Web Structure and Dietary Assumptions for the Bioaccumulation Model

Table J-1. Diet fraction assumptions for modeled organisms.

↓ Prey ↓	Consumers →																
	Herbivorous zpl.	Large copepod (*N. plumchrus*)	Small copepod (*P. minutes*)	Shellfish (*Mytilus* spp.)	Crab	Grazing inverts.	Carnivorous zpl. (amphipods)	Krill (*E. pacifica*)	Predatory inverts.	Spot prawn	Graceful crab	Small pelagic fish (seal prey)	Small pelagic fish (bird prey)	River lamprey (*L. ayresi*)	Misc. demersal fish (seal prey)	Misc. demersal fish (bird prey)	Pacific hake (*M. productus*)
Sediment / Detritus	0.3	0.3	0.3	0.21	0.438	0.374	0.05	0.14	0.5	0	0.098	0	0	0	0.1	0.1	0
Phytoplankton	0.7	0.7	0.7	0.579	0.002	0.176	0	0.809	0	0	0	0.005	0.005	0	0.005	0.005	0.005
Kelp / Seagrass	0	0	0	0.1	0.1	0.3	0	0	0	0	0	0	0	0	0	0	0
Herbivorous zooplankton	0	0	0	0.03	0.06	0.05	0.359	0.05	0.065	0	0.077	0.1	0.1	0	0.04	0.058	0.02
Large copepod (*N. plumchrus*)	0	0	0	0.05	0.02	0.05	0.404	0	0.05	0	0	0.15	0.151	0	0.051	0.051	0.02
Small copepod (*P. minutes*)	0	0	0	0.02	0.02	0.05	0.102	0	0.05	0	0	0.07	0.07	0	0.05	0.05	0.01
Shellfish (*Mytilus* spp.)	0	0	0	0.01	0.15	0	0.03	0.001	0.055	0	0.758	0.03	0.03	0	0.172	0.172	0.03
Crab	0	0	0	0.001	0.01	0	0.002	0	0.01	0	0	0.01	0.01	0	0	0	0.001
Grazing invertebrates	0	0	0	0	0.2	0	0.003	0	0.1	0.3	0.046	0.05	0.05	0	0.09	0.09	0
Carnivorous zpl. (amphipods)	0	0	0	0	0	0	0.05	0	0	0.7	0.02	0.264	0.264	0	0.154	0.154	0.163
Krill (*E. pacifica*)	0	0	0	0	0	0	0	0	0.111	0	0	0.15	0.17	0	0.1	0.13	0.7
Predatory invertebrates	0	0	0	0	0	0	0	0	0.036	0	0	0.05	0.05	0	0.04	0.04	0.005
Spot prawn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Graceful crab	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small pelagic fish (seal prey)	0	0	0	0	0	0	0	0	0.001	0	0	0.1	0	0.199	0.05	0	0.04
Small pelagic fish (bird prey)	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0.05	0
River lamprey (*L. ayresi*)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Misc. demersal fish (seal prey)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0
Misc. demersal fish (bird prey)	0	0	0	0	0	0	0	0	0	0	0.001	0	0	0	0	0.1	0
Chum salmon (immigrant)	0	0	0	0	0	0	0	0	0	0	0	0.001	0	0.053	0.001	0	0.001
Coho salmon (immigrant)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.051	0.004	0	0.001
Chinook salmon (immigrant)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.051	0.003	0	0.001
Pacific hake (*M. productus*)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.001	0.01	0	0
Spiny dogfish (*S. acanthias*)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pollock (*T. chalcogramma*)	0	0	0	0	0	0	0	0	0	0	0	0	0	0.005	0	0	0.002
N. smooth-tongue (*L. schmidti*)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.001
English sole (*P. vetulus*)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Herring (resident)	0	0	0	0	0	0	0	0	0.022	0	0	0.02	0	0.64	0.03	0	0
Seal mother's milk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Table J-1 (continued). Diet fraction assumptions for modeled organisms.

	Consumers →																
↓ Prey ↓	Spiny dogfish (*S. acanthias*)	Pollock (*T. chalcogramma*)	N. smooth-tongue (*L. schmidti*)	English sole (*P. vetulus*)	Herring (resident)	Blackmouth salmon (resident)	Ratfish (*H. colliei*)	Shiner surfperch (*C. aggregata*)	Staghorn sculpin (*L. armatus*)	Dbl. cr. cormorant (adult male)	Dbl. cr. cormorant (adult female)	Great blue heron (adult male)	Great blue heron (adult female)	Harbor seal (adult male)	Harbor seal (adult female)	Harbor seal (1 yr old)	Harbor seal (pup)
Sediment / Detritus	0	0	0	0	0	0	0.007	0	0.018	0	0	0	0	0	0	0	0
Phytoplankton	0	0.01	0.02	0.07	0	0	0	0	0	0	0	0	0	0	0	0	0
Kelp / Seagrass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Herbivorous zooplankton	0.01	0.01	0.31	0.05	0	0	0	0	0.47	0	0	0	0	0	0	0	0
Large copepod (*N. plumchrus*)	0.01	0.03	0.3	0	0.25	0.0345	0	0.13	0	0	0	0	0	0	0	0	0
Small copepod (*P. minutes*)	0.01	0.02	0.15	0	0.25	0.0345	0	0.12	0	0	0	0	0	0	0	0	0
Shellfish (*Mytilus* spp.)	0.05	0.001	0.001	0	0	0	0.586	0.435	0	0	0	0	0	0	0	0	0
Crab	0.01	0	0	0	0	0.02	0	0	0	0	0	0	0	0	0	0	0
Grazing invertebrates	0.15	0	0.056	0.88	0	0	0.153	0.285	0.001	0	0	0	0	0	0	0	0
Carnivorous zpl. (amphipods)	0.11	0.09	0.05	0	0.1	0	0	0	0.024	0	0	0	0	0	0	0	0
Krill (*E. pacifica*)	0.08	0.668	0.102	0	0.37	0.6	0	0	0	0	0	0	0	0	0	0	0
Predatory invertebrates	0.235	0.05	0	0	0	0.2	0	0.01	0	0	0	0	0	0	0	0	0
Spot prawn	0	0	0	0	0	0	0	0.02	0	0	0	0	0	0	0	0	0
Graceful crab	0	0	0	0	0	0	0.252	0	0.476	0	0	0	0	0	0	0	0
Small pelagic fish (seal prey)	0.042	0.01	0.01	0	0.02	0.071	0	0	0	0	0	0	0	0.1	0.1	0.1	0
Small pelagic fish (bird prey)	0	0	0	0	0	0	0	0	0.011	0.057	0.057	0.109	0.109	0	0	0	0
River lamprey (*L. ayresi*)	0.005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Misc. demersal fish (seal prey)	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0.175	0.175	0.175	0
Misc. demersal fish (bird prey)	0	0	0	0	0	0	0.002	0	0	0.916	0.916	0.891	0.891	0	0	0	0
Chum salmon (immigrant)	0.055	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0.01	0.01	0
Coho salmon (immigrant)	0.07	0	0	0	0	0	0	0	0	0	0	0	0	0.008	0.008	0.008	0
Chinook salmon (immigrant)	0.07	0	0	0	0	0	0	0	0	0	0	0	0	0.005	0.005	0.005	0
Pacific hake (*M. productus*)	0.056	0.01	0.001	0	0	0	0	0	0	0	0	0	0	0.464	0.464	0.464	0
Spiny dogfish (*S. acanthias*)	0.005	0	0	0	0	0	0	0	0	0	0	0	0	0.001	0.001	0.001	0
Pollock (*T. chalcogramma*)	0.001	0.001	0	0	0	0	0	0	0	0	0	0	0	0.006	0.006	0.006	0
N. smooth-tongue (*L. schmidti*)	0	0.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
English sole (*P. vetulus*)	0.001	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Herring (resident)	0.02	0.05	0	0	0.01	0.04	0	0	0	0.027	0.027	0	0	0.231	0.231	0.231	0
Seal mother's milk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Appendix K. Summary of Observed Data for Contaminants in Biota

Table K-1. Observed data summary for PCB concentrations in modeled organisms.

With the exception of harbor seals, all samples were whole body and all concentrations are given in units of ng/g wet weight; harbor seal samples were blubber and concentrations are given on a lipid weight basis.

Species	Data Source	Collection Years	Model Region	Analytical Method	Congeners Reported	n	NDs	Mean	StDev.	Min.	Max.	Units
POM (phytoplankton)	West et al. (2011a)	2009	Comm. Bay	low-res GC/MS	46	1	0	2.8				ng/g ww
	West et al. (2011a)	2009	Elliott Bay	low-res GC/MS	46	2	0	7.6		4.9	10.3	ng/g ww
	West et al. (2011a)	2009	Hood North	low-res GC/MS	46	3	0	2.3		2.1	2.4	ng/g ww
	West et al. (2011a)	2009	Hood South	low-res GC/MS	46	3	0	2.3		2.1	2.4	ng/g ww
	West et al. (2011a)	2009	Main Basin	low-res GC/MS	46	4	0	3.0		2.6	3.5	ng/g ww
	West et al. (2011a)	2009	South Sound	low-res GC/MS	46	9	0	2.7		2.2	3.6	ng/g ww
	West et al. (2011a)	2009	Whidbey	low-res GC/MS	46	10	0	2.5		2.1	4.3	ng/g ww
E.pacifica (krill)	West et al. (2011a)	2009	Elliott Bay	low-res GC/MS	46	3	0	11.7		11	12.5	ng/g ww
	West et al. (2011a)	2009	Hood North	low-res GC/MS	46	3	0	3.1		2.9	3.4	ng/g ww
	West et al. (2011a)	2009	Hood South	low-res GC/MS	46	3	0	3.1		2.9	3.4	ng/g ww
	West et al. (2011a)	2009	Main Basin	low-res GC/MS	46	3	0	3.9		3.8	4.0	ng/g ww
	West et al. (2011a)	2009	South Sound	low-res GC/MS	46	3	0	4.1		3.4	4.7	ng/g ww
	West et al. (2011a)	2009	Whidbey	low-res GC/MS	46	7	0	4.6		4.2	5.1	ng/g ww
Mytilus spp. (mussels)	NCCOS NS&T	2000-02	Admiralty	ECDDUAL.M	18	2	0	9.27	1.63			ng/g ww
	NCCOS NS&T	2006-10	Admiralty	ECDDUAL.M	40	3	0	29.1	5.97			ng/g ww
	NCCOS NS&T	2000-04	Elliott Bay	ECDDUAL.M	18	3	0	18.4	3.90			ng/g ww
	NCCOS NS&T	2006-10	Elliott Bay	ECDDUAL.M	40	4	0	21.4	8.37			ng/g ww
	NCCOS NS&T	2000-04	Hood North	ECDDUAL.M	18	3	0	2.39	0.62			ng/g ww
	NCCOS NS&T	2006-10	Hood North	ECDDUAL.M	40	2	0	9.66	9.68			ng/g ww
	NCCOS NS&T	2005-10	Main Basin	ECDDUAL.M	40	13	0	21.5	12.2			ng/g ww
	NCCOS NS&T	2001-04	Main Basin	ECDDUAL.M	18	6	0	12.9	8.68			ng/g ww
	ENVVEST	2005	Sinclair/Dyes	EPA1668A GC/MS	26	3	0	7.34	0.67	6.61	7.93	ng/g ww
	ENVVEST	2005	Sinclair/Dyes	EPA1668A GC/MS	26	3	0	9.06	0.95	7.98	9.78	ng/g ww
	NCCOS NS&T	2001-04	Sinclair/Dyes	ECDDUAL.M	18	2	0	11.3	2.52			ng/g ww
	NCCOS NS&T	2005-10	Sinclair/Dyes	ECDDUAL.M	40	3	0	21.2	4.41			ng/g ww
	ENVVEST	2005	Sinclair/Dyes	EPA1668A GC/MS	26	3	0	4.29	0.40	3.92	4.71	ng/g ww
	NCCOS NS&T	2000-04	South Sound	ECDDUAL.M	18	3	0	14.7	3.71			ng/g ww
	NCCOS NS&T	2006-10	South Sound	ECDDUAL.M	40	5	0	16.4	4.67			ng/g ww
	NCCOS NS&T	2005-09	Whidbey	ECDDUAL.M	40	29	0	11.2	5.27			ng/g ww
	NCCOS NS&T	2000-04	Whidbey	ECDDUAL.M	18	6	0	4.54	2.08			ng/g ww
	NCCOS NS&T	2009	Whidbey	ECDDUAL.M	40	1	0	5.01				ng/g ww
T.spinifera (krill)	West et al. (2011a)	2009	Main Basin	low-res GC/MS	46	3	0	17.6		17.2	18.6	ng/g ww
Graceful crab	ENVVEST	2005-07	Hood North	EPA1668A GC/MS	26	4	0	2.99	0.73	2.43	4.00	ng/g ww
	ENVVEST	2003-07	Sinclair/Dyes	EPA1668A GC/MS	26	13	0	35.73	22.72	10.14	83.81	ng/g ww
	ENVVEST	2003-05	South Sound	EPA1668A GC/MS	26	6	0	5.13	1.15	3.33	6.17	ng/g ww

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Table K-1 (continued). Observed data summary for PCB concentrations in modeled organisms.

Species	Data Source	Collection Years	Model Region	Analytical Method	Congeners Reported	n	NDs	Mean	StDev.	Min.	Max.	Units
Shiner surfperch	ENVVEST	2005-07	Hood North	EPA1668A GC/MS	26	5	0	11.82	5.52	4.37	19.06	ng/g ww
	ENVVEST	2003-07	Sinclair/Dyes	EPA1668A GC/MS	26	9	0	102.65	49.26	33.41	151.52	ng/g ww
	ENVVEST	2003-05	South Sound	EPA1668A GC/MS	26	5	0	24.99	4.97	20.83	33.56	ng/g ww
	EMAP	2000	South Sound	SW80818082	21	1	0	22.7				ng/g ww
Staghorn sculpin	EIM	2003	Comm. Bay	YLITALO05B	22	8	0	136	72.7			ng/g ww
	EMAP	2005	Sinclair/Dyes	SW8270Cm	54	1	1	5.00				ng/g ww
	ENVVEST	2003-07	Sinclair/Dyes	EPA1668A GC/MS	26	8	0	35.59	23.85	14.94	88.91	ng/g ww
	EMAP	2005	Whidbey	SW8270Cm	54	1	1	5.00				ng/g ww
Ratfish	ENVVEST	2007	Comm. Bay	EPA1668A GC/MS	26	3	0	107.74	71.57	47.74	186.95	ng/g ww
	ENVVEST	2007	Elliott Bay	EPA1668A GC/MS	26	3	0	698.91	760.25	172.07	1570.45	ng/g ww
	ENVVEST	2005-07	Hood North	EPA1668A GC/MS	26	6	0	32.41	17.36	15.67	65.69	ng/g ww
	ENVVEST	2007	Main Basin	EPA1668A GC/MS	26	3	0	74.39	39.91	46.33	120.08	ng/g ww
	ENVVEST	2003-07	Sinclair/Dyes	EPA1668A GC/MS	26	10	0	211.55	214.69	66.32	787.52	ng/g ww
	ENVVEST	2005-07	South Sound	EPA1668A GC/MS	26	6	0	91.27	45.72	50.75	178.68	ng/g ww
Dogfish	ENVVEST	2007	Admiralty	EPA1668A GC/MS	26	6	0	45.11	23.96	11.60	81.41	ng/g ww
English sole	EMAP	2000	Admiralty	SW80818082	21	3	0	16.1	6.02			ng/g ww
	ENVVEST	2005-07	Comm. Bay	EPA1668A GC/MS	26	9	0	125.84	90.97	24.56	299.24	ng/g ww
	EMAP	2000	Comm. Bay	SW80818082	21	1	0	50.5				ng/g ww
	ENVVEST	2007	Elliott Bay	EPA1668A GC/MS	26	3	0	264.31	249.02	27.33	523.83	ng/g ww
	ENVVEST	2005-07	Elliott Bay	EPA1668A GC/MS	26	8	0	102.36	90.87	9.12	263.01	ng/g ww
	WDFW	2007	Elliott Bay	GC/MS	40	3	0	271.79	51.14	223.48	325.36	ng/g ww
	EMAP	2000	Elliott Bay	SW80818082	21	1	0	411				ng/g ww
	ENVVEST	2005-07	Hood North	EPA1668A GC/MS	26	9	0	9.05	7.28	2.12	26.96	ng/g ww
	EMAP	2000-04	Hood North	SW80818082	21	5	0	12.9	3.6			ng/g ww
	EMAP	2000	Hood South	SW80818082	21	3	0	18.0	15.1			ng/g ww
	ENVVEST	2007	Main Basin	EPA1668A GC/MS	26	3	0	47.04	22.21	32.37	72.60	ng/g ww
	EMAP	2000	Main Basin	SW80818082	21	5	0	41.2	20.0			ng/g ww
	EMAP	2005	Main Basin	SW8270Cm	54	1	0	7.20				ng/g ww
	EMAP	2000	Sinclair/Dyes	SW80818082	21	1	0	97.3				ng/g ww
	ENVVEST	2007	Sinclair/Dyes	EPA1668A GC/MS	26	6	0	43.50	11.78	29.04	60.12	ng/g ww
	ENVVEST	2005-07	South Sound	EPA1668A GC/MS	26	9	0	16.57	7.29	7.52	28.94	ng/g ww
	EMAP	2000	South Sound	SW80818082	21	3	0	43.1	17.8			ng/g ww
	EMAP	2000-04	Whidbey	SW80818082	21	7	0	19.8	13.3			ng/g ww
	ENVVEST	2005-07	Whidbey	EPA1668A GC/MS	26	8	0	13.96	6.87	5.91	27.69	ng/g ww
Pacific herring	WDFW	2003	Main Basin	GC/MS	40	10	0	158	38.5	114	215	ng/g ww
	WDFW, O'Neill	2000-12	Sinclair/Dyes	GC/MS	40	99	0	207	56.9	77.1	380	ng/g ww
	WDFW, O'Neill	2000-12	South Sound	GC/MS	40	103	0	188	64.1	79.5	399	ng/g ww

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Table K-1 (continued). Observed data summary for PCB concentrations in modeled organisms.

Species	Data Source	Collection Years	Model Region	Analytical Method	Congeners Reported	n	NDs	Mean	StDev.	Min.	Max.	Units
Pacific hake	West et al. (2011b)	2009	Elliott Bay	high-res GC/MS	207	11	0	45		29	72	ng/g ww
	West et al. (2011b)	2009	Hood North	high-res GC/MS	207	10	0	15		9	38	ng/g ww
	West et al. (2011b)	2009	Hood South	high-res GC/MS	207	10	0	15		9	38	ng/g ww
	West et al. (2011b)	2009	Main Basin	high-res GC/MS	207	12	0	33		23	68	ng/g ww
	West et al. (2011b)	2009	South Sound	high-res GC/MS	207	3	0	33		32	34	ng/g ww
	West et al. (2011b)	2009	Whidbey	high-res GC/MS	207	10	0	44		29	67	ng/g ww
Walleye pollock	West et al. (2011b)	2009	Elliott Bay	high-res GC/MS	207	1	0	120				ng/g ww
	West et al. (2011b)	2009	Hood North	high-res GC/MS	207	3	0	7.6		6.9	8.4	ng/g ww
	West et al. (2011b)	2009	Hood South	high-res GC/MS	207	3	0	7.6		6.9	8.4	ng/g ww
	West et al. (2011b)	2009	Main Basin	high-res GC/MS	207	4	0	15		11	26	ng/g ww
Blackmouth salmon	WDFW	2003-04	Main Basin	GC/MS	40	48	0	113.15	45.09	5.82	191.76	ng/g ww
Harbor seal pups	Noel et al. (2011)	2009	Hood South	high-res GC/MS	207	8	0	1570	210			ng/g lw
	Noel et al. (2011)	2009	Main Basin	high-res GC/MS	207	3	0	6340	1530			ng/g lw
	Noel et al. (2011)	2009	South Sound	high-res GC/MS	207	7	0	4020	730			ng/g lw
	Tabuchi et al. (2006)	2003	South Sound	high-res GC/MS	154	7	0	6238	1008			ng/g lw
	Noel et al. (2011)	2009	Whidbey	high-res GC/MS	207	6	0	2590	630			ng/g lw

EIM = Environmental Information management database, maintained by the Washington State Department of Ecology. Accessed July 2012 at http://www.ecy.wa.gov/eim/index.htm.

EMAP = Western Coastal Environmental Monitoring and Assessment Program. Databases from 2000, 2002, 2004, and 2005-2006 provided by Valerie Partridge, Environmental Assessment Program, Washington State Department of Ecology, personal communication, 2012.

ENVVEST = Project ENVironmental investment. Compilation of data from 2000-2007 by Bob Johnston, Marine Environmental Support Office, U.S. Navy, personal communication, 2008-2009.

n = Number of samples.

NCCOS NS&T = National Centers for Ocean and Coastal Science, National Status and Trends Program data portal. Accessed October 2012 at http://ccma.nos.noaa.gov/about/coast/nsandt/download.aspx.

NDs = Number of non-detects.

O'Neill = Unpublished data from a 2006 study of killer whale prey by WDFW and NOAA Fisheries provided by Sandra O'Neill, Northwest Fisheries Science Center (NWFSC), personal communication, 2008.

POM = Particulate organic matter.

StDev. = Standard deviation.

WDFW = Washington Department of Fish and Wildlife. Compilation of Pacific herring data from 2000-2012 provided by James E. West, personal communication, 2013, and compilation of various biota data 2000-2007 provided by James E. West, personal communication, 2009.

Table K-2. Observed data summary for PBDE concentrations in modeled organisms.

With the exception of harbor seals, all samples were whole body and all concentrations are given in units of ng/g wet weight; harbor seal samples were blubber and concentrations are given on a lipid weight basis.

Species	Data Source	Collection Years	Model Region	Analytical Method	Congeners Reported	n	NDs	Mean	StDev.	Min.	Max.	Units
POM (phytoplankton)	West et al. (2011a)	2009	Comm. Bay	low-res GC/MS	10	1	0	0.27				ng/g ww
	West et al. (2011a)	2009	Elliott Bay	low-res GC/MS	10	2	0	0.95		0.44	1.45	ng/g ww
	West et al. (2011a)	2009	Hood North	low-res GC/MS	10	3	3	0.078		0.078	0.078	ng/g ww
	West et al. (2011a)	2009	Hood South	low-res GC/MS	10	3	3	0.078		0.078	0.078	ng/g ww
	West et al. (2011a)	2009	Main Basin	low-res GC/MS	10	4	1	0.15		0.11	0.18	ng/g ww
	West et al. (2011a)	2009	South Sound	low-res GC/MS	10	9	3	0.29		0.078	0.86	ng/g ww
	West et al. (2011a)	2009	Whidbey	low-res GC/MS	10	10	8	0.15		0.11	0.19	ng/g ww
E.pacifica (krill)	West et al. (2011a)	2009	Elliott Bay	low-res GC/MS	10	3	0	1.42		0.98	1.92	ng/g ww
	West et al. (2011a)	2009	Hood North	low-res GC/MS	10	3	0	0.17		0.14	0.19	ng/g ww
	West et al. (2011a)	2009	Hood South	low-res GC/MS	10	3	0	0.17		0.14	0.19	ng/g ww
	West et al. (2011a)	2009	Main Basin	low-res GC/MS	10	3	0	0.55		0.52	0.57	ng/g ww
	West et al. (2011a)	2009	South Sound	low-res GC/MS	10	3	0	0.28		0.22	0.36	ng/g ww
	West et al. (2011a)	2009	Whidbey	low-res GC/MS	10	7	0	0.59		0.44	0.78	ng/g ww
Mytilus spp. (mussels)	NCCOS NS&T	2006	Admiralty	PBDE2003/6	38	1	0	0.50				ng/g ww
	NCCOS NS&T	2004-06	Elliott Bay	PBDE2003/6	38	2	0	2.57	2.53			ng/g ww
	NCCOS NS&T	2004-06	Hood North	PBDE2003/6	38	2	0	0.29	0.01			ng/g ww
	NCCOS NS&T	2004-05	Main Basin	PBDE2003/6	38	6	0	6.34	2.11			ng/g ww
	NCCOS NS&T	2010	Main Basin	PBDEBACK	51	1	0	1.56				ng/g ww
	NCCOS NS&T	2004-05	Sinclair/Dyes	PBDE2003/6	38	2	0	4.78	0.91			ng/g ww
	NCCOS NS&T	2004-06	South Sound	PBDE2003/6	38	2	0	4.05	1.87			ng/g ww
	NCCOS NS&T	2010-11	Whidbey	PBDEBACK	51	4	0	4.72	2.26			ng/g ww
	NCCOS NS&T	2004-06	Whidbey	PBDE2003/6	38	5	0	1.57	1.02			ng/g ww
T.spinifera (krill)	West et al. (2011a)	2009	Main Basin	low-res GC/MS	10	3	0	7.89		7.61	8.28	ng/g ww
English sole	WDFW	2007	Elliott Bay	GC/MS	10	3	1	19.5	17.5	0.8	35.5	ng/g ww
Pacific herring	WDFW, O'Neill	2001-10	Sinclair/Dyes	GC/MS	10	48	0	45	19	13	86	ng/g ww
	WDFW, O'Neill	2006-10	South Sound	GC/MS	10	43	0	43	23	12	110	ng/g ww
Pacific hake	West et al. (2011b)	2009	Elliott Bay	high-res GC/MS	59	11	0	14		8.0	28	ng/g ww
	West et al. (2011b)	2009	Hood North	high-res GC/MS	59	10	0	2.6		1.4	8.2	ng/g ww
	West et al. (2011b)	2009	Hood South	high-res GC/MS	59	10	0	2.6		1.4	8.2	ng/g ww
	West et al. (2011b)	2009	Main Basin	high-res GC/MS	59	12	0	9.4		6.5	19	ng/g ww
	West et al. (2011b)	2009	South Sound	high-res GC/MS	59	3	0	7.6		7.3	7.9	ng/g ww
	West et al. (2011b)	2009	Whidbey	high-res GC/MS	59	10	0	13		7.3	21	ng/g ww

(continued on next page)

Table K-2 (continued). Observed data summary for PBDE concentrations in modeled organisms.

Species	Data Source	Collection Years	Model Region	Analytical Method	Congeners Reported	n	NDs	Mean	StDev.	Min.	Max.	Units
Walleye pollock	West et al. (2011b)	2009	Elliott Bay	high-res GC/MS	59	1	0	5.0				ng/g ww
	West et al. (2011b)	2009	Hood North	high-res GC/MS	59	3	0	1.7		1.6	2.0	ng/g ww
	West et al. (2011b)	2009	Hood South	high-res GC/MS	59	3	0	1.7		1.6	2.0	ng/g ww
	West et al. (2011b)	2009	Main Basin	high-res GC/MS	59	4	0	4.9		3.8	7.8	ng/g ww
Blackmouth salmon	WDFW	2003-04	Main Basin	GC/MS	10	48	1	35.4	18.2	1.1	75.8	ng/g ww
Harbor seal pups	Noel et al. (2011)	2009	Hood South	high-res GC/MS	not given	8	0	250	50			ng/g lw
	Noel et al. (2011)	2009	Main Basin	high-res GC/MS	not given	3	0	820	140			ng/g lw
	Noel et al. (2011)	2009	South Sound	high-res GC/MS	not given	7	0	860	130			ng/g lw
	Noel et al. (2011)	2009	Whidbey	high-res GC/MS	not given	6	0	480	100			ng/g lw

n = Number of samples.

NCCOS NS&T = National Centers for Ocean and Coastal Science, National Status and Trends Program data portal. Accessed October 2012 at http://ccma.nos.noaa.gov/about/coast/nsandt/download.aspx.

NDs = Number of non-detects.

O'Neill = Unpublished data from a 2006 study of killer whale prey by WDFW and NOAA Fisheries provided by Sandra O'Neill, Northwest Fisheries Science Center (NWFSC), personal communication, 2008.

POM = Particulate organic matter.

StDev. = Standard deviation.

WDFW = Washington Department of Fish and Wildlife. Compilation of Pacific herring data from 2000-2012 provided by James E. West, personal communication, 2013, and compilation of various biota data 2000-2007 provided by James E. West, personal communication, 2009.

Table K-3. Bioaccumulation model inputs for PCB congener concentrations (ng/g ww) in immigrant species.

All data on PCB concentrations in immigrant species were collected by WDFW and provided by James E. West (WDFW, personal communication, 2013 and 2009). The Total PCBs value listed at the bottom of the table is the mean observed concentration; WDFW estimated Total PCBs as twice the sum of 17 specific measured congeners (i.e., "sum 17 x 2"). The mean concentration was allocated to each modeled congener according to the average relative contribution of each congener to the available data.

PCB Congener	Pacific Herring	Chum Salmon	Coho Salmon	Chinook Salmon		
				Elliott Bay	South Sound	All others
PCB-008	0.00	0.00	0.00	0.00	0.00	0.00
PCB-018	0.64	0.38	0.00	0.70	0.31	0.58
PCB-028	1.76	0.37	0.11	1.22	0.78	1.03
PCB-044	2.62	0.18	0.18	1.43	0.94	1.11
PCB-052	7.78	0.72	1.21	3.21	2.20	2.57
PCB-066	0.00	0.00	0.00	0.00	0.00	0.00
PCB-077	0.00	0.00	0.00	0.00	0.00	0.00
PCB-101	24.88	1.13	2.86	6.80	6.32	6.46
PCB-105	8.83	0.59	1.16	2.60	2.39	2.47
PCB-118	19.88	1.05	2.30	5.61	5.28	5.43
PCB-126	3.16	0.17	0.36	0.98	0.77	0.84
PCB-128	5.42	0.08	0.21	1.19	1.15	1.16
PCB-138	37.53	1.20	4.06	9.95	9.76	9.74
PCB-153	50.88	1.30	4.89	13.37	12.68	12.77
PCB-170	4.13	0.00	0.17	0.99	0.97	0.97
PCB-180	12.03	0.07	0.91	3.00	2.95	2.99
PCB-187	14.40	0.07	0.95	3.13	2.99	3.01
PCB-195	0.33	0.00	0.00	0.01	0.02	0.01
PCB-208	0.91	0.00	0.00	0.07	0.04	0.04
PCB-209	0.27	0.00	0.00	0.00	0.00	0.00
Total PCBs	195.43	7.30	19.36	54.25	49.55	51.16

Table K-4. Bioaccumulation model inputs for PBDE congener concentrations (ng/g ww) in immigrant species.

All data on PBDE concentrations in immigrant species were collected by WDFW and provided by James E. West (WDFW, personal communication, 2013 and 2009). The Total PBDEs value listed at the bottom of the table is the mean observed concentration; WDFW estimated Total PBDEs as the sum of the 10 measured congeners. The mean concentration was allocated to each modeled congener according to the average relative contribution of each congener to the available data.

PCB Congener	Pacific Herring	Chum Salmon	Coho Salmon	Chinook Salmon		
				Elliott Bay	South Sound	All others
PBDE-017	0.00	0.00	0.00	0.00	0.00	0.00
PBDE-028	0.73	0.07	0.00	0.08	0.08	0.08
PBDE-047	21.75	0.07	3.11	7.55	8.51	8.54
PBDE-049	8.43	0.07	0.10	1.37	1.39	1.47
PBDE-066	0.38	0.07	0.00	0.07	0.06	0.05
PBDE-071	0.00	0.00	0.00	0.00	0.00	0.00
PBDE-085	0.00	0.07	0.00	0.00	0.00	0.00
PBDE-099	6.89	0.07	1.01	2.18	2.42	2.57
PBDE-100	5.05	0.07	0.45	1.89	1.93	2.09
PBDE-138	0.00	0.00	0.00	0.00	0.00	0.00
PBDE-153	0.25	0.07	0.00	0.07	0.04	0.06
PBDE-154	0.44	0.07	0.00	0.10	0.13	0.13
PBDE-183	0.00	0.07	0.00	0.00	0.00	0.00
PBDE-184	0.00	0.00	0.00	0.00	0.00	0.00
PBDE-190	0.00	0.00	0.00	0.00	0.00	0.00
PBDE-191	0.00	0.00	0.00	0.00	0.00	0.00
PBDE-209	0.00	0.00	0.00	0.00	0.00	0.00
Total PBDEs	43.91	0.73	4.68	13.31	14.57	14.98

Appendix L. Biological-Chemical Parameters for the Bioaccumulation Model

Table L-1. Bioaccumulation model inputs for PCB congener-specific chemical properties.

PCB Congener	CAS No.	# Cl atoms	Molecular Formula	Molecular Weight [a] (g/mol)	LeBas Molar Volume [b] (cm^3/mol)	Enthalpy of Octanol-Water Phase Change [c] (kJ/mol)	Reference [d] Log Kow fw @ 25 °C (unitless)	T-adjusted [e] Log Kow fw @ Tw (unitless)	T-adjusted [e] Log Kow fw @ Tb (unitless)	Reference [f] Log Koa @ 25 °C (unitless)	T-adjusted [g] Log Koa @ Ta (unitless)	T-adjusted [g] Log Koa @ Tb (unitless)
PCB-008	34883-43-7	2	C12H8Cl2	223.10	226.4	-22.2	5.07	5.28	4.91	7.05	7.64	6.59
PCB-018	37680-65-2	3	C12H7Cl3	257.54	247.3	-24.0	5.24	5.47	5.07	7.29	7.89	6.82
PCB-028	7012-37-5	3	C12H7Cl3	257.54	247.3	-24.0	5.67	5.90	5.50	7.94	8.58	7.44
PCB-044	41464-39-5	4	C12H6Cl4	291.99	268.2	-25.1	5.75	5.99	5.57	8.48	9.14	7.96
PCB-052	35693-99-3	4	C12H6Cl4	291.99	268.2	-25.1	5.84	6.08	5.66	8.12	8.77	7.62
PCB-066	32598-10-0	4	C12H6Cl4	291.99	268.2	-25.1	6.20	6.44	6.02	9.13	9.83	8.58
PCB-077	32598-13-3	4	C12H6Cl4	291.99	268.2	-25.1	6.36	6.60	6.18	9.47	10.19	8.91
PCB-101	37680-73-2	5	C12H5Cl5	326.43	289.1	-25.5	6.38	6.62	6.20	9.11	9.81	8.56
PCB-105	32598-14-4	5	C12H5Cl5	326.43	289.1	-25.5	6.65	6.89	6.47	9.93	10.68	9.36
PCB-118	31508-00-6	5	C12H5Cl5	326.43	289.1	-25.5	6.74	6.98	6.56	9.66	10.39	9.09
PCB-126	57465-28-8	5	C12H5Cl5	326.43	289.1	-25.5	6.89	7.13	6.71	10.38	11.14	9.78
PCB-128	38380-07-3	6	C12H4Cl6	360.88	310.0	-25.1	6.74	6.98	6.56	9.73	10.46	9.16
PCB-138	35065-28-2	6	C12H4Cl6	360.88	310.0	-25.1	6.83	7.07	6.65	9.83	10.57	9.26
PCB-153	35065-27-1	6	C12H4Cl6	360.88	310.0	-25.1	6.92	7.16	6.74	9.77	10.51	9.20
PCB-170	35065-30-6	7	C12H3Cl7	395.32	330.9	-24.1	7.27	7.50	7.10	10.49	11.26	9.89
PCB-180	35065-29-3	7	C12H3Cl7	395.32	330.9	-24.1	7.36	7.59	7.19	10.75	11.54	10.14
PCB-187	52663-68-0	7	C12H3Cl7	395.32	330.9	-24.1	7.17	7.40	7.00	10.30	11.07	9.71
PCB-195	52663-78-2	8	C12H2Cl8	429.77	351.8	-22.3	7.56	7.77	7.40	11.07	11.87	10.45
PCB-206	40186-72-9	9	C12HCl9	464.21	372.7	-19.8	8.09	8.28	7.95	11.62	12.45	10.98
PCB-209	2051-24-3	10	C12Cl10	498.66	393.6	-16.6	8.18	8.34	8.06	12.85	13.75	12.16

fw = Freshwater.
Koa = Octanol-air partition coefficient.
Kow = Octanol-water partition coefficient.
T-adjusted = Temperature-adjusted.
Ta = Air temperature (10.3 degrees C).
Tb = Biota temperature (37.5 degrees C).
Tw = Water temperature (9.5 degrees C).

[a] Molecular weights were calculated assuming atomic weights (g/mol) of C = 12.0107, H = 1.00794, and Cl = 35.4527.
[b] LeBas molar volumes were calculated following Table 1.1 of Mackay et al. (1992a); for method description see Reid et al. (1977) or Tucker and Nelken (1982).
[c] Enthalpies of octanol-water phase change were derived by Condon (2007) using a polynomial regression of the 16 enthalpies given in Table 20 of Li et al. (2003).
[d] Reference octanol-water partition coefficient is for freshwater at 25 degrees Celsius; congener-specific values were from Hawker and Connell (1988).
[e] Equation 9 of Li et al. (2003) was used to adjust the reference Log Kow values to water and biota temperatures.
[f] Reference octanol-air partition coefficient is at 25 degrees Celsius; congener-specific values were from Chen et al. (2003).
[g] Temperature-adjusted octanol-air partition coefficient values were derived by Condon (2007) based on calculations given in Chen et al. (2003).

Table L-2. Bioaccumulation model inputs for PBDE congener-specific chemical properties.

PBDE Congener	CAS No.	# Br atoms	Molecular Formula	Molecular Weight [a] (g/mol)	LeBas Molar Volume [b] (cm^3/mol)	Enthalpy of Octanol-Water Phase Change [c] (kJ/mol)	Reference [d] Log Kow fw @ 25 °C (unitless)	T-adjusted [e] Log Kow fw @ Tw (unitless)	T-adjusted [e] Log Kow fw @ Tb (unitless)	Reference [f] Log Koa @ 25 °C (unitless)	T-adjusted [e] Log Koa @ Ta (unitless)	T-adjusted [e] Log Koa @ Tb (unitless)
PBDE-017	147217-75-2	3	C12H7Br3O	406.90	264.4	-15	5.82	5.96	5.71	-80.1	8.62	9.35
PBDE-028	41318-75-6	3	C12H7Br3O	406.90	264.4	-15	5.82	5.96	5.71	-80.1	8.62	9.35
PBDE-047	5436-43-1	4	C12H6Br4O	485.79	287.7	-20	6.28	6.48	6.14	-93.9	9.44	10.29
PBDE-049	243982-82-3	4	C12H6Br4O	485.79	287.7	-20	6.28	6.48	6.14	-93.9	9.44	10.29
PBDE-066	189084-61-5	4	C12H6Br4O	485.79	287.7	-20	6.28	6.48	6.14	-93.9	9.44	10.29
PBDE-071	189084-62-6	4	C12H6Br4O	485.79	287.7	-20	6.28	6.48	6.14	-93.9	9.44	10.29
PBDE-085	182346-21-0	5	C12H5Br5O	564.69	311.0	-20	6.75	6.94	6.61	-101.4	10.26	11.18
PBDE-099	60348-60-9	5	C12H5Br5O	564.69	311.0	-20	6.75	6.94	6.61	-101.4	10.26	11.18
PBDE-100	189084-64-8	5	C12H5Br5O	564.69	311.0	-20	6.75	6.94	6.61	-101.4	10.26	11.18
PBDE-138	182677-30-1	6	C12H4Br6O	643.58	334.3	-20	7.22	7.41	7.08	-99.8	11.07	11.98
PBDE-153	68631-49-2	6	C12H4Br6O	643.58	334.3	-20	7.22	7.41	7.08	-99.8	11.07	11.98
PBDE-154	207122-15-4	6	C12H4Br6O	643.58	334.3	-20	7.22	7.41	7.08	-99.8	11.07	11.98
PBDE-183	207122-16-5	7	C12H3Br7O	722.48	357.6	-25	7.68	7.92	7.51	-89.5	11.89	12.70
PBDE-184	119264-56-1	7	C12H3Br7O	722.48	357.6	-25	7.68	7.92	7.51	-89.5	11.89	12.70
PBDE-190	79682-25-0	7	C12H3Br7O	722.48	357.6	-25	7.68	7.92	7.51	-89.5	11.89	12.70
PBDE-191	NA	7	C12H3Br7O	722.48	357.6	-25	7.68	7.92	7.51	-89.5	11.89	12.70
PBDE-209	1163-19-5	10	C12Br10O	959.17	427.5	-25	9.08	9.32	8.90	-89.5	14.33	15.15

fw = Freshwater.
Koa = Octanol-air partition coefficient.
Kow = Octanol-water partition coefficient.
NA = Not available.
T-adjusted = Temperature-adjusted.
Ta = Air temperature (10.3 degrees C).
Tb = Biota temperature (37.5 degrees C).
Tw = Water temperature (9.5 degrees C).

[a] Molecular weights were calculated assuming atomic weights (g/mol) of C = 12.0107, H = 1.00794, Br = 79.904, and O = 15.9994.
[b] LeBas molar volumes were calculated following Table 1.1 of Mackay et al. (1992a); for method description see Reid et al. (1977) or Tucker and Nelken (1982).
[c] Enthalpies of octanol-water phase change were obtained from Table 4.3 of Palm et al. (2004).
[d] Reference octanol-water partition coefficient is for freshwater at 25 degrees Celsius; congener-specific values were derived using Equation A4 of Palm et al. (2004).
[e] Octanol-water and octanol-air partitioning coefficients were temperature-adjusted using the van't Hoff equation (e.g., see Equation 9 of ten Hulscher et al., 1992, or Equation 9 of Bamford et al., 1999).
[f] Reference octanol-air partition coefficient is at 25 degrees Celsius; congener-specific values were derived using Equation A6 of Palm et al. (2004).

Table L-3. General biological parameters used in the bioaccumulation model.

Model Parameter	Symbol	Units	Value	Applicable Organisms
Non-lipid organic matter (NLOM) – octanol proportionality constant	beta	unitless	0.035	All
Particle scavenging efficiency	sigma	unitless	1	Filter-Feeding Invertebrates
Growth rate factor	GRI	unitless	0.00035	Invertebrates
Growth rate factor	GRF	unitless	0.0007	Fish
Dietary chemical transfer efficiency constant A	edA	unitless	8.50E-08	Invertebrates and Fish
Dietary chemical transfer efficiency constant B	edB	unitless	2	Invertebrates and Fish
Dietary absorption efficiency of water	eW	unitless	0.55	Invertebrates and Fish
Metabolic transformation rate	kMp	day^-1	0	Poikilotherms/Homeotherms
Mean homeothermic biota temperature	Tb	degrees C	37.5	Homeotherms
Density of lipids	dL	kg/L	0.9	Homeotherms
Diffusive transfer efficiency constant A	EW_A	unitless	1.85	Poikilotherms

Table L-4. Plant-specific biological parameters used in the bioaccumulation model.

Model Parameter	Symbol	Units	Phytoplankton	Kelp/Seagrass
Lipid fraction in plant	vLB	unitless	0.012	0.001
Non-lipid organic carbon fraction in plant	vNB	unitless	0.088	0.062
Water fraction in plant	vWB	unitless	0.900	0.937
Growth rate constant	kG	day^-1	0.080	0.125
Aqueous phase resistance constant	Ap	unitless	0.00006	0.00006
Organic phase resistance constant	Bp	unitless	5.5	5.5
Carbon fraction of total dry weight	CfracDW	unitless	0.4	0.4

Table L-5. Invertebrate-specific biological parameters used in the bioaccumulation model.

Numbers in italics are the final, post-calibration values; see Table M-1 for details.

Model Parameter	Symbol	Units	Herbivorous zooplankton	Large copepod (*N.plumchrus*)	Small copepod (*P.minutus*)	Shellfish (*Mytilus* spp.)	Crab	Grazing invertebrates
Wet weight of the organism	Wb	kg	*1.20E-07*	4.54E-06	8.84E-08	*5.00E-03*	5.37E-01	*1.10E-04*
Lipid fraction in biota	vLB	unitless	*0.020*	*0.060*	0.040	0.012	0.030	0.015
NLOM fraction in biota	vNB	unitless	0.166	0.126	0.146	0.188	0.170	0.185
Water fraction in biota	vWB	unitless	0.814	0.814	0.814	0.800	0.800	0.800
Dietary absorption efficiency of lipid	eL	unitless	0.72	0.72	0.72	*0.70*	*0.70*	*0.70*
Dietary absorption efficiency of NLOM	eN	unitless	0.72	0.72	0.72	*0.70*	*0.70*	*0.70*
Fraction of respiration that involves sediment pore water	Mp	unitless	0.00	0.00	0.00	0.20	*0.10*	*0.10*
Filter feeder (*Yes" or "No")	filterFeeeder	unitless	Yes	Yes	Yes	Yes	No	No
Carbon fraction of lipds	CfracLB	unitless	0.75	0.75	0.75	0.75	0.75	0.75
Carbon fraction of NLOM	CfracNB	unitless	0.50	0.50	0.50	0.50	0.50	0.50

Table L-5 (continued).

Model Parameter	Symbol	Units	Carnivorous zooplankton (amphipods)	Krill (*E.pacifica*)	Predatory invertebrates	Spot prawn	Graceful crab
Wet weight of the organism	Wb	kg	*3.13E-06*	4.03E-05	*6.05E-05*	3.70E-04	*1.56E-01*
Lipid fraction in biota	vLB	unitless	*0.010*	0.016	0.020	0.015	*0.008*
NLOM fraction in biota	vNB	unitless	0.160	0.156	0.180	0.242	0.154
Water fraction in biota	vWB	unitless	0.830	0.828	0.800	0.743	0.838
Dietary absorption efficiency of lipid	eL	unitless	0.72	0.75	0.75	0.75	*0.70*
Dietary absorption efficiency of NLOM	eN	unitless	0.72	0.75	0.75	0.75	*0.70*
Fraction of respiration that involves sediment pore water	Mp	unitless	0.05	0.05	0.20	0.20	0.20
Filter feeder (*Yes" or "No")	filterFeeeder	unitless	No	Yes	No	No	No
Carbon fraction of lipds	CfracLB	unitless	0.75	0.75	0.75	0.75	0.75
Carbon fraction of NLOM	CfracNB	unitless	0.50	0.50	0.50	0.50	0.50

NLOM = Non-lipid organic matter.

Table L-6. Fish-specific biological parameters used in the bioaccumulation model.

Numbers in italics are the final, post-calibration values; see Table M-1 for details.

Model Parameter	Symbol	Units	Small Pelagic fish (seal prey)	Small Pelagic fish (bird prey)	River lamprey	Misc. demersal fish (seal prey)	Misc. demersal fish (bird prey)
Wet weight of the organism	Wb	kg	4.49E-02	4.92E-03	1.43E-02	1.81E-01	4.72E-03
Lipid fraction in biota	vLB	unitless	0.039	0.015	0.125	0.025	0.016
NLOM fraction in biota	vNB	unitless	0.200	0.200	0.200	0.200	0.200
Water fraction in biota	vWB	unitless	0.761	0.785	0.675	0.775	0.784
Dietary absorption efficiency of lipid	eL	unitless	0.90	0.90	0.90	0.90	0.90
Dietary absorption efficiency of NLOM	eN	unitless	0.50	0.50	0.50	0.50	0.50
Fraction of respiration that involves sediment pore water	mP	unitless	0.00	0.00	0.00	0.05	0.05
Is this fish group an immigrant (Yes or No)?	fishImm	unitless	No	No	No	No	No
Carbon fraction of lipds	CfracLB	unitless	0.75	0.75	0.75	0.75	0.75
Carbon fraction of NLOM	CfracNB	unitless	0.50	0.50	0.50	0.50	0.50

Table L-6 (continued).

Model Parameter	Symbol	Units	Pacific hake	Spiny dogfish	Walleye pollock	Northern smooth-tongue	English sole
Wet weight of the organism	Wb	kg	*1.90E-01*	*4.23E+00*	*2.10E-02*	7.50E-04	*1.81E-01*
Lipid fraction in biota	vLB	unitless	*0.016*	0.100	*0.009*	0.050	*0.016*
NLOM fraction in biota	vNB	unitless	0.200	0.200	0.200	0.200	0.200
Water fraction in biota	vWB	unitless	0.784	0.700	0.791	0.750	0.784
Dietary absorption efficiency of lipid	eL	unitless	0.90	0.90	0.90	0.90	*0.90*
Dietary absorption efficiency of NLOM	eN	unitless	0.50	0.50	0.50	0.50	*0.50*
Fraction of respiration that involves sediment pore water	mP	unitless	0.00	0.00	0.00	0.00	0.05
Is this fish group an immigrant (Yes or No)?	fishImm	unitless	No	No	No	No	No
Carbon fraction of lipds	CfracLB	unitless	0.75	0.75	0.75	0.75	0.75
Carbon fraction of NLOM	CfracNB	unitless	0.50	0.50	0.50	0.50	0.50

NLOM = Non-lipid organic matter.

Table L-6 (continued). Fish-specific biological parameters used in the bioaccumulation model.

Numbers in italics are the final, post-calibration values; see Table M-1 for details.

Model Parameter	Symbol	Units	Pacific herring (resident)	Blackmouth salmon (resident)	Ratfish	Shiner surfperch	Staghorn Sculpin
Wet weight of the organism	Wb	kg	*7.00E-02*	*2.40E+00*	*5.08E-01*	*1.64E-02*	*5.18E-02*
Lipid fraction in biota	vLB	unitless	*0.120*	0.110	0.120	*0.035*	*0.011*
NLOM fraction in biota	vNB	unitless	0.200	0.200	0.180	0.214	0.190
Water fraction in biota	vWB	unitless	0.680	0.690	0.700	0.751	0.799
Dietary absorption efficiency of lipid	eL	unitless	*0.92*	*0.92*	*0.92*	*0.90*	*0.90*
Dietary absorption efficiency of NLOM	eN	unitless	*0.60*	*0.60*	*0.60*	*0.50*	*0.50*
Fraction of respiration that involves sediment pore water	mP	unitless	0.00	0.00	0.05	0.00	0.00
Is this fish group an immigrant (Yes or No)?	fishImm	unitless	No	No	No	No	No
Carbon fraction of lipds	CfracLB	unitless	0.75	0.75	0.75	0.75	0.75
Carbon fraction of NLOM	CfracNB	unitless	0.50	0.50	0.50	0.50	0.50

Table L-6 (continued).

Model Parameter	Symbol	Units	Pacific herring (immigrant)	Chum salmon (immigrant)	Coho salmon (immigrant)	Chinook salmon (immigrant)
Wet weight of the organism	Wb	kg	5.95E-02	3.96E+00	*2.88E+00*	*6.45E+00*
Lipid fraction in biota	vLB	unitless	0.050	0.048	0.064	0.054
NLOM fraction in biota	vNB	unitless	0.200	0.200	0.200	0.200
Water fraction in biota	vWB	unitless	0.750	0.752	0.736	0.746
Dietary absorption efficiency of lipid	eL	unitless	0.90	0.90	0.90	0.90
Dietary absorption efficiency of NLOM	eN	unitless	0.50	0.50	0.50	0.50
Fraction of respiration that involves sediment pore water	mP	unitless	0.00	0.00	0.00	0.00
Is this fish group an immigrant (Yes or No)?	fishImm	unitless	Yes	Yes	Yes	Yes
Carbon fraction of lipds	CfracLB	unitless	0.75	0.75	0.75	0.75
Carbon fraction of NLOM	CfracNB	unitless	0.50	0.50	0.50	0.50

NLOM = Non-lipid organic matter.

Table L-7. Bird-specific biological parameters used in the bioaccumulation model.

Model Parameter	Symbol	Units	Double-crested cormorant (adult male)	Double-crested cormorant (adult female)	Great blue heron (adult male)	Great blue heron (adult female)
Wet weight of the organism	Wb	kg	2.50E+00	2.40E+00	2.58E+00	2.20E+00
Lipid fraction in biota	vLB	unitless	0.075	0.075	0.075	0.075
NLOM fraction in biota	vNB	unitless	0.200	0.200	0.200	0.200
Water fraction in biota	vWB	unitless	0.725	0.725	0.725	0.725
Dietary absorption efficiency of lipid	eL	unitless	0.95	0.95	0.95	0.95
Dietary absorption efficiency of NLOM	eN	unitless	0.75	0.75	0.75	0.75
Dietary absorption efficiency of water	eW	unitless	0.85	0.85	0.85	0.85
Lung uptake efficiency	Ea	unitless	0.70	0.70	0.70	0.70
Growth rate constant	kG	day^-1	0	0	0	0
Activity factor	AF	unitless	3	3	3	3
Dietary chemical transfer efficiency constant A	edA	unitless	3.00E-09	3.00E-09	3.00E-09	3.00E-09
Dietary chemical transfer efficiency constant B	edB	unitless	1.04	1.04	1.04	1.04
Carbon fraction of lipds	CfracLB	unitless	0.75	0.75	0.75	0.75
Carbon fraction of NLOM	CfracNB	unitless	0.50	0.50	0.50	0.50

NLOM = Non-lipid organic matter.

Table L-8 Bird egg-specific biological parameters used in the bioaccumulation model.

Model Parameter	Symbol	Units	Double-crested cormorant (adult male)	Double-crested cormorant (adult female)	Great blue heron (adult male)	Great blue heron (adult female)
Wet weight of the organism	Wb_B	kg	2.50E+00	2.40E+00	2.58E+00	2.20E+00
Lipid fraction in biota	vLB_B	unitless	0.075	0.075	0.075	0.075
NLOM fraction in biota	vNB_B	unitless	0.200	0.200	0.200	0.200
Water fraction in biota	vWB_B	unitless	0.725	0.725	0.725	0.725
Dietary absorption efficiency of lipid	eL_B	unitless	0.95	0.95	0.95	0.95
Dietary absorption efficiency of NLOM	eN_B	unitless	0.75	0.75	0.75	0.75
Dietary absorption efficiency of water	eW_B	unitless	0.85	0.85	0.85	0.85
Lung uptake efficiency	Ea_B	unitless	0.70	0.70	0.70	0.70

NLOM = Non-lipid organic matter.

Table L-9 Seal-specific biological parameters used in the bioaccumulation model.

Numbers in italics are the final, post-calibration values; see Table M-1 for details.

Model Parameter	Symbol	Units	Harbor seal (adult male)	Harbor seal (adult female)	Harbor seal (1 year old)	Harbor seal (pup)
Wet weight of the organism	Wb_S	kg	87.00	64.80	33.30	23.89
Lipid fraction in biota	vLB_S	unitless	0.430	*0.430*	0.116	0.413
NLOM fraction in biota	vNB_S	unitless	0.200	0.200	0.246	0.151
Water fraction in biota	vWB_S	unitless	0.370	0.370	0.638	0.436
Dietary absorption efficiency of lipid	eL_S	unitless	*0.93*	*0.93*	*0.93*	*0.93*
Dietary absorption efficiency of NLOM	eN_S	unitless	0.75	0.75	0.75	0.75
Dietary absorption efficiency of water	eW_S	unitless	0.85	0.85	0.85	0.85
Lung uptake efficiency	Ea_S	unitless	0.70	0.70	0.70	0.70
Growth rate constant	kG_S	day^-1	7.50E-05	1.00E-05	1.00E-03	2.50E-02
Activity factor	AF_S	unitless	2.5	2.5	2.5	1.5
Dietary chemical transfer efficiency constant A	edA_S	unitless	1.00E-09	1.00E-09	1.00E-09	1.00E-09
Dietary chemical transfer efficiency constant B	edB_S	unitless	1.025	1.025	1.025	1.025
Gender	sealSex	unitless	Male	Female	Male	Male
Feeding rate coefficient kGd	kGd_seal	unitless	*0.072*	*0.136*	*0.100*	*0.040*
Carbon fraction of lipds	CfracLB_S	unitless	0.75	0.75	0.75	0.75
Carbon fraction of NLOM	CfracNB_S	unitless	0.50	0.50	0.50	0.50

NLOM = Non-lipid organic matter.

Table L-10 Additional seal-specific biological parameters used in the bioaccumulation model.

Model Parameter	Symbol	Units	Value
Proportion of population reproducing	PR	unitless	0.90
Wet weight of fetus	WF	kg	11.20
Lipid content of fetus	vLF	unitless	0.110
Non-lipid organic matter (NLOM) content of fetus	vNF	unitless	0.200
Water content of fetus	vWF	unitless	0.690
Lipid content of milk	vLM	unitless	0.493

Table L-11 Bioaccumulation model inputs of PCB metabolic rates (day^-1) for cormorants, heron, and adult seals. When available, rates from Table 6-4 of Condon (2007) were adopted. All other congeners (values in italics) were assigned the average congener rate for each species from Table 6-4.

PCB congener	Metabolic Rate (day^-1)			
	Cormorant	Heron	Male seal	Female seal
PCB-008	*2.19E-02*	*5.79E-02*	2.25E-02	2.25E-02
PCB-018	*2.19E-02*	*5.79E-02*	1.47E-02	1.47E-02
PCB-028	3.50E-02	8.00E-03	2.29E-02	2.29E-02
PCB-044	*2.19E-02*	*5.79E-02*	3.65E-03	3.65E-03
PCB-052	*2.19E-02*	*5.79E-02*	0.00E+00	0.00E+00
PCB-066	3.12E-02	1.00E-02	2.00E-01	2.00E-01
PCB-077	*2.19E-02*	*5.79E-02*	*4.70E-02*	*4.70E-02*
PCB-101	1.15E-01	9.43E-02	2.66E-03	2.66E-03
PCB-105	1.20E-02	4.90E-03	2.66E-02	2.66E-02
PCB-118	6.80E-03	8.50E-04	3.03E-02	3.03E-02
PCB-126	*2.19E-02*	*5.79E-02*	*4.70E-02*	*4.70E-02*
PCB-128	1.15E-02	2.68E-03	7.80E-03	7.80E-03
PCB-138	5.20E-03	1.89E-03	2.25E-03	2.25E-03
PCB-153	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PCB-170	3.00E-03	3.50E-04	0.00E+00	0.00E+00
PCB-180	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PCB-187	4.40E-02	0.00E+00	6.61E-04	6.61E-04
PCB-195	*2.19E-02*	*5.79E-02*	*4.70E-02*	*4.70E-02*
PCB-206	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PCB-209	*2.19E-02*	*5.79E-02*	0.00E+00	0.00E+00

Table L-12 Bioaccumulation model inputs of PBDE metabolic rates (day^-1) for cormorants, heron, and adult seals. Metabolic rates for cormorants and herons were assumed to be zero for all modeled congeners. The value used for each PBDE congener was determined during model calibration and is equal to one-fourth of the median rate for the PCB congeners modeled by Condon (2007).

PBDE congener	Metabolic Rate (day^-1)			
	Cormorant	Heron	Male seal	Female seal
PBDE-017	0.00E+00	0.00E+00	1.43E-03	1.43E-03
PBDE-028	0.00E+00	0.00E+00	1.43E-03	1.43E-03
PBDE-047	0.00E+00	0.00E+00	1.43E-03	1.43E-03
PBDE-049	0.00E+00	0.00E+00	1.43E-03	1.43E-03
PBDE-066	0.00E+00	0.00E+00	1.43E-03	1.43E-03
PBDE-071	0.00E+00	0.00E+00	1.43E-03	1.43E-03
PBDE-085	0.00E+00	0.00E+00	1.43E-03	1.43E-03
PBDE-099	0.00E+00	0.00E+00	1.43E-03	1.43E-03
PBDE-100	0.00E+00	0.00E+00	1.43E-03	1.43E-03
PBDE-138	0.00E+00	0.00E+00	1.43E-03	1.43E-03
PBDE-153	0.00E+00	0.00E+00	1.43E-03	1.43E-03
PBDE-154	0.00E+00	0.00E+00	1.43E-03	1.43E-03
PBDE-183	0.00E+00	0.00E+00	1.43E-03	1.43E-03
PBDE-190	0.00E+00	0.00E+00	1.43E-03	1.43E-03
PBDE-209	0.00E+00	0.00E+00	1.43E-03	1.43E-03

Appendix M. Calibration of the Bioaccumulation Model

Table M-1. Summary of adjustments made to food web model inputs during the calibration process.

All changes were applied to both the PCB and PBDE models, with the exception of the contaminant-specific adjustments listed at the bottom of the table.

Organism or Region	Parameter	Previous Value	Updated Value	Reference(s)
Phytoplankton	Lipid fraction in plant	0.0009	0.012	DeGasperi et al. (2014), EPA (2009)
	Water fraction in plant	0.9985	0.90	DeGasperi et al. (2014), EPA (2009)
	NLOC fraction in plant	0.0006	0.088	Model constraints; also based on Alava et al. (2012), Gobas and Arnot (2005), Mackintosh et al. (2004)
	Growth rate constant (day^-1)	0.125	0.08	Alava et al. (2012), Windward (2010), Swackhamer and Skoglund (1993)
Herbivorous Zpl	Wet weight of the organism (kg)	7.1E-08	1.2E-07	Adjusted within range of DeGasperi et al. (2014), Windward (2010), Townes-Witzel (2007)
	Lipid fraction in biota	0.04	0.02	DeGasperi et al. (2014)
Neocalanus plumchrus	Lipid fraction in biota	0.12	0.06	Adjusted toward DeGasperi et al. (2014), Alava et al. (2012)
Shellfish (*Mytilus* spp.)	Wet weight of the organism (kg)	8.06E-03	5.00E-03	Alava et al. (2012)
	Dietary absorption efficiency of lipid	0.75	0.70	Adjusted toward Windward (2010) based on Arnot and Gobas (2004)
	Dietary absorption efficiency of NLOM	0.75	0.70	Adjusted toward Alava et al. (2012) based on Arnot and Gobas (2004)
Crab	Dietary absorption efficiency of lipid	0.75	0.70	Adjusted toward Alava et al. (2012) and Windward (2010) based on Arnot and Gobas (2004)
	Dietary absorption efficiency of NLOM	0.75	0.70	Adjusted toward Alava et al. (2012) and Windward (2010) based on Arnot and Gobas (2004)
	Fraction of respiration that involves pore water	0.20	0.10	Adjusted toward Windward (2010)
Grazing Invertebrates	Wet weight of the organism (kg)	5.00E-02	1.10E-04	Alava et al. (2012), Townes-Witzel (2007)
	Dietary absorption efficiency of lipid	0.75	0.70	Based on Arnot and Gobas (2004)
	Dietary absorption efficiency of NLOM	0.75	0.70	Alava et al. (2012) based on Arnot and Gobas (2004)
	Fraction of respiration that involves pore water	0.20	0.10	Adjusted toward Townes-Witzel (2007)
Carnivorous Zpl (Amphipods)	Wet weight of the organism (kg)	3.23E-07	3.13E-06	Alava et al. (2012), Gobas and Arnot (2005)
	Lipid fraction in biota	0.037	0.01	Alava et al. (2012), DeGasperi et al. (2014), McIntyre (2004)
Predatory Invertebrates	Wet weight of the organism (kg)	1.00E+00	6.02E-05	Observed data for *T. spinifera*
Graceful Crab	Wet weight of the organism (kg)	0.165	0.156	Observed data
	Lipid fraction in biota	0.01117	0.0081	Observed data
	Dietary absorption efficiency of lipid	0.301	0.70	Arnot and Gobas (2004), Windward (2010)
	Dietary absorption efficiency of NLOM	0.31	0.70	Arnot and Gobas (2004), Windward (2010)
Coho (Immigrant)	Wet weight of the organism (kg)	3.5	2.88	Observed data
Chinook (Immigrant)	Wet weight of the organism (kg)	3.63	6.45	Observed data
Pacific Hake	Wet weight of the organism (kg)	0.374	0.1899	Observed data
	Lipid fraction in biota	0.052	0.01568	Observed data
Spiny Dogfish	Wet weight of the organism (kg)	2.0	4.23	Observed data
Walleye Pollock	Wet weight of the organism (kg)	0.0797	0.02103	Observed data
	Lipid fraction in biota	0.0216	0.00892	Observed data
English Sole	Wet weight of the organism (kg)	0.074	0.1812	Observed data
	Lipid fraction in biota	0.02	0.0158	Observed data
	Dietary absorption efficiency of lipid	0.505	0.90	Condon (2007)
	Dietary absorption efficiency of NLOM	0.508	0.50	Condon (2007)
	Diet	GA	Windward	Windward (2010)

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Table M-1 (continued). Summary of adjustments made to food web model inputs during the calibration process.

Organism or Region	Parameter	Previous Value	Updated Value	Reference(s)
Herring (resident)	Wet weight of the organism (kg)	0.059	0.070	Alava et al. (2012)
	Lipid fraction in biota	0.065	0.12	Alava et al. (2012)
	Dietary absorption efficiency of lipid	0.90	0.92	DeGasperi et al. (2014), Lachmuth et al. (2010), Townes-Witzel (2007)
	Dietary absorption efficiency of NLOM	0.50	0.60	DeGasperi et al. (2014), Lachmuth et al. (2010), Townes-Witzel (2007)
	Diet	T-W	Harvey	Harvey et al. (2010)
Blackmouth salmon (resident)	Wet weight of the organism (kg)	3.63	2.40	Observed data
	Dietary absorption efficiency of lipid	0.651	0.92	DeGasperi et al. (2014), Lachmuth et al. (2010), Townes-Witzel (2007)
	Dietary absorption efficiency of NLOM	0.662	0.60	DeGasperi et al. (2014), Lachmuth et al. (2010), Townes-Witzel (2007)
	Diet	GA	Li	Li (2012)
Ratfish	Wet weight of the organism (kg)	0.75	0.508	Observed data
	Dietary absorption efficiency of lipid	0.307	0.92	DeGasperi et al. (2014), Lachmuth et al. (2010), Townes-Witzel (2007)
	Dietary absorption efficiency of NLOM	0.306	0.60	DeGasperi et al. (2014), Lachmuth et al. (2010), Townes-Witzel (2007)
Shiner Surfperch	Wet weight of the organism (kg)	0.188	0.0164	Observed data
	Lipid fraction in biota	0.0462	0.0349	Observed data
	Dietary absorption efficiency of lipid	0.301	0.90	Condon (2007)
	Dietary absorption efficiency of NLOM	0.326	0.50	Condon (2007)
	Diet	GA	Harvey	Harvey et al. (2010)
Staghorn Sculpin	Wet weight of the organism (kg)	0.0752	0.05182	Observed data
	Lipid fraction in biota	0.0212	0.0109	Observed data
	Dietary absorption efficiency of lipid	0.301	0.90	Condon (2007)
	Dietary absorption efficiency of NLOM	0.326	0.50	Condon (2007)
Harbor Seal (adult male)	Dietary absorption efficiency of lipid	0.97	0.93	Condon (2007), Townes-Witzel (2007)
	Coefficient kGd for Gd = kGd * Wb	0.07	0.072	Calculated using Grigg (2003)
Harbor Seal (adult female)	Dietary absorption efficiency of lipid	0.97	0.93	Condon (2007), Townes-Witzel (2007)
	Lipid fraction in biota	0.15	0.43	Gobas and Arnot (2005)
	Coefficient kGd for Gd = kGd * Wb	0.11	0.136	Calculated using Grigg (2003)
Harbor Seal (1 yr old)	Dietary absorption efficiency of lipid	0.97	0.93	Condon (2007), Townes-Witzel (2007)
	Coefficient kGd for Gd = kGd * Wb	0.08	0.1	Calculated using Grigg (2003)
Harbor Seal (pup)	Dietary absorption efficiency of lipid	0.97	0.93	Condon (2007), Townes-Witzel (2007)
	Coefficient kGd for Gd = kGd * Wb	0.06	0.04	Calculated using Grigg (2003)
Main Basin	Organic carbon content of sediment	0.0048	0.013	Observed data (median value of samples from all "Basins")
Hood Canal North	Concentration of suspended solids (mg/L)	4.5	2.0	Observed data (regional median appeared to be biased high; adjusted based on offshore ambient samples)
Hood Canal South	Concentration of suspended solids (mg/L)	4.0	2.0	Observed data (regional median appeared to be biased high; adjusted based on offshore ambient samples)
Sinclair/Dyes Inlet	Concentration of suspended solids (mg/L)	5.00	4.25	Observed data (25th percentile value from Sinclair/Dyes Inlet samples)

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Table M-1 (continued). Summary of adjustments made to food web model inputs during the calibration process.

Organism or Region	Parameter	Previous Value	Updated Value	Reference(s)
PCBs				
Commencement Bay	Median concentration in sediment (ug/kg dw)	4.44	34.2	Observed data (median value of samples from all "Urban Bays")
Elliott Bay	Median concentration in water (pg/L)	80.40	98.37	Observed data (75th percentile value from Elliott Bay samples)
Hood Canal North	Median concentration in water (pg/L)	33.26	26.13	Observed data (median value of samples from Hood Canal South)
Sinclair/Dyes Inlet	Median concentration in water (pg/L)	80.40	50	Observed data (based on 25th percentile value of samples from all "Urban Bays")
Whidbey Basin	Median concentration in water (pg/L)	51.74	33.26	Observed data (median value of samples from all "Basins")
PBDEs				
Elliott Bay	Median concentration in water (pg/L)	25.24	60.00	Estimated based on model results (i.e., agreement between predicted and observed biota concentrations)
Hood Canal North	Median concentration in water (pg/L)	25.24	7.00	Estimated based on model results (i.e., agreement between predicted and observed biota concentrations)
Hood Canal South	Median concentration in water (pg/L)	25.24	5.00	Estimated based on model results (i.e., agreement between predicted and observed biota concentrations)
Main Basin	Median concentration in water (pg/L)	25.24	15.00	Estimated based on model results (i.e., agreement between predicted and observed biota concentrations)
South Sound	Median regional concentration in water (pg/L)	25.24	13.55	Estimated based on model results (i.e., agreement between predicted and observed biota concentrations)
Whidbey Basin	Median regional concentration in water (pg/L)	25.24	12.00	Estimated based on model results (i.e., agreement between predicted and observed biota concentrations)
Harbor Seal (adult male)	Metabolic rate (day^-1)	0.00E+00	1.43E-03	Estimated based on model results (i.e., agreement between predicted and observed biota concentrations)
Harbor Seal (adult female)	Metabolic rate (day^-1)	0.00E+00	1.43E-03	Estimated based on model results (i.e., agreement between predicted and observed biota concentrations)

GA = Derived by Pelletier and Mohamedali (2009) using a genetic algorithm.
Gd = Feeding rate (kg/day).
kGd = Species- and age-specific rate constant for feeding.
NLOM = Non-lipid organic matter.
PBDE = Polybrominated diphenyl ether.
PCB = Polychlorinated biphenyl.
T-W = Townes-Witzel (2007).
Wb = Wet weight of the organism (kg).
Zpl = Zooplankton.

Table M-2. Comparison of observed and predicted concentrations of Total PCBs in biota, organized by species.

Model bias is the ratio of predicted to observed concentrations. For example, if the predicted concentration is 150 ng/g and the observed concentration is 100 ng/g, then the model bias is 1.5.

Species	Sample Location	Model Region	Observed Concentration (Mean +/- SD)			Predicted Concentration	Units	Model Bias
POM (phytoplankton)	Commencement Bay	Comm. Bay	2.8	+/-		2.90	ng/g ww	1.04
	Elliott Bay	Elliott Bay	7.6	+/-		3.55	ng/g ww	0.47
	Hood Canal	Hood North	2.3	+/-		1.36	ng/g ww	0.59
	Hood Canal	Hood South	2.3	+/-		1.39	ng/g ww	0.60
	Main Basin	Main Basin	3.0	+/-		1.55	ng/g ww	0.52
	South Sound	South Sound	2.7	+/-		1.60	ng/g ww	0.59
	Whidbey Basin	Whidbey Basin	2.5	+/-		1.71	ng/g ww	0.68
E.pacifica (krill)	Elliott Bay	Elliott Bay	11.7	+/-		13.5	ng/g ww	1.15
	Hood Canal	Hood North	3.1	+/-		2.7	ng/g ww	0.86
	Hood Canal	Hood South	3.1	+/-		2.8	ng/g ww	0.92
	Main Basin	Main Basin	3.9	+/-		3.2	ng/g ww	0.82
	South Sound	South Sound	4.1	+/-		3.8	ng/g ww	0.93
	Whidbey Basin	Whidbey Basin	4.6	+/-		3.5	ng/g ww	0.76
Mytilus spp. (mussels)	Port Townsend	Admiralty Inlet	9.27	+/-	1.63	2.9	ng/g ww	0.31
	Port Townsend	Admiralty Inlet	29.1	+/-	5.97	2.9	ng/g ww	0.10
	Duwamish Head	Elliott Bay	18.4	+/-	3.90	21.6	ng/g ww	1.17
	Duwamish Head, Myrtle Edwards	Elliott Bay	21.4	+/-	8.37	21.6	ng/g ww	1.01
	Hood Canal	Hood North	2.39	+/-	0.62	1.8	ng/g ww	0.75
	Hood Canal	Hood North	9.66	+/-	9.68	1.8	ng/g ww	0.19
	Four-Mile Rock, Edmonds Ferry, Picnic Point, Tahlequah Point	Main Basin	21.5	+/-	12.2	2.6	ng/g ww	0.12
	Four-Mile Rock, Edmonds Ferry, South Seattle, Tahlequah Point	Main Basin	12.9	+/-	8.68	2.6	ng/g ww	0.20
	Port Orchard marina	Sinclair/Dyes	7.34	+/-	0.67	13.2	ng/g ww	1.80
	Puget Sound Naval Shipyard	Sinclair/Dyes	9.06	+/-	0.95	13.2	ng/g ww	1.46
	Waterman Point	Sinclair/Dyes	11.3	+/-	2.52	13.2	ng/g ww	1.17
	Waterman Point	Sinclair/Dyes	21.2	+/-	4.41	13.2	ng/g ww	0.62
	Waterman Point	Sinclair/Dyes	4.29	+/-	0.40	13.2	ng/g ww	3.08
	Budd Inlet	South Sound	14.7	+/-	3.71	2.9	ng/g ww	0.20
	Budd Inlet, Kopachuck Park, Tolmie Park	South Sound	16.4	+/-	4.67	2.9	ng/g ww	0.18
	Cavalero Co. Park, Eide Road, Everett Cemex, Everett Harbor, Hat Island, Hermosa Point, Kayak Point, Mukilteo, Possession Point	Whidbey Basin	11.2	+/-	5.27	2.6	ng/g ww	0.23
	Everett Harbor, Mukilteo, Possession Point	Whidbey Basin	4.54	+/-	2.08	2.6	ng/g ww	0.57
	Everett Harbor	Whidbey Basin	5.01	+/-		2.6	ng/g ww	0.52
T.spinifera (krill)	Main Basin	Main Basin	17.6	+/-		17.8	ng/g ww	1.01
Graceful crab	Hood Canal	Hood North	2.99	+/-	0.73	4.5	ng/g ww	1.52
	Sinclair Inlet	Sinclair/Dyes	35.73	+/-	22.72	35.8	ng/g ww	1.00
	Nisqually	South Sound	5.13	+/-	1.15	7.0	ng/g ww	1.36
Shiner surfperch	Hood Canal	Hood North	11.82	+/-	5.52	20.0	ng/g ww	1.69
	Sinclair Inlet	Sinclair/Dyes	102.65	+/-	49.26	122.4	ng/g ww	1.19
	Nisqually	South Sound	24.99	+/-	4.97	28.1	ng/g ww	1.12
	Port of Shelton	South Sound	22.7	+/-		28.1	ng/g ww	1.24
Staghorn sculpin	Olympic View, Skookum Wulge	Comm. Bay	136	+/-	72.7	108.1	ng/g ww	0.80
	Port Orchard	Sinclair/Dyes	5.00	+/-		70.3	ng/g ww	14.06
	Sinclair Inlet	Sinclair/Dyes	35.59	+/-	23.85	70.3	ng/g ww	1.98
	Saratoga Passage	Whidbey Basin	5.00	+/-		16.7	ng/g ww	3.34

(continued on next page)

Table M-2 (continued). Comparison of observed and predicted concentrations of Total PCBs in biota, organized by species.

Species	Sample Location	Model Region	Observed Concentration (Mean +/- SD)			Predicted Concentration	Units	Model Bias
Ratfish	Commencement Bay	Comm. Bay	107.74	+/-	71.57	432.8	ng/g ww	4.02
	Elliott Bay	Elliott Bay	698.91	+/-	760.25	416.5	ng/g ww	0.60
	Hood Canal	Hood North	32.41	+/-	17.36	34.9	ng/g ww	1.08
	Eagle Harbor	Main Basin	74.39	+/-	39.91	49.0	ng/g ww	0.66
	Sinclair Inlet	Sinclair/Dyes	211.55	+/-	214.69	270.2	ng/g ww	1.28
	Nisqually	South Sound	91.27	+/-	45.72	52.8	ng/g ww	0.58
Dogfish	Admiralty Inlet	Admiralty Inlet	45.11	+/-	23.96	198.2	ng/g ww	4.39
English sole	Admiralty Bay, Mutiny Bay, Useless Bay	Admiralty Inlet	16.1	+/-	6.02	25.1	ng/g ww	1.56
	Commencement Bay	Comm. Bay	125.84	+/-	90.97	183.1	ng/g ww	1.45
	Commencement Bay, west	Comm. Bay	50.5	+/-		183.1	ng/g ww	3.63
	Duwamish	Elliott Bay	264.31	+/-	249.02	204.2	ng/g ww	0.77
	Elliott Bay	Elliott Bay	102.36	+/-	90.87	204.2	ng/g ww	1.99
	Elliott Bay	Elliott Bay	271.79	+/-	51.14	204.2	ng/g ww	0.75
	Elliott Bay, northeast	Elliott Bay	411	+/-		204.2	ng/g ww	0.50
	Hood Canal	Hood North	9.05	+/-	7.28	17.6	ng/g ww	1.94
	Hood Canal, Pt. Ludlow, Pt. Gamble Bay	Hood North	12.9	+/-	3.6	17.6	ng/g ww	1.36
	Dabob Bay, Hood Canal South	Hood South	18.0	+/-	15.1	21.0	ng/g ww	1.17
	Eagle Harbor	Main Basin	47.04	+/-	22.21	23.4	ng/g ww	0.50
	Gig Harbor, Adm. Inlet South, Colvos Psg.	Main Basin	41.2	+/-	20.0	23.4	ng/g ww	0.57
	Puget Sound	Main Basin	7.20	+/-		23.4	ng/g ww	3.25
	Port Madison	Sinclair/Dyes	97.3	+/-		144.0	ng/g ww	1.48
	Sinclair Inlet	Sinclair/Dyes	43.50	+/-	11.78	144.0	ng/g ww	3.31
	Nisqually	South Sound	16.57	+/-	7.29	23.6	ng/g ww	1.42
	Port of Olympia, East Anderson Island/ North Cormorant Passage	South Sound	43.1	+/-	17.8	23.6	ng/g ww	0.55
	Everett Harbor, Penn Cove, Possession Sound, Oak Harbor, Saratoga Passage	Whidbey Basin	19.8	+/-	13.3	24.4	ng/g ww	1.23
	Port Gardner	Whidbey Basin	13.96	+/-	6.87	24.4	ng/g ww	1.75
Pacific herring	Quartermaster	Main Basin	158	+/-	38.5	66.5	ng/g ww	0.42
	Port Orchard	Sinclair/Dyes	207	+/-	56.9	207.3	ng/g ww	1.00
	Squaxin Pass	South Sound	188	+/-	64.1	79.1	ng/g ww	0.42
Pacific hake	Elliott Bay	Elliott Bay	45	+/-		97.7	ng/g ww	2.17
	Hood Canal	Hood North	15	+/-		18.5	ng/g ww	1.23
	Hood Canal	Hood South	15	+/-		19.9	ng/g ww	1.32
	Main Basin	Main Basin	33	+/-		22.0	ng/g ww	0.67
	South Sound	South Sound	33	+/-		25.8	ng/g ww	0.78
	Whidbey Basin	Whidbey Basin	44	+/-		24.3	ng/g ww	0.55
Walleye pollock	Elliott Bay	Elliott Bay	120	+/-		91.2	ng/g ww	0.76
	Hood Canal	Hood North	7.6	+/-		17.5	ng/g ww	2.30
	Hood Canal	Hood South	7.6	+/-		18.8	ng/g ww	2.47
	Main Basin	Main Basin	15	+/-		20.8	ng/g ww	1.38
Blackmouth salmon	Apple Cove Point	Main Basin	113.15	+/-	45.09	144.4	ng/g ww	1.28
Harbor seal pups	Dosewallips R., Quilcene Bay	Hood South	1570	+/-	210	4104	ng/g lw	2.61
	Orchard Rocks, Blakely Rocks	Main Basin	6340	+/-	1530	4474	ng/g lw	0.71
	Gertrude Island	South Sound	4020	+/-	730	5211	ng/g lw	1.30
	Gertrude Island	South Sound	6238	+/-	1008	5211	ng/g lw	0.84
	Skagit Bay	Whidbey Basin	2590	+/-	630	4974	ng/g lw	1.92
Overall geometric mean of model bias for all species and locations:								0.97

POM = Particulate organic matter.

Table M-3. Comparison of observed and predicted concentrations of Total PCBs in biota, organized by region.

Model bias is the ratio of predicted to observed concentrations.

Species	Sample Location	Model Region	Observed Concentration (Mean +/- SD)			Predicted Concentration	Units	Model Bias
Mytilus spp. (mussels)	Port Townsend	Admiralty Inlet	9.27	+/-	1.63	2.9	ng/g ww	0.31
Mytilus spp. (mussels)	Port Townsend		29.1	+/-	5.97	2.9	ng/g ww	0.10
Dogfish	Admiralty Inlet		45.11	+/-	23.96	198.2	ng/g ww	4.39
English sole	Admiralty Bay, Mutiny Bay, Useless Bay		16.1	+/-	6.02	25.1	ng/g ww	1.56
POM (phytoplankton)	Commencement Bay	Comm. Bay	2.8	+/-		2.90	ng/g ww	1.04
Staghorn sculpin	Olympic View, Skookum Wulge		136	+/-	72.7	108.1	ng/g ww	0.80
Ratfish	Commencement Bay		107.74	+/-	71.57	432.8	ng/g ww	4.02
English Sole	Commencement Bay		125.84	+/-	90.97	183.1	ng/g ww	1.45
English sole	Commencement Bay, west		50.5	+/-		183.1	ng/g ww	3.63
POM (phytoplankton)	Elliott Bay	Elliott Bay	7.6	+/-		3.55	ng/g ww	0.47
E.pacifica (krill)	Elliott Bay		11.7	+/-		13.5	ng/g ww	1.15
Mytilus spp. (mussels)	Duwamish Head		18.4	+/-	3.90	21.6	ng/g ww	1.17
Mytilus spp. (mussels)	Duwamish Head, Myrtle Edwards		21.4	+/-	8.37	21.6	ng/g ww	1.01
Ratfish	Elliott Bay		698.91	+/-	760.25	416.5	ng/g ww	0.60
English Sole	Duwamish		264.31	+/-	249.02	204.2	ng/g ww	0.77
English Sole	Elliott Bay		102.36	+/-	90.87	204.2	ng/g ww	1.99
English sole	Elliott Bay		271.79	+/-	51.14	204.2	ng/g ww	0.75
English sole	Elliott Bay, northeast		411	+/-		204.2	ng/g ww	0.50
Pacific hake	Elliott Bay		45	+/-		97.7	ng/g ww	2.17
Walleye pollock	Elliott Bay		120	+/-		91.2	ng/g ww	0.76
POM (phytoplankton)	Hood Canal	Hood North	2.3	+/-		1.36	ng/g ww	0.59
E.pacifica (krill)	Hood Canal		3.1	+/-		2.7	ng/g ww	0.86
Mytilus spp. (mussels)	Hood Canal		2.39	+/-	0.62	1.8	ng/g ww	0.75
Mytilus spp. (mussels)	Hood Canal		9.66	+/-	9.68	1.8	ng/g ww	0.19
Graceful crab	Hood Canal		2.99	+/-	0.73	4.5	ng/g ww	1.52
Shiner surfperch	Hood Canal		11.82	+/-	5.52	20.0	ng/g ww	1.69
Ratfish	Hood Canal		32.41	+/-	17.36	34.9	ng/g ww	1.08
English Sole	Hood Canal		9.05	+/-	7.28	17.6	ng/g ww	1.94
English sole	Hood Canal, Pt. Ludlow, Pt. Gamble Bay		12.9	+/-	3.6	17.6	ng/g ww	1.36
Pacific hake	Hood Canal		15	+/-		18.5	ng/g ww	1.23
Walleye pollock	Hood Canal		7.6	+/-		17.5	ng/g ww	2.30
POM (phytoplankton)	Hood Canal	Hood South	2.3	+/-		1.39	ng/g ww	0.60
E.pacifica (krill)	Hood Canal		3.1	+/-		2.8	ng/g ww	0.92
English sole	Dabob Bay, Hood Canal South		18.0	+/-	15.1	21.0	ng/g ww	1.17
Pacific hake	Hood Canal		15	+/-		19.9	ng/g ww	1.32
Walleye pollock	Hood Canal		7.6	+/-		18.8	ng/g ww	2.47
Harbor seal pups	Dosewallips R., Quilcene Bay		1570	+/-	210	4104	ng/g lw	2.61
POM (phytoplankton)	Main Basin	Main Basin	3.0	+/-		1.55	ng/g ww	0.52
E.pacifica (krill)	Main Basin		3.9	+/-		3.2	ng/g ww	0.82
Mytilus spp. (mussels)	Four-Mile Rock, Edmonds Ferry, Picnic Point, Tahlequah Point		21.5	+/-	12.2	2.6	ng/g ww	0.12
Mytilus spp. (mussels)	Four-Mile Rock, Edmonds Ferry, South Seattle, Tahlequah Point		12.9	+/-	8.68	2.6	ng/g ww	0.20
T.spinifera (krill)	Main Basin		17.6	+/-		17.8	ng/g ww	1.01
Ratfish	Eagle Harbor		74.39	+/-	39.91	49.0	ng/g ww	0.66
English Sole	Eagle Harbor		47.04	+/-	22.21	23.4	ng/g ww	0.50
English sole	Gig Harbor, Adm. Inlet South, Colvos Psg.		41.2	+/-	20.0	23.4	ng/g ww	0.57
English sole	Puget Sound		7.20	+/-		23.4	ng/g ww	3.25
Pacific herring	Quartermaster		158	+/-	38.5	66.5	ng/g ww	0.42

(continued on next page)

Table M-3 (continued). Comparison of observed and predicted concentrations of Total PCBs in biota, organized by region.

Species	Sample Location	Model Region	Observed Concentration (Mean +/- SD)			Predicted Concentration	Units	Model Bias
Pacific hake	Main Basin	Main Basin (continued)	33	+/-		22.0	ng/g ww	0.67
Walleye pollock	Main Basin		15	+/-		20.8	ng/g ww	1.38
Blackmouth salmon	Apple Cove Point		113.15	+/-	45.09	144.4	ng/g ww	1.28
Harbor seal pups	Orchard Rocks, Blakely Rocks		6340	+/-	1530	4474	ng/g lw	0.71
Mytilus spp. (mussels)	Port Orchard marina	Sinclair/Dyes	7.34	+/-	0.67	13.2	ng/g ww	1.80
Mytilus spp. (mussels)	Puget Sound Naval Shipyard		9.06	+/-	0.95	13.2	ng/g ww	1.46
Mytilus spp. (mussels)	Waterman Point		11.3	+/-	2.52	13.2	ng/g ww	1.17
Mytilus spp. (mussels)	Waterman Point		21.2	+/-	4.41	13.2	ng/g ww	0.62
Mytilus spp. (mussels)	Waterman Point		4.29	+/-	0.40	13.2	ng/g ww	3.08
Graceful crab	Sinclair Inlet		35.73	+/-	22.72	35.8	ng/g ww	1.00
Shiner surfperch	Sinclair Inlet		102.65	+/-	49.26	122.4	ng/g ww	1.19
Staghorn sculpin	Port Orchard		5.00	+/-		70.3	ng/g ww	14.06
Staghorn sculpin	Sinclair Inlet		35.59	+/-	23.85	70.3	ng/g ww	1.98
Ratfish	Sinclair Inlet		211.55	+/-	214.69	270.2	ng/g ww	1.28
English sole	Port Madison		97.3	+/-		144.0	ng/g ww	1.48
English Sole	Sinclair Inlet		43.50	+/-	11.78	144.0	ng/g ww	3.31
Pacific herring	Port Orchard		207	+/-	56.9	207.3	ng/g ww	1.00
POM (phytoplankton)	South Sound	South Sound	2.7	+/-		1.60	ng/g ww	0.59
E.pacifica (krill)	South Sound		4.1	+/-		3.8	ng/g ww	0.93
Mytilus spp. (mussels)	Budd Inlet		14.7	+/-	3.71	2.9	ng/g ww	0.20
Mytilus spp. (mussels)	Budd Inlet, Kopachuck Park, Tolmie Park		16.4	+/-	4.67	2.9	ng/g ww	0.18
Graceful crab	Nisqually		5.13	+/-	1.15	7.0	ng/g ww	1.36
Shiner surfperch	Nisqually		24.99	+/-	4.97	28.1	ng/g ww	1.12
Shiner surfperch	Port of Shelton		22.7	+/-		28.1	ng/g ww	1.24
Ratfish	Nisqually		91.27	+/-	45.72	52.8	ng/g ww	0.58
English Sole	Nisqually		16.57	+/-	7.29	23.6	ng/g ww	1.42
English sole	Port of Olympia, East Anderson Island/ North Cormorant Passage		43.1	+/-	17.8	23.6	ng/g ww	0.55
Pacific herring	Squaxin Pass		188	+/-	64.1	79.1	ng/g ww	0.42
Pacific hake	South Sound		33	+/-		25.8	ng/g ww	0.78
Harbor seal pups	Gertrude Island		4020	+/-	730	5211	ng/g lw	1.30
Harbor seal pups	Gertrude Island		6238	+/-	1008	5211	ng/g lw	0.84
POM (phytoplankton)	Whidbey Basin	Whidbey Basin	2.5	+/-		1.71	ng/g ww	0.68
E.pacifica (krill)	Whidbey Basin		4.6	+/-		3.5	ng/g ww	0.76
Mytilus spp. (mussels)	Cavalero Co. Park, Eide Road, Everett Cemex, Everett Harbor, Hat Island, Hermosa Point, Kayak Point, Mukilteo, Possession Point		11.2	+/-	5.27	2.6	ng/g ww	0.23
Mytilus spp. (mussels)	Everett Harbor, Mukilteo, Possession Point		4.54	+/-	2.08	2.6	ng/g ww	0.57
Mytilus spp. (mussels)	Everett Harbor		5.01	+/-		2.6	ng/g ww	0.52
Staghorn sculpin	Saratoga Passage		5.00	+/-		16.7	ng/g ww	3.34
English sole	Everett Harbor, Penn Cove, Possession Sound, Oak Harbor, Saratoga Passage		19.8	+/-	13.3	24.4	ng/g ww	1.23
English Sole	Port Gardner		13.96	+/-	6.87	24.4	ng/g ww	1.75
Pacific hake	Whidbey Basin		44	+/-		24.3	ng/g ww	0.55
Harbor seal pups	Skagit Bay		2590	+/-	630	4974	ng/g lw	1.92
							Overall geometric mean of model bias for all species and locations:	0.97

POM = Particulate organic matter.

Table M-4. Comparison of observed and predicted concentrations of Total PBDEs in biota, organized by species.

Model bias is the ratio of predicted to observed concentrations.

Species	Sample Location	Model Region	Observed Concentration (Mean +/- SD)			Predicted Concentration	Units	Model Bias
POM (phytoplankton)	Commencement Bay	Comm. Bay	0.27	+/-		0.41	ng/g ww	1.53
	Elliott Bay	Elliott Bay	0.95	+/-		0.98	ng/g ww	1.04
	Hood Canal	Hood North	0.078	+/-		0.15	ng/g ww	1.96
	Hood Canal	Hood South	0.078	+/-		0.11	ng/g ww	1.42
	Main Basin	Main Basin	0.15	+/-		0.29	ng/g ww	1.96
	South Sound	South Sound	0.29	+/-		0.29	ng/g ww	0.99
	Whidbey Basin	Whidbey Basin	0.15	+/-		0.26	ng/g ww	1.73
E.pacifica (krill)	Elliott Bay	Elliott Bay	1.42	+/-		1.60	ng/g ww	1.13
	Hood Canal	Hood North	0.17	+/-		0.22	ng/g ww	1.32
	Hood Canal	Hood South	0.17	+/-		0.17	ng/g ww	1.02
	Main Basin	Main Basin	0.55	+/-		0.46	ng/g ww	0.83
	South Sound	South Sound	0.28	+/-		0.50	ng/g ww	1.80
	Whidbey Basin	Whidbey Basin	0.59	+/-		0.39	ng/g ww	0.66
Mytilus spp. (mussels)	Port Townsend	Admiralty	0.50	+/-		0.63	ng/g ww	1.26
	Duwamish Head	Elliott Bay	2.57	+/-	2.53	1.66	ng/g ww	0.64
	Hood Canal	Hood North	0.29	+/-	0.01	0.16	ng/g ww	0.57
	Edmonds Ferry, Four-Mile Rock, Tahlequah Point	Main Basin	6.34	+/-	2.11	0.41	ng/g ww	0.07
	Picnic Point	Main Basin	1.56	+/-		0.41	ng/g ww	0.27
	Waterman Point	Sinclair/Dyes	4.78	+/-	0.91	0.49	ng/g ww	0.10
	Budd Inlet	South Sound	4.05	+/-	1.87	0.39	ng/g ww	0.10
	Cavalero Co. Park, Everett Cemex, Hat Island, Hermosa Point	Whidbey Basin	4.72	+/-	2.26	0.30	ng/g ww	0.06
	Cavalero Co. Park, Everett harbor, Mukilteo, Possession Point	Whidbey Basin	1.57	+/-	1.02	0.30	ng/g ww	0.19
T.spinifera (krill)	Main Basin	Main Basin	7.89	+/-		2.28	ng/g ww	0.29
English sole	Elliott Bay	Elliott Bay	19.5	+/-	17.5	12.93	ng/g ww	0.66
Pacific herring	Port Orchard	Sinclair/Dyes	45	+/-	19	14.18	ng/g ww	0.32
	Squaxin Pass	South Sound	43	+/-	23	10.64	ng/g ww	0.25
Pacific hake	Elliott Bay	Elliott Bay	14	+/-		10.07	ng/g ww	0.72
	Hood Canal	Hood North	2.6	+/-		1.46	ng/g ww	0.56
	Hood Canal	Hood South	2.6	+/-		1.15	ng/g ww	0.44
	Main Basin	Main Basin	9.4	+/-		2.89	ng/g ww	0.31
	South Sound	South Sound	7.6	+/-		3.09	ng/g ww	0.41
	Whidbey Basin	Whidbey Basin	13	+/-		2.48	ng/g ww	0.19
Walleye pollock	Elliott Bay	Elliott Bay	5.0	+/-		9.45	ng/g ww	1.89
	Hood Canal	Hood North	1.7	+/-		1.33	ng/g ww	0.78
	Hood Canal	Hood South	1.7	+/-		1.03	ng/g ww	0.61
	Main Basin	Main Basin	4.9	+/-		2.68	ng/g ww	0.55
Blackmouth salmon	Apple Cove Point	Main Basin	35.4	+/-	18.2	20.61	ng/g ww	0.58
Harbor seal pups	Dosewallips R., Quilcene Bay	Hood South	250	+/-	50	294	ng/g lw	1.17
	Orchard Rocks, Blakely Rocks	Main Basin	820	+/-	140	720	ng/g lw	0.88
	Gertrude Island	South Sound	860	+/-	130	769	ng/g lw	0.89
	Skagit Bay	Whidbey Basin	480	+/-	100	621	ng/g lw	1.29
Overall geometric mean of model bias for all species and locations:								0.59

POM = Particulate organic matter.

Table M-5. Comparison of observed and predicted concentrations of Total PBDEs in biota, organized by region.

Model bias is the ratio of predicted to observed concentrations.

Species	Sample Location	Model Region	Observed Concentration (Mean +/- SD)			Predicted Concentration	Units	Model Bias
Mytilus spp. (mussels)	Port Townsend	Admiralty	0.50	+/-		0.63	ng/g ww	1.26
POM (phytoplankton)	Commencement Bay	Comm. Bay	0.27	+/-		0.41	ng/g ww	1.53
POM (phytoplankton)	Elliott Bay	Elliott Bay	0.95	+/-		0.98	ng/g ww	1.04
E.pacifica (krill)	Elliott Bay		1.42	+/-		1.60	ng/g ww	1.13
Mytilus spp. (mussels)	Duwamish Head		2.57	+/-	2.53	1.66	ng/g ww	0.64
English sole	Elliott Bay		19.5	+/-	17.5	12.93	ng/g ww	0.66
Pacific hake	Elliott Bay		14	+/-		10.07	ng/g ww	0.72
Walleye pollock	Elliott Bay		5.0	+/-		9.45	ng/g ww	1.89
POM (phytoplankton)	Hood Canal	Hood North	0.078	+/-		0.15	ng/g ww	1.96
E.pacifica (krill)	Hood Canal		0.17	+/-		0.22	ng/g ww	1.32
Mytilus spp. (mussels)	Hood Canal		0.29	+/-	0.01	0.16	ng/g ww	0.57
Pacific hake	Hood Canal		2.6	+/-		1.46	ng/g ww	0.56
Walleye pollock	Hood Canal		1.7	+/-		1.33	ng/g ww	0.78
POM (phytoplankton)	Hood Canal	Hood South	0.078	+/-		0.11	ng/g ww	1.42
E.pacifica (krill)	Hood Canal		0.17	+/-		0.17	ng/g ww	1.02
Pacific hake	Hood Canal		2.6	+/-		1.15	ng/g ww	0.44
Walleye pollock	Hood Canal		1.7	+/-		1.03	ng/g ww	0.61
Harbor seal pups	Dosewallips R., Quilcene Bay		250	+/-	50	294	ng/g lw	1.17
POM (phytoplankton)	Main Basin	Main Basin	0.15	+/-		0.29	ng/g ww	1.96
E.pacifica (krill)	Main Basin		0.55	+/-		0.46	ng/g ww	0.83
Mytilus spp. (mussels)	Edmonds Ferry, Four-Mile Rock, Tahlequah Point		6.34	+/-	2.11	0.41	ng/g ww	0.07
Mytilus spp. (mussels)	Picnic Point		1.56	+/-		0.41	ng/g ww	0.27
T.spinifera (krill)	Main Basin		7.89	+/-		2.28	ng/g ww	0.29
Pacific hake	Main Basin		9.4	+/-		2.89	ng/g ww	0.31
Walleye pollock	Main Basin		4.9	+/-		2.68	ng/g ww	0.55
Blackmouth salmon	Apple Cove Point		35.4	+/-	18.2	20.61	ng/g ww	0.58
Harbor seal pups	Orchard Rocks, Blakely Rocks		820	+/-	140	720	ng/g lw	0.88
Mytilus spp. (mussels)	Waterman Point	Sinclair/Dyes	4.78	+/-	0.91	0.49	ng/g ww	0.10
Pacific herring	Port Orchard		45	+/-	19	14.18	ng/g ww	0.32
POM (phytoplankton)	South Sound	South Sound	0.29	+/-		0.29	ng/g ww	0.99
E.pacifica (krill)	South Sound		0.28	+/-		0.50	ng/g ww	1.80
Mytilus spp. (mussels)	Budd Inlet		4.05	+/-	1.87	0.39	ng/g ww	0.10
Pacific herring	Squaxin Pass		43	+/-	23	10.64	ng/g ww	0.25
Pacific hake	South Sound		7.6	+/-		3.09	ng/g ww	0.41
Harbor seal pups	Gertrude Island		860	+/-	130	769	ng/g lw	0.89
POM (phytoplankton)	Whidbey Basin	Whidbey Basin	0.15	+/-		0.26	ng/g ww	1.73
E.pacifica (krill)	Whidbey Basin		0.59	+/-		0.39	ng/g ww	0.66
Mytilus spp. (mussels)	Cavalero Co. Park, Everett Cemex, Hat Island, Hermosa Point		4.72	+/-	2.26	0.30	ng/g ww	0.06
Mytilus spp. (mussels)	Cavalero Co. Park, Everett harbor, Mukilteo, Possession Point		1.57	+/-	1.02	0.30	ng/g ww	0.19
Pacific hake	Whidbey Basin		13	+/-		2.48	ng/g ww	0.19
Harbor seal pups	Skagit Bay		480	+/-	100	621	ng/g lw	1.29
			Overall geometric mean of model bias for all species and locations:					0.59

POM = Particulate organic matter.

Appendix N. Sensitivity Analyses for the Food Web Bioaccumulation Model

Table N-1. Results of the sensitivity analyses for the PCB bioaccumulation model. Only the parameters that contributed to more than 10% of the variance of each individual taxon's predicted concentration are shown.

Organism	Parameter	Contribution to Variance
Phytoplankton	*Water fraction in plant* for Phytoplankton	49.60%
	NLOM fraction in plant for Phytoplankton	43.82%
Kelp / Seagrass	*Water fraction in plant* for Kelp / Seagrass	46.27%
	NLOM fraction in plant for Kelp / Seagrass	46.22%
Herbivorous zooplankton	*Total PCBs concentration* in Water	29.69%
	Lipid fraction in biota for Herbivorous zpl.	13.78%
Large copepod *(N. plumchrus*)	*Total PCBs concentration* in Water	35.47%
Small copepod (*P. minutus*)	*Total PCBs concentration* in Water	29.84%
	Lipid fraction in biota for Small copepods	13.05%
Shellfish (*Mytilus* spp.)	*Water fraction in biota* for Shellfish	26.43%
	NLOM fraction in biota for Shellfish	26.08%
Crab	*Dietary absorption efficiency of lipid* for Crab	41.54%
Grazing invertebrates	*Dietary absorption efficiency of lipid* for Grazing invertebrates	35.52%
	Water fraction in biota for Grazing invertebrates	15.96%
	NLOM fraction in biota for Grazing invertebrates	15.65%
Carnivorous zpl. (amphipods)	*Dietary absorption efficiency of lipid* for Carnivorous zpl.	41.79%
	Total PCBs concentration in Water	12.58%
Krill (E. pacifica)	*Water fraction in biota* for Krill	25.25%
	NLOM fraction in biota for Krill	24.71%
	Total PCBs concentration in Water	14.02%
Predatory invertebrates	*Dietary absorption efficiency of lipid* for Predatory invertebrates	51.09%
Spot prawn	*Dietary absorption efficiency of lipid* for Spot prawn	35.64%
	Dietary absorption efficiency of lipid for Carnivorous zpl.	13.36%
	Water fraction in biota for Spot prawn	10.99%
	NLOM fraction in biota for Spot prawn	10.73%
Graceful crab	*Water fraction in biota* for Graceful crab	36.29%
	NLOM fraction in biota for Graceful crab	35.92%
Small pelagic fish (seal prey)	*Dietary absorption efficiency of lipid* for Small pelagic fish (seal prey)	84.48%
Small pelagic fish (bird prey)	*Dietary absorption efficiency of lipid* for Small pelagic fish (bird prey)	77.28%
River lamprey	*Dietary absorption efficiency of lipid* for River lamprey	34.98%
	Dietary absorption efficiency of lipid for Pacific herring (resident	19.04%
	Dietary absorption efficiency of lipid for Small pelagic fish (seal prey)	17.41%
Misc. demersal fish (seal prey)	*Dietary absorption efficiency of lipid* for Misc. demersal fish (seal prey)	65.39%
	Dietary absorption efficiency of lipid for Small pelagic fish (seal prey)	12.95%
Misc. demersal fish (bird prey)	*Dietary absorption efficiency of lipid* for Misc. demersal fish (bird prey)	65.37%
Pacific hake	*Dietary absorption efficiency of lipid* for Small pelagic fish (seal prey)	35.73%
	Dietary absorption efficiency of lipid for Pacific hake	28.18%
Spiny dogfish	*Dietary absorption efficiency of lipid* for Spiny dogfish	41.34%
	Dietary absorption efficiency of lipid for Small pelagic fish (seal prey)	19.75%
Walleye pollock	*Dietary absorption efficiency of lipid* for Walleye pollock	49.83%
Northern smooth-tongue	*Dietary absorption efficiency of lipid* for Northern smooth-tongue	75.03%
English sole	*Dietary absorption efficiency of lipid* for Grazing invertebrates	15.17%
	Water fraction in biota for English sole	14.47%
	NLOM fraction in biota for English sole	13.96%
	Total PCBs concentration in Water	10.68%

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Table N-1 (continued). Results of the sensitivity analyses for the PCB bioaccumulation model.

Organism	Parameter	Contribution to Variance
Pacific herring (resident)	*Dietary absorption efficiency of lipid* for Pacific herring (resident	59.67%
Blackmouth salmon (resident)	*Dietary absorption efficiency of lipid* for Small pelagic fish (seal prey)	31.19%
	Total PCBs concentration in Water	11.00%
Ratfish	*Lipid fraction in biota* for Ratfish	15.07%
	Total PCBs concentration in Water	10.92%
	Dietary absorption efficiency of lipid for Grazing invertebrates	10.46%
Shiner surfperch	*Total PCBs concentration* in Water	18.41%
	Lipid fraction in biota for Shiner surfperch	12.69%
	Dietary absorption efficiency of lipid for Carnivorous zpl.	11.31%
Staghorn sculpin	*Water fraction in biota* for Staghorn sculpin	19.41%
	NLOM fraction in biota for Staghorn sculpin	18.61%
	Total PCBs concentration in Water	14.06%
	Lipid fraction in biota for Staghorn sculpin	10.32%
Double-crested cormorant (adult male)	*Dietary absorption efficiency of lipid* for Cormorant (male)	46.22%
	Dietary absorption efficiency of lipid for Misc. demersal fish (bird prey)	27.27%
Double-crested cormorant (adult female)	*Dietary absorption efficiency of lipid* for Cormorant (female)	45.24%
	Dietary absorption efficiency of lipid for Misc. demersal fish (bird prey)	26.12%
Great blue heron (adult male)	*Dietary absorption efficiency of lipid* for Great blue heron (male)	45.81%
	Dietary absorption efficiency of lipid for Misc. demersal fish (bird prey)	26.30%
Great blue heron (adult female)	*Dietary absorption efficiency of lipid* for Great blue heron (female)	44.39%
	Dietary absorption efficiency of lipid for Misc. demersal fish (bird prey)	26.71%
Double-crested cormorant (egg)	*Dietary absorption efficiency of lipid* for Cormorant (female)	44.15%
	Dietary absorption efficiency of lipid for Misc. demersal fish (bird prey)	25.64%
Great blue heron (egg)	*Dietary absorption efficiency of lipid* for Great blue heron (female)	43.27%
	Dietary absorption efficiency of lipid for Misc. demersal fish (bird prey)	26.57%
Harbor seal (adult male)	*Dietary absorption efficiency of lipid* for Harbor seal (adult male)	74.87%
Harbor seal (adult female)	*Dietary absorption efficiency of lipid* for Harbor seal (adult female)	31.75%
	Dietary absorption efficiency of lipid for Small pelagic fish (seal prey)	23.23%
Harbor seal (1 yr old)	*Dietary absorption efficiency of lipid* for Harbor seal (1 yr old)	64.18%
	Dietary absorption efficiency of lipid for Small pelagic fish (seal prey)	12.18%
Harbor seal (pup)	*Dietary absorption efficiency of lipid* for Harbor seal (adult female)	27.17%
	Dietary absorption efficiency of lipid for Small pelagic fish (seal prey)	19.64%

NLOM = Non-lipid organic matter.

Table N-2. Results of the sensitivity analyses for the PBDE bioaccumulation model. Only the parameters that contributed to more than 10% of the variance of each individual taxon's predicted concentration are shown.

Organism	Parameter	Contribution to Variance
Phytoplankton	*Water fraction in plant* for Phytoplankton	49.25%
	NLOM fraction in plant for Phytoplankton	44.17%
Kelp / Seagrass	*Water fraction in plant* for Kelp / Seagrass	47.55%
	NLOM fraction in plant for Kelp / Seagrass	47.50%
Herbivorous zooplankton	*Total PBDEs concentration* in Water	32.56%
	Lipid fraction in biota for Herbivorous zpl.	13.82%
Large copepod (*N. plumchrus*)	*Total PBDEs concentration* in Water	39.39%
	Lipid fraction in biota for Large copepods	13.63%
Small copepod (*P. minutus*)	*Total PBDEs concentration* in Water	32.70%
	Lipid fraction in biota for Small copepods	14.52%
Shellfish (*Mytilus* spp.)	*Water fraction in biota* for Shellfish	29.73%
	NLOM fraction in biota for Shellfish	29.34%
Crab	*Dietary absorption efficiency of lipid* for Crab	37.08%
Grazing invertebrates	*Dietary absorption efficiency of lipid* for Grazing invertebrates	26.28%
	Water fraction in biota for Grazing invertebrates	14.51%
	NLOM fraction in biota for Grazing invertebrates	14.21%
Carnivorous zpl. (amphipods)	*Dietary absorption efficiency of lipid* for Carnivorous zpl.	36.60%
	Total PBDEs concentration in Water	15.71%
	Lipid fraction in biota for Carnivorous zpl.	11.49%
Krill (E. pacifica)	*Water fraction in biota* for Krill	26.17%
	NLOM fraction in biota for Krill	25.60%
	Total PBDEs concentration in Water	15.31%
Predatory invertebrates	*Dietary absorption efficiency of lipid* for Predatory invertebrates	47.48%
Spot prawn	*Dietary absorption efficiency of lipid* for Spot prawn	31.75%
	Water fraction in biota for Spot prawn	11.61%
	Dietary absorption efficiency of lipid for Carnivorous zpl.	11.58%
	NLOM fraction in biota for Spot prawn	11.36%
Graceful crab	*Water fraction in biota* for Graceful crab	36.77%
	NLOM fraction in biota for Graceful crab	36.39%
Small pelagic fish (seal prey)	*Dietary absorption efficiency of lipid* for Small pelagic fish (seal prey)	84.23%
Small pelagic fish (bird prey)	*Dietary absorption efficiency of lipid* for Small pelagic fish (bird prey)	74.23%
River lamprey	*Dietary absorption efficiency of lipid* for River lamprey	39.77%
	Dietary absorption efficiency of lipid for Pacific herring (resident)	18.52%
	Dietary absorption efficiency of lipid for Small pelagic fish (seal prey)	16.35%
Misc. demersal fish (seal prey)	*Dietary absorption efficiency of lipid* for Misc. demersal fish (bird prey)	65.77%
	Dietary absorption efficiency of lipid for Small pelagic fish (seal prey)	11.56%
Misc. demersal fish (bird prey)	*Dietary absorption efficiency of lipid* for Misc. demersal fish (bird prey)	60.60%
Pacific hake	*Dietary absorption efficiency of lipid* for Small pelagic fish (seal prey)	33.54%
	Dietary absorption efficiency of lipid for Pacific hake	32.37%
Spiny dogfish	*Dietary absorption efficiency of lipid* for Spiny dogfish	52.78%
	Dietary absorption efficiency of lipid for Small pelagic fish (seal prey)	15.03%
English sole	*Water fraction in biota* for English sole	13.37%
	NLOM fraction in biota for English sole	12.89%
	Dietary absorption efficiency of lipid for Grazing invertebrates	11.33%
	Total PBDEs concentration in Water	10.63%

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Table N-2 (continued). Results of the sensitivity analyses for the PBDE bioaccumulation model.

Organism	Parameter	Contribution to Variance
Walleye pollock	*Dietary absorption efficiency of lipid* for Walley pollock	48.11%
Northern smooth-tongue	*Dietary absorption efficiency of lipid* for Northern smooth-tongue	75.28%
Pacific herring (resident)	*Dietary absorption efficiency of lipid* for Pacific herring (resident)	61.87%
Blackmouth salmon (resident)	*Dietary absorption efficiency of lipid* for Small pelagic fish (seal prey)	28.49%
	Total PBDEs concentration in Water	12.96%
	Dietary absorption efficiency of lipid for Blackmouth salmon	10.34%
Ratfish	*Lipid fraction in biota* for Ratfish	15.64%
	Total PBDEs concentration in Water	13.70%
Shiner surfperch	*Total PBDEs concentration* in Water	19.01%
	Lipid fraction in biota for Shiner surfperch	13.32%
Staghorn sculpin	*Water fraction in biota* for Staghorn sculpin	19.71%
	NLOM fraction in biota for Staghorn sculpin	18.91%
	Total PBDEs concentration in Water	16.18%
	Lipid fraction in biota for Staghorn sculpin	10.27%
Double-crested cormorant (adult male)	*Dietary absorption efficiency of lipid* for Cormorant (male)	55.25%
	Dietary absorption efficiency of lipid for Misc. demersal fish (bird prey)	16.87%
Double-crested cormorant (adult female)	*Dietary absorption efficiency of lipid* for Cormorant (female)	55.86%
	Dietary absorption efficiency of lipid for Misc. demersal fish (bird prey)	16.32%
Great blue heron (adult male)	*Dietary absorption efficiency of lipid* for Great blue heron (male)	52.10%
	Dietary absorption efficiency of lipid for Misc. demersal fish (bird prey)	16.75%
Great blue heron (adult female)	*Dietary absorption efficiency of lipid* for Great blue heron (female)	49.64%
	Dietary absorption efficiency of lipid for Misc. demersal fish (bird prey)	20.29%
Double-crested cormorant (egg)	*Dietary absorption efficiency of lipid* for Cormorant (female)	55.87%
	Dietary absorption efficiency of lipid for Misc. demersal fish (bird prey)	16.19%
Great blue heron (egg)	*Dietary absorption efficiency of lipid* for Great blue heron (female)	49.30%
	Dietary absorption efficiency of lipid for Misc. demersal fish (bird prey)	19.93%
Harbor seal (adult male)	*Dietary absorption efficiency of lipid* for Harbor seal (adult male)	78.77%
Harbor seal (adult female)	*Dietary absorption efficiency of lipid* for Harbor seal (adult female)	37.48%
	Dietary absorption efficiency of lipid for Small pelagic fish (seal prey)	18.57%
Harbor seal (1 yr old)	*Dietary absorption efficiency of lipid* for Harbor seal (1 yr old)	72.73%
Harbor seal (pup)	*Dietary absorption efficiency of lipid* for Harbor seal (adult female)	31.51%
	Dietary absorption efficiency of lipid for Small pelagic fish (seal prey)	16.15%
	Dietary absorption efficiency of lipid for Harbor seal (pup)	10.32%

NLOM = Non-lipid organic matter.

Appendix O. Bioaccumulation Model Scenarios

Table O-1. Various regulatory and advisory criteria for PCB and PBDE concentrations in marine biota. Target endpoints for model scenarios (i.e., Model Scenario Threshold Concentrations, or MSTCs) were selected from these criteria.

Source	Criteria	Criteria Type	Intended Protection	Prey or Target Organism	Biota Criteria (whole body)		Units
					Total PCBs	Total PBDEs	
BC MoE (1992)	Fish and Shellfish Guidelines	Dietary Threshold	Human consumers	Fish/shellfish (edible tissue)	2000	NA	ug/kg ww
BC MoE (1992)	Fish and Shellfish Guidelines	Dietary Threshold	Wildlife consumers	Fish/shellfish (whole animal)	100	NA	ug/kg ww
CCME (2001)	Tissue Residue Guidelines	Dietary Threshold	Mammalian consumers	Aquatic biota	0.79	NA	ng TEQ/kg ww
CCME (2001)	Tissue Residue Guidelines	Dietary Threshold	Avian consumers	Aquatic biota	2.4	NA	ng TEQ/kg ww
Environment Canada (2013) [a]	Federal Fish Tissue Guideline	Adverse Effects Threshold	Fish themselves	Fish tissue	NA	629	ug/kg ww
Environment Canada (2013) [b]	Federal Wildlife Dietary Guideline	Dietary Threshold	Mammalian and avian consumers	Aquatic biota	NA	265	ug/kg ww
EPA (1997)	Fish Tissue Benchmark	Dietary Threshold	Human consumers (1 in 10^-5 cancer risk)	Fish tissue	14	NA	ug/kg ww
EPA (1997)	Fish Tissue Benchmark	Dietary Threshold	Human consumers (non-carcinogenic effects)	Fish tissue	220	NA	ug/kg ww
EPA (2004)	Fish Tissue Benchmark	Dietary Threshold	Human consumers (1 in 10^-5 cancer risk)	Fish tissue	20	NA	ug/kg ww
EPA (2004)	Fish Tissue Benchmark	Dietary Threshold	Human consumers (non-carcinogenic effects)	Fish tissue	80	NA	ug/kg ww
Hall et al. (2006)	Estimated Effects Concentration	Adverse Effects Threshold	Dolphins themselves	Bottlenose dolphin	10000	NA	ug/kg lw
Hickie et al. (2007) [c]	Estimated Effects Concentration	Dietary Threshold	Mammalian consumers	Chinook salmon	50	NA	ug/kg ww
Hickie et al. (2007) [d]	Estimated Effects Concentration	Dietary Threshold	Mammalian consumers (Transient orcas)	Chinook salmon	8	NA	ug/kg ww
Mos et al. (2010) [e]	Estimated Effects Concentration	Adverse Effects Threshold	Seals themselves	Harbor seal	1300	1300	ug/kg lw
PSP (2012)	Ecosystem Recovery Targets	Adverse Effects Threshold	Fish themselves	Herring, English sole, salmon, steelhead	2400	1400	ug/kg lw
PSP (2012) [f]	Ecosystem Recovery Targets	Dietary Threshold	Human consumers at recreational rates	Herring, English sole, salmon, steelhead	33	NA	ug/kg ww
PSP (2012) [f]	Ecosystem Recovery Targets	Dietary Threshold	Human consumers at subsistence rates	Herring, English sole, salmon, steelhead	10	NA	ug/kg ww
Reijinders (1986), Brouwer et al. (1989)	Estimated Effects Concentration	Adverse Effects Threshold	Seals themselves	Harbor seal	25000	NA	ug/kg lw
Ross et al. (1996a, 1996b), De Swart et al. (1994, 1996)	Estimated Effects Concentration	Adverse Effects Threshold	Seals themselves	Harbor seal	17000	NA	ug/kg lw
Ecology (2014)	NTR Fish Tissue Criteria	Dietary Threshold	Human consumers	Fish tissue	5.304	NA	ug/kg ww

Table O-1 (continued) . Various regulatory and advisory criteria for PCB and PBDE concentrations in marine biota.

BC MoE = British Columbia (Canada) Ministry of Environment.
CCME = Canadian Council of Ministers of the Environment.
EPA = Environmental Protection Agency.
NA = Not available or not applicable.
NTR = National Toxics Rule.
PBDE = Polybrominated diphenyl ether.
PCB = Polychlorinated biphenyl.
PSP = Puget Sound Partnership

[a] The CCME Federal Fish Tissue Guideline shown for Total PBDEs is the sum of homolog-specific PBDE criteria (i.e., tri-, tetra-, penta-, and hexa-BDEs).
[b] The CCME Federal Wildlife Dietary Guidelines shown for Total PBDEs is the sum of homolog-specific PBDE criteria (i.e., tetra, penta-, hexa-, hepta-, octa-, nona-, and deca-BDEs).
[c] The dietary threshold for mammalian consumers of Chinook salmon given in Hickie et al. (2007) was derived from the CCME mammalian Tissue Residue Guideline for the protection of fish-eating wildlife (dioxin-like equivalency guideline of 0.79 ng TEQ/kg ww).
[d] The dietary threshold for Transient orca consumers of Chinook salmon given in Hickie et al. (2007) is the estimated prey concentration for which 95% of the Transient killer whale population would fall below the 17000 ug/kg threshold developed for harbor seals by Ross et al. (1996a, 1996b) and others.
[e] Adverse effects thresholds for PBDEs in marine mammals were not found in the literature. However, Ross et al. (2013) state that similarities in PCB and PBDE structures would suggest similar toxic effects, and so the PCB adverse effects threshold (1300 ng/g lw) was applied to PBDEs.
[f] The Puget Sound Partnership dietary thresholds for human consumers were based on Washington Department of Health consumption advice for Puget Sound salmon (fillets) that used noncancer endpoints for human health screening levels and assumed an intake of 40 g/day for recreational consumption and 140 g/day for subsistence consumers.

Table O-2. Correction factors used to adjust model-predicted Total PCB concentrations in each species and region (based on comparisons to observed data from 2000-2012).

Organism	Basins						Urban Bays		
	Admrlt. Inlet	Hood North	Hood South	Main Basin	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes
Phytoplankton	0.62	1.04	0.47	0.59	0.60	0.52	0.62	0.59	0.68
Shellfish (*Mytilus* spp.)	0.17	0.48	1.09	0.37	0.48	0.16	1.43	0.19	0.41
Krill (*E. pacifica*)	0.90	0.90	1.15	0.86	0.92	0.82	0.90	0.93	0.76
Predatory invertebrates	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
Graceful crab	1.28	1.28	1.28	1.52	1.28	1.28	1.00	1.36	1.28
Pacific hake (*M. productus*)	1.00	1.00	2.17	1.23	1.32	0.67	1.00	0.78	0.55
Spiny dogfish (*S. acanthias*)	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4.39
Walleye pollock (*T. chalcogramma*)	1.56	1.56	0.76	2.30	2.47	1.38	1.56	1.56	1.56
English sole (*P. vetulus*)	1.56	2.30	0.87	1.63	1.17	0.97	2.21	0.88	1.47
Pacific herring (resident)	0.56	0.56	0.56	0.56	0.56	0.42	1.00	0.42	0.56
Blackmouth salmon (resident)	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28
Ratfish (*H. colliei*)	1.04	4.02	0.60	1.08	1.04	0.66	1.28	0.58	1.04
Shiner surfperch (*C. aggregata*)	1.29	1.29	1.29	1.69	1.29	1.29	1.19	1.18	1.29
Staghorn sculpin (*L. armatus*)	2.93	0.80	2.93	2.93	2.93	2.93	5.27	2.93	3.34
Harbor seal (pup)	1.31	1.31	1.31	1.31	2.61	0.71	1.31	1.04	1.92

Table O-3. Correction factors used to adjust model-predicted Total PBDE concentrations in each species and region (based on comparisons to observed data from 2000-2012).

Organism	Basins						Urban Bays		
	Admrlt. Inlet	Hood North	Hood South	Main Basin	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes
Phytoplankton	1.47	1.53	1.04	1.96	1.42	1.96	1.47	0.99	1.73
Shellfish (*Mytilus* spp.)	1.26	0.21	0.64	0.57	0.21	0.13	0.10	0.10	0.11
Krill (*E. pacifica*)	1.07	1.07	1.13	1.32	1.02	0.83	1.07	1.80	0.66
Predatory invertebrates	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Pacific hake (*M. productus*)	0.40	0.40	0.72	0.56	0.44	0.31	0.40	0.41	0.19
Walleye pollock (*T. chalcogramma*)	0.84	0.84	1.89	0.78	0.61	0.55	0.84	0.84	0.84
English sole (*P. vetulus*)	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Pacific herring (resident)	0.28	0.28	0.28	0.28	0.28	0.28	0.32	0.25	0.28
Blackmouth salmon (resident)	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58
Harbor seal (pup)	1.05	1.05	1.05	1.05	1.17	0.88	1.05	0.89	1.29

Table O-4. Predicted contaminant concentrations in selected organisms based on current best estimates of sediment and water concentrations in each region (see Table I-1).

Organism	Units	Basins						Urban Bays		
		Admrlt. Inlet	Hood North	Hood South	Main Basin	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes
Total PCBs										
English sole	ng/g ww	16.1	10.8	18.0	24.1	26.7	16.6	79.7	234.5	65.1
	ng/g lw	1018.8	684.1	1138.4	1524.3	1691.2	1051.5	5043.4	14842.2	4118.4
Pacific herring	ng/g ww	135.0	100.8	106.8	157.7	188.3	131.7	538.4	452.7	206.6
	ng/g lw	1124.6	840.0	890.2	1314.2	1569.5	1097.2	4486.3	3772.8	1721.8
Blackmouth salmon	ng/g ww	126.3	91.3	101.1	113.1	128.6	122.5	675.1	648.6	479.9
	ng/g lw	1148.5	830.2	919.3	1028.6	1169.4	1113.6	6137.3	5896.2	4362.8
Harbor seal pups	ng/g ww	1614.6	1199.1	648.4	2618.4	2068.1	1069.7	7241.2	6420.6	5103.5
	ng/g lw	3909.4	2903.3	1570.0	6340.0	5007.6	2590.0	17533.1	15546.3	12357.0
Total PBDEs										
English sole	ng/g ww	7.4	2.1	1.9	4.7	4.1	3.7	12.9	19.5	5.8
	ng/g lw	470.7	135.4	118.0	296.3	261.9	232.5	818.9	1233.8	365.8
Pacific herring	ng/g ww	63.5	17.3	13.1	34.4	43.2	30.0	72.6	119.7	44.5
	ng/g lw	529.0	144.5	109.6	286.9	360.3	250.3	605.0	997.8	370.9
Blackmouth salmon	ng/g ww	61.4	17.0	13.6	35.4	36.5	29.5	86.5	132.5	48.9
	ng/g lw	558.5	154.3	123.8	321.6	331.7	267.8	786.2	1204.3	444.6
Harbor seal pups	ng/g ww	503.9	146.2	103.3	338.7	355.2	198.2	623.8	986.8	400.6
	ng/g lw	1220.2	354.0	250.0	820.0	860.0	480.0	1510.3	2389.4	970.0

Table O-5. Percent reduction (%) of predicted Total PCB concentrations in region-specific organisms needed to achieve various biota targets. The predicted concentrations in these species for current conditions can be found in Table O-4.

Criteria and Source	Biota Target	Organism	Basins						Urban Bays		
			Admrlt. Inlet	Hood North	Hood South	Main Basin	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes
Adverse effects threshold (Mos et al., 2010)	1300 ng PCB/g lw	Harbor seal pups	66.7%	55.2%	17.2%	79.5%	74.0%	49.8%	92.6%	91.6%	89.5%
Adverse effects threshold (PSP Ecosystem Recovery Target)	2400 ng PCB/g lw	English sole	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	52.4%	83.8%	41.7%
		Pacific herring	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	46.5%	36.4%	0.0%
		Blackmouth salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	60.9%	59.3%	45.0%
Wildlife dietary threshold (Hickie et al., 2007)	50 ng PCB/g ww	Blackmouth salmon	60.4%	45.2%	50.6%	55.8%	61.1%	59.2%	92.6%	92.3%	89.6%
Human dietary threshold at recreational rates (PSP Ecosystem Recovery Target)	33 ng PCB/g ww	English sole	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	58.6%	85.9%	49.3%
		Pacific herring	75.5%	67.3%	69.1%	79.1%	82.5%	74.9%	93.9%	92.7%	84.0%
		Blackmouth salmon	73.9%	63.9%	67.4%	70.8%	74.3%	73.1%	95.1%	94.9%	93.1%
Human dietary threshold at subsistence rates (PSP Ecosystem Recovery Target)	10 ng PCB/g ww	English sole	37.9%	7.5%	44.4%	58.5%	62.6%	39.8%	87.5%	95.7%	84.6%
		Pacific herring	92.6%	90.1%	90.6%	93.7%	94.7%	92.4%	98.1%	97.8%	95.2%
		Blackmouth salmon	92.1%	89.0%	90.1%	91.2%	92.2%	91.8%	98.5%	98.5%	97.9%

Table O-6. Percent reduction (%) of predicted Total PBDE concentrations in region-specific organisms needed to achieve various biota targets. The predicted concentrations in these species for current conditions can be found in Table O-4.

Criteria and Source	Biota Target	Organism	Basins						Urban Bays		
			Admrlt. Inlet	Hood North	Hood South	Main Basin	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes
Adverse effects threshold (Mos et al., 2010)	1300 ng PBDE/g lw	Harbor seal pups	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	13.9%	45.6%	0.0%
Adverse effects threshold (PSP Ecosystem Recovery Target)	1400 ng PBDE/g lw	English sole	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Pacific herring	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Blackmouth salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table O-7. Scenario results showing the **sediment** concentration of Total PCBs (ng/g dw) in each region needed to meet the various biota targets. The value in parentheses below each region name is the current best-estimate sediment concentration.

Criteria and Source	Biota Target		Organism	Basins						Urban Bays		
				Admrlt. Inlet (1.11)	Hood North (0.47)	Hood South (1.26)	Main Basin (1.39)	South Sound (0.91)	Whidbey Basin (1.11)	Comm. Bay (34.18)	Elliott Bay (43.48)	Sinclair/ Dyes (31.28)
Adverse effects threshold (Mos et al., 2010)	1300	ng PCB/g lw	Harbor seal pups	0.35	0.20	1.03	0.26	0.22	0.54	2.38	3.37	3.10
Adverse effects threshold (PSP Ecosystem Recovery Target)	2400	ng PCB/g lw	English sole	2.61	1.64	2.54	2.18	1.39	2.53	16.23	6.96	18.22
			Pacific herring	2.36	1.33	3.38	2.53	1.39	2.43	18.25	27.61	43.48
			Blackmouth salmon	2.32	1.35	3.28	3.24	1.86	2.38	13.36	17.61	17.20
Wildlife dietary threshold (Hickie et al., 2007)	50	ng PCB/g ww	Blackmouth salmon	0.44	0.25	0.62	0.61	0.35	0.45	2.48	3.26	3.21
Human dietary threshold at recreational rates (PSP Ecosystem Recovery Target)	33	ng PCB/g ww	English sole	2.27	1.38	2.24	1.85	1.09	2.14	14.01	6.09	15.64
			Pacific herring	0.27	0.15	0.38	0.28	0.16	0.28	2.05	3.15	4.93
			Blackmouth salmon	0.29	0.17	0.40	0.40	0.23	0.29	1.62	2.17	2.11
Human dietary threshold at subsistence rates (PSP Ecosystem Recovery Target)	10	ng PCB/g ww	English sole	0.69	0.43	0.69	0.57	0.34	0.67	4.27	1.74	4.69
			Pacific herring	0.08	0.05	0.12	0.09	0.05	0.08	0.60	0.87	1.49
			Blackmouth salmon	0.08	0.05	0.12	0.12	0.07	0.09	0.50	0.65	0.63
Total PCBs in sediments (ng/g dw) needed to meet the most protective biota target:				0.08	0.05	0.12	0.09	0.05	0.08	0.50	0.65	0.63

Table O-8. Scenario results showing the **water** concentration of Total PCBs (pg/L) in each region needed to meet the various biota targets. The value in parentheses below each region name is the current best-estimate water concentration.

Criteria and Source	Biota Target		Organism	Basins						Urban Bays		
				Admrlt. Inlet (33.26)	Hood North (26.13)	Hood South (26.13)	Main Basin (34.19)	South Sound (31.91)	Whidbey Basin (33.26)	Comm. Bay (80.40)	Elliott Bay (98.37)	Sinclair/ Dyes (50.00)
Adverse effects threshold (Mos et al., 2010)	1300	ng PCB/g lw	Harbor seal pups	10.56	11.23	21.49	6.33	7.74	16.30	5.59	7.62	4.95
Adverse effects threshold (PSP Ecosystem Recovery Target)	2400	ng PCB/g lw	English sole	78.17	91.71	54.87	53.68	45.32	75.84	38.19	15.74	29.13
			Pacific herring	70.85	74.72	70.28	62.23	48.83	75.85	42.93	62.47	69.50
			Blackmouth salmon	69.52	75.51	68.19	79.67	65.42	71.52	31.44	39.84	27.50
Wildlife dietary threshold (Hickie et al., 2007)	50	ng PCB/g ww	Blackmouth salmon	13.14	14.24	12.80	15.04	12.29	13.47	5.83	7.38	5.13
Human dietary threshold at recreational rates (PSP Ecosystem Recovery Target)	33	ng PCB/g ww	English sole	68.19	77.34	46.51	45.47	38.29	64.20	32.97	13.77	25.00
			Pacific herring	8.07	8.49	7.84	7.01	5.58	8.32	4.82	7.13	7.88
			Blackmouth salmon	8.65	9.28	8.36	9.92	8.14	8.81	3.82	4.92	3.38
Human dietary threshold at subsistence rates (PSP Ecosystem Recovery Target)	10	ng PCB/g ww	English sole	20.62	24.17	14.37	14.02	11.81	19.96	10.05	3.93	7.50
			Pacific herring	2.41	2.55	2.42	2.14	1.68	2.49	1.41	1.97	2.38
			Blackmouth salmon	2.49	2.81	2.55	2.99	2.39	2.66	1.17	1.48	1.00
Total PCBs in water (pg/L) needed to meet the most protective biota target:				2.41	2.55	2.42	2.14	1.68	2.49	1.17	1.48	1.00

Table O-9. Scenario results showing the **sediment** concentration of Total PBDEs (ng/g dw) in each region needed to meet the various biota targets. The value in parentheses below each region name is the current best-estimate sediment concentration.

Criteria and Source	Biota Target	Organism	Basins						Urban Bays		
			Admrlt. Inlet (0.42)	Hood North (0.20)	Hood South (0.33)	Main Basin (0.68)	South Sound (0.29)	Whidbey Basin (0.33)	Comm. Bay (4.19)	Elliott Bay (4.93)	Sinclair/ Dyes (0.52)
Adverse effects threshold (Mos et al., 2010)	1300 ng PBDE/g lw	Harbor seal pups	0.45	0.78	1.88	1.09	0.44	0.92	3.59	2.65	0.70
Adverse effects threshold (PSP Ecosystem Recovery Target)	1400 ng PBDE/g lw	English sole	1.25	2.07	3.95	3.20	1.52	1.99	7.16	5.57	1.99
		Pacific herring	1.11	1.94	4.25	3.30	1.11	1.84	9.67	6.90	1.97
		Blackmouth salmon	1.05	1.82	3.76	2.95	1.20	1.73	7.45	5.72	1.64
Total PBDEs in sediments (ng/g dw) needed to meet the most protective biota target:			0.45	0.78	1.88	1.09	0.44	0.92	3.59	2.65	0.70

Table O-10. Scenario results showing the **water** concentration of Total PBDEs (pg/L) in each region needed to meet the various biota targets. The value in parentheses below each region name is the current best-estimate water concentration.

Criteria and Source	Biota Target	Organism	Basins						Urban Bays		
			Admrlt. Inlet (25.24)	Hood North (7.00)	Hood South (5.00)	Main Basin (15.00)	South Sound (13.55)	Whidbey Basin (12.00)	Comm. Bay (25.24)	Elliott Bay (60.00)	Sinclair/ Dyes (25.24)
Adverse effects threshold (Mos et al., 2010)	1300 ng PBDE/g lw	Harbor seal pups	26.88	27.23	28.25	24.15	20.73	33.48	21.64	32.25	34.07
Adverse effects threshold (PSP Ecosystem Recovery Target)	1400 ng PBDE/g lw	English sole	74.96	72.38	59.35	70.80	72.49	72.24	43.16	67.80	96.67
		Pacific herring	66.89	67.83	63.90	73.20	52.71	67.08	58.30	84.00	95.41
		Blackmouth salmon	63.10	63.56	56.55	65.25	57.18	62.76	44.93	69.60	79.51
Total PBDEs in water (pg/L) needed to meet the most protective biota target:			26.88	27.23	28.25	24.15	20.73	33.48	21.64	32.25	34.07

Table O-11. Percent reduction (%) of current predicted Total PCB concentrations in the sediments and water column of each region needed to achieve various biota targets.

Criteria and Source	Biota Target	Organism	Basins						Urban Bays		
			Admrlt. Inlet	Hood North	Hood South	Main Basin	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes
Adverse effects threshold (Mos et al., 2010)	1300 ng PCB/g lw	Harbor seal pups	68.3%	57.0%	17.8%	81.5%	75.8%	51.0%	93.1%	92.3%	90.1%
Adverse effects threshold (PSP Ecosystem Recovery Target)	2400 ng PCB/g lw	English sole	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	52.5%	84.0%	41.8%
		Pacific herring	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	46.6%	36.5%	0.0%
		Blackmouth salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	60.9%	59.5%	45.0%
Wildlife dietary threshold (Hickie et al., 2007)	50 ng PCB/g ww	Blackmouth salmon	60.5%	45.5%	51.0%	56.0%	61.5%	59.5%	92.8%	92.5%	89.8%
Human dietary threshold at recreational rates (PSP Ecosystem Recovery Target)	33 ng PCB/g ww	English sole	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	59.0%	86.0%	50.0%
		Pacific herring	75.8%	67.5%	70.0%	79.5%	82.5%	75.0%	94.0%	92.8%	84.3%
		Blackmouth salmon	74.0%	64.5%	68.0%	71.0%	74.5%	73.5%	95.3%	95.0%	93.3%
Human dietary threshold at subsistence rates (PSP Ecosystem Recovery Target)	10 ng PCB/g ww	English sole	38.0%	7.5%	45.0%	59.0%	63.0%	40.0%	87.5%	96.0%	85.0%
		Pacific herring	92.8%	90.3%	90.8%	93.8%	94.8%	92.5%	98.3%	98.0%	95.3%
		Blackmouth salmon	92.5%	89.3%	90.3%	91.3%	92.5%	92.0%	98.6%	98.5%	98.0%
% reduction of sediment and water PCBs needed to meet the most protective biota target:			92.8%	90.3%	90.8%	93.8%	94.8%	92.5%	98.6%	98.5%	98.0%

Table O-12. Percent reduction (%) of predicted Total PBDE concentrations in the sediments and water column of each region needed to achieve various biota targets.

Criteria and Source	Biota Target	Organism	Basins						Urban Bays		
			Admrlt. Inlet	Hood North	Hood South	Main Basin	South Sound	Whidbey Basin	Comm. Bay	Elliott Bay	Sinclair/ Dyes
Adverse effects threshold (Mos et al., 2010)	1300 ng PBDE/g lw	Harbor seal pups	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.3%	46.3%	0.0%
Adverse effects threshold (PSP Ecosystem Recovery Target)	1400 ng PBDE/g lw	English sole	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Pacific herring	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Blackmouth salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% reduction of sediment and water PBDEs needed to meet the most protective biota target:			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.3%	46.3%	0.0%

Appendix P. Data Compilations

Puget Sound sediment and water data that were used to develop various model inputs are available for download. These data sets are provided in a zipped Excel spreadsheet that is linked to this report at https://fortress.wa.gov/ecy/publications/SummaryPages/1503025.html.

The data sets cover the period 2000-2012 and include the following:

- **Sediment data:** copper; lead; zinc; PCB congeners; PCB Aroclors; PBDE congeners; PAH compounds; and organic carbon content.
- **Water data:** total and dissolved copper, lead, and zinc; PCB congeners; PBDE congeners; PAH compounds; total suspended solids; and dissolved and particulate organic carbon.

Sources of these data are described in the Model Inputs section of the report. Acceptance criteria that were applied to the original data (e.g., to exclude records from outside the model domain) and data rules that caused some results to be modified (e.g., replicates were averaged) are also discussed in the Model Inputs section. For complete, unmodified data sets, contact the original data sources directly.

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Appendix R. Glossary, Acronyms, and Abbreviations

Glossary

Accuracy: The closeness of model predictions to measured values, which are assumed to represent true values.

Acute conditions: Changes in the physical, chemical, or biological environment which are expected or demonstrated to result in injury or death to an organism as a result of short-term exposure to the substance or detrimental environmental condition.

Anthropogenic: Human-caused.

Bias: The systematic deviation between model predictions and true values.

Bioaccumulation: The process by which the chemical concentration within an organism achieves a level that exceeds that in its environment as a result of chemical uptake through all possible routes of exposure (e.g., dietary, dermal, respiratory).

Biomagnification: The process in which the chemical concentration in an organism achieves a level that exceeds that in the organism's diet, due to dietary absorption.

Carcinogen: A chemical or chemical group that has been identified as "carcinogenic to humans" or "likely to be carcinogenic to humans" by the Environmental Protection Agency, as a Group 1, 2A, or 2B carcinogen by the International Agency for Research on Cancer, or as a "known to be human carcinogen" or "reasonably anticipated to be a human carcinogen" by the National Toxicology Program.

Chemical: A naturally occurring element, mixture, or group of organic and inorganic compounds that is produced by or used in a chemical process. Chemical "groups" share a common chemical structure.

Chronic conditions: Changes in the physical, chemical, or biological environment which are expected or demonstrated to result in injury or death to an organism as a result of repeated or constant exposure over an extended period of time to a substance or detrimental environmental condition.

Degradation: The process by which organic chemicals are transformed into derivative chemicals and ultimately broken down.

Effluent: An outflowing of water from a natural body of water or from a man-made structure. For example, the treated outflow from a wastewater treatment plant.

Geometric mean: A mathematical expression of the central tendency (an average) of multiple sample values. A geometric mean, unlike an arithmetic mean, tends to dampen the effect of very high or low values, which might bias the mean if a straight average (arithmetic mean) were calculated. This is helpful when analyzing bacteria concentrations, because levels may vary

anywhere from 10 to 10,000 fold over a given period. The calculation is performed by either: (1) taking the nth root of a product of n factors, or (2) taking the antilogarithm of the arithmetic mean of the logarithms of the individual values.

Half-life: The amount of time required for a quantity to decrease to half its value as measured at the beginning of the time period.

Interquartile: A measure of the statistical dispersion of a data set, equal to the difference between the upper and lower quartiles (75^{th} and 25^{th} percentiles, respectively).

Media (or medium): A component of the environment (air, water, soil, or sediment) in which a contaminant is measured and from which an organism can accumulate contaminants.

Median: A statistical measure of central tendency, equal to the numerical value separating the higher half of a data set from the lower half. The median is the same as the second quartile, or 50^{th} percentile.

Model scenario threshold concentration (MSTC): Project-specific term used to describe a chemical concentration in water, sediment, or biota above which exposed aquatic organisms and ecosystem processes may not be adequately protected from toxic effects.

Nonpoint source: Pollution that enters any waters of the state from any dispersed land-based or water-based activities, including but not limited to atmospheric deposition, surface-water runoff from agricultural lands, urban areas, or forest lands, subsurface or underground sources, or discharges from boats or marine vessels not otherwise regulated under the NPDES program. Generally, any unconfined and diffuse source of contamination. Legally, any source of water pollution that does not meet the legal definition of "point source" in section 502(14) of the Clean Water Act.

Parameter: Water quality constituent being measured (analyte). A physical, chemical, or biological property whose values determine environmental characteristics or behavior.

Persistence: The tendency of a chemical to remain in the environment without transformation or breakdown into another chemical form. It refers to the length of time a chemical is expected to reside in the environment and be available for exposure.

Point source: Sources of pollution that discharge at a specific location from pipes, outfalls, and conveyance channels to a surface water. Examples of point source discharges include municipal wastewater treatment plants, municipal stormwater systems, industrial waste treatment facilities, and construction sites that clear more than 5 acres of land.

Pollution: Contamination or other alteration of the physical, chemical, or biological properties of any waters of the state. This includes change in temperature, taste, color, turbidity, or odor of the waters. It also includes discharge of any liquid, gaseous, solid, radioactive, or other substance into any waters of the state. This definition assumes that these changes will, or are likely to, create a nuisance or render such waters harmful, detrimental, or injurious to (1) public health, safety, or welfare, or (2) domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or (3) livestock, wild animals, birds, fish, or other aquatic life.

Salmonid: Fish that belong to the family *Salmonidae*. Any species of salmon, trout, or char.

Stormwater: The portion of precipitation that does not naturally percolate into the ground or evaporate but instead runs off roads, pavement, and roofs during rainfall or snow melt. Stormwater can also come from hard or saturated grass surfaces such as lawns, pastures, playfields, and from gravel roads and parking lots.

Sub-lethal effects: Negative impacts that do not cause immediate or direct death.

Surface waters of the state: Lakes, rivers, ponds, streams, inland waters, salt waters, wetlands and all other surface waters and water courses within the jurisdiction of Washington State.

Total suspended solids (TSS): Dry weight measure of the portion of solids retained by a filter.

Toxicity: The degree to which a substance or mixture of substances can harm humans, plants, or wildlife.

Volatilization: The mass transfer process whereby a dissolved substance is vaporized.

Watershed: A drainage area or basin in which all land and water areas drain or flow toward a central collector such as a stream, river, or lake at a lower elevation.

25th percentile: A statistical number obtained from a distribution of a data set, above which 75% of the data exists and below which 25% of the data exists.

75th percentile: A statistical number obtained from a distribution of a data set, above which 25% of the data exists and below which 75% of the data exists.

Acronyms and Abbreviations

COC	Contaminant of concern
cPAH	Carcinogenic PAH
DL	Detection limit
DOC	Dissolved organic carbon
e.g.	For example
EAP	Environmental Assessment Program (Ecology)
Ecology	Washington State Department of Ecology
EIM	Environmental Information Management database (Ecology)
EMAP	Environmental Monitoring and Assessment Program (EPA)
EPA	U.S. Environmental Protection Agency
et al.	And others
GIS	Geographic Information System software
i.e.	In other words
HOC	Hydrophobic organic contaminant
HPAH	High molecular weight PAH
KCDNRP	King County Department of Natural Resources and Parks
LDW	Lower Duwamish Waterway

LPAH	Low molecular weight PAH
MEL	Manchester Environmental Laboratory
MSTC	Model scenario threshold concentration (See Glossary above)
MW	Mussel Watch (NOAA)
ND	Non-detect
NOAA	National Oceanic and Atmospheric Administration
NTR	National Toxics Rule
OSV	Ocean Survey Vessel
PAH	Polycyclic aromatic hydrocarbon
PBDE	Polybrominated diphenyl ether
PBT	Persistent, bioaccumulative, and toxic substance
PCB	Polychlorinated biphenyl
POC	Particulate organic carbon
POTW	Publicly owned treatment works
PSEMP	Puget Sound Ecosystem Monitoring Program
PSP	Puget Sound Partnership
PSRTM	Puget Sound Regional Toxics Model
PSTLA	Puget Sound Toxics Loading Analysis
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
RL	Reporting limit
RMSE	Root mean square error
RPD	Relative percent difference
RSD	Relative standard deviation
SJF	Strait of Juan de Fuca
SOG	Strait of Georgia
TOC	Total organic carbon
TSS	Total suspended solids (See Glossary above)
UAL	Unit area load
VBA	Visual Basic for Applications (Microsoft)
WAC	Washington Administrative Code
WASP	Water Quality Analysis Simulation Program (EPA)
WDFW	Washington State Department of Fish and Wildlife
WRIA	Water Resource Inventory Area

Units of Measurement

°C	degrees centigrade
Å	angstrom, a unit of length equal to 1/10,000,000,000 of a meter
atm	standard atmosphere, a unit of pressure
cm	centimeter, a unit of length equal to 1/100 of a meter
cm/h	centimeters per hour
cm/s	centimeters per second
cm/yr	centimeters per year
cP	centipoise, a unit of dynamic viscosity
dw	dry weight basis

g	gram, a unit of mass
g/day	grams per day
g/m^3	grams per cubic meter
g/mol	grams per mole
g/yr	grams per year
J	joule, a unit of energy
K	degrees Kelvin
kg	kilograms, a unit of mass equal to 1,000 grams
kg/d	kilograms per day
kg/L	kilograms per liter
kg/yr	kilograms per year
kJ	kilojoule, a unit of energy equal to 1,000 joules
km	kilometer, a unit of length equal to 1,000 meters
L	liter, a unit of volume
L/kg	liters per kilogram
L/s	liters per second (0.03531 cubic foot per second)
lw	lipid weight basis
m	meter, a unit of length
m/day	meters per day
mg	milligram, a unit of mass equal to 1/1,000 of a gram
mg/kg	milligrams per kilogram (parts per million)
mg/L	milligrams per liter (parts per million)
MGY	million gallons per year
mole	an International System of Units (IS) unit of matter
mol/L	moles per liter
m/s	meters per second
ng	nanogram, a unit of mass equal to 1/1,000,000,000 of a gram
ng/g	nanograms per gram (parts per billion)
ng/L	nanograms per liter (parts per trillion)
Pa	pascal, a unit of pressure
pg	picogram, a unit of mass equal to 1/1,000,000,000,000 of a gram
pg/L	picograms per liter (parts per quadrillion)
psu	practical salinity units
t	metric ton, a unit of mass equal to 1,000 kg
t/yr	metric ton per year
TEQ	toxic equivalent
ug	microgram, a unit of mass equal to 1/1,000,000 of a gram
ug/kg	micrograms per kilogram (parts per billion)
ug/L	micrograms per liter (parts per billion)
um	micrometer, a unit of length equal to 1/1,000,000 of a meter