

Tennessee Valley Authority

Appendix S:

**Statistical Analysis of Metals in
Sediment and Ash**

Kingston Recovery Project
Kingston, Tennessee

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Acronyms

| | |
|---------|---|
| USEPA | United States Environmental Protection Agency |
| NOAA | National Oceanic and Atmospheric Administration |
| SQuiRTs | Screening Quick Reference Tables |

1. Introduction

Sediment was collected from locations throughout the Emory, Clinch, and Tennessee rivers. The Emory River was divided into four separate reaches (A, B, C, and reference), the Clinch was divided into three separate reaches (A, B, and reference) and the Tennessee River was divided into three separate reaches (A, B, and reference). Sediment data from these reaches are summarized in different databases/groups: submerged sediment and seasonally-exposed sediment. For the purposes of this assessment, submerged sediment is defined as sediment that is perpetually submerged, even during winter low water conditions. Submerged sediment was collected using a VibeCore™ sampler. Seasonally-exposed sediment includes sediment collected from locations that are periodically exposed during low water conditions, but below the water surface during high water conditions. Seasonally-exposed samples were collected via coring with a hand auger. Bulk sediment is defined as sediment collected via grab sample via dredge. A subset of all sample types was chemically analyzed for both ash and constituent concentrations. Submerged and seasonally-exposed sediment samples were collected primarily for nature and extent purposes, and were collected from a wide range of locations to help determine the spatial distribution of constituents.

In an effort to explore the nature and extent of constituents across the Emory, Clinch, and Tennessee rivers, a four-tiered approach was undertaken. An analysis of constituents in ash (and the concentrations in relation to reference sediment) was conducted. A statistical analysis between reference and the individual reaches of the Emory, Clinch, and Tennessee rivers was also conducted. Cumulative frequency distributions were generated to look at the frequency of concentrations of the constituents measured. Lastly, regressions were also generated comparing ash content in sediment with metal concentrations, in an effort to understand the relative influence that ash content has on metal concentrations.

2. Methods

2.1 Enrichment Factor

In order to determine the constituent levels found in the ash in relation to reference sediment levels, an enrichment factor was calculated for both submerged and seasonally-exposed sediment. This enrichment factor can be used to estimate the impact that ash would have on constituent concentrations relative to other potential sources as represented by concentrations in reference sediment. The enrichment factor was calculated according to the following formula:

$$\text{Enrichment factor} = [\text{mean concentration in ash}] / [\text{mean concentration in reference sediment}]$$

This enrichment factor can be used to determine which constituents are more likely to be present in site sediments as a result of the ash release rather than another upstream source. If the mean constituent concentration in ash was equivalent to the mean concentration in reference sediment, the enrichment factor would be equal to 1, and that constituent would not be likely to increase at all, regardless of the amount of ash found in sediment. If ash held a 10 times greater concentration than reference sediment, the enrichment factor would be 10, and the concentration of that constituent would likely increase in response to increasing ash content.

2.2 Reach vs. Reference Statistical Analysis

A parametric one-way analysis of variance (ANOVA) was used to determine if statistically significant differences existed between constituent levels in reaches and those in reference locations, using the full detection limit for non-detected constituents. A Dunnett's post hoc test was used to determine if the constituent levels in the different reaches were statistically significantly greater than those in the reference location. If the probability was less than 0.10, the difference was considered significant. Submerged and seasonally-exposed sediment samples were statistically analyzed to determine differences between reference locations and individual reaches. Within the submerged and seasonally-exposed sediment samples, only the constituents with a large enough sample size were included in the statistical analysis; generally, only metals had sufficient sample size to be included.

Both submerged and seasonally-exposed sediment were screened against United States Environmental Protection Agency (USEPA) Region 4 sediment screening criteria. For constituents that had no USEPA Region 4 sediment screening criteria, National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQuiRTs) and USEPA Region 5 sediment screening criteria were used. A more thorough explanation of screening criteria can be found in Section 3. The maximum concentrations of the constituents, by reach, were analyzed to determine if any exceedances to the conservative screening criteria occurred. Even if exceedances to screening criteria are present, risks to potential ecological receptors are not necessarily present due to the conservative nature of the screening criteria.

2.3 Cumulative Frequency Distribution

In order to better visualize the distribution of the concentrations of constituents, cumulative frequency distribution graphs were generated. By sorting the sampled data from highest concentration to lowest concentration, it was possible to assign a probability to each concentration that was measured. For instance, the median data point would be assigned a 50 percent probability. This means that for any additional random sample taken from the area that these data were collected, there is a 50 percent probability that a given sample will be either above or below that value. For heuristic purposes, a solid line denoting the screening value was included on the figures to help visualize the distribution of the data in relation to conservative screening values.

2.4 Regression of Ash vs. Metals

To examine which constituents have positive correlations to ash content, regressions of metal concentration and ash content were generated for all metals. Non-metal constituents were not included due to low sample sizes. This analysis was performed on both submerged and seasonally-exposed sediment sample results.

3. Results

3.1 Enrichment Factor

Figure S-1 shows the enrichment factors for all metals separated by sediment type. This data can be used to ascertain the relative enrichment of metals in ash content in relation to reference sediment samples. If a concentration of constituent in ash content is equal to the concentration found in reference sediment, the enrichment factor is equal to 1. For instance, manganese has enrichment factors for submerged and seasonally-exposed sediment of 0.089 and 0.27, respectively, meaning that the manganese concentration in ash is less than the manganese concentration in reference sediment. Constituents with enrichment factors close to 1 will show little or no increase in concentration as ash content increases.

If a concentration of a constituent in ash is greater than that found in reference sediment, as is the case for arsenic (enrichment factor of 25 and 17 for seasonally-exposed and submerged sediment, respectively), that particular constituent is likely to increase in concentration as ash content increases. The higher the enrichment factor, the more pronounced the effect of having ash mixed with sediment and the easier the ash signature is to observe.

In seasonally-exposed sediments, the following constituents were determined to have enrichment factors greater than 10: arsenic, barium, beryllium, boron, calcium, and copper. Only arsenic, barium, boron, and calcium have enrichment factors greater than 15 for seasonally-exposed sediment. Arsenic has the greatest enrichment factor (25) in seasonally-exposed sediment.

For submerged sediment, only arsenic has an enrichment factor greater than 10 (enrichment factor 14). Barium, beryllium, boron, calcium, copper, and selenium have enrichment factors greater than 5 and less than 10.

3.2 Reach vs. Reference Statistical Analysis

Table S-1 (submerged sediment) and Table S-2 (seasonally-exposed sediment) show the constituents that were found to be present in significantly greater concentrations in the individual reaches compared to the respective reference locations. These tables also identify which constituents were found to have maximum detected concentrations greater than the respective sediment screening value. To be included on Tables S-1 and S-2 as exceeding the screening value, the sample must have been detected in the reaches in a significantly greater concentration than the respective reference locations. For example, mercury was detected in submerged sediment at a concentration greater than its respective screening value in both Clinch river reaches A and B, but the mercury concentrations in those reaches were not statistically greater than the levels found in the Clinch river reference locations, therefore it was not included as exceeding its screening criteria on Table S-1.

3.3 Cumulative Frequency Distribution

Using the data collected in each reach (Section 2), cumulative frequency distribution graphs were generated. By calculating the probability associated with our current data points and plotting it against the concentrations, these graphs show the probability of a random sample occurring at any given concentration. Figures S-2 and S-3 show the cumulative frequency distribution plots for all metals in submerged sediment and seasonally-exposed sediment, respectively. The vertical dotted line in the graph shows the sediment screening value for each individual constituent.

For example, in arsenic in submerged sediment (Figure S-2) from the Emory River, all samples from reach ER-A were above the screening level, while ER-B showed that less than half of all samples were below the screening level. In ER-C, approximately 80% of samples were detected below the screening level, with one detected concentration being significantly higher than all other samples. All four samples collected from the reference location (ER-R) were below the screening level.

3.4 Regression of Ash vs. Metals

In order to visualize the relationship between ash content in sediment and metal concentration, the data were plotted with ash content on the abscissa and metal concentration on the ordinate. Plots were generated for submerged sediment samples only, as seasonally-exposed samples were rarely analyzed for ash content. All plots can be seen in Figure S-4.

Given the fact that some of these metals, such as aluminum, are not commonly associated with coal fly ash, it is logical that their concentration does not appear to have a positive relationship with ash content. Metals such as arsenic, which are commonly associated with coal fly ash, do appear to show a positive relationship with ash content.

Exhibit S-1. Correlation Coefficients of Ash Content and Metals in Submerged Sediment:

| Metal | Correlation Coefficient |
|-----------|-------------------------|
| Aluminum | 0.072 |
| Arsenic | 0.82 |
| Barium | 0.58 |
| Beryllium | 0.66 |
| Boron | 0.39 |
| Chromium | 0.37 |
| Cobalt | 0.20 |
| Copper | 0.61 |
| Iron | 0.34 |
| Lead | 0.26 |
| Magnesium | -0.087 |
| Manganese | -0.31 |
| Mercury | -0.10 |
| Nickel | 0.51 |
| Selenium | 0.68 |
| Strontium | 0.81 |
| Vanadium | 0.60 |
| Zinc | -0.10 |

Table S-1. Comparison of Submerged Sediment between Reaches and Reference Locations
Tennessee Valley Authority Kingston, Tennessee

| Analyte | ER-C | ER-B | ER-A | CR-B | CR-A | TR-B | TR-A |
|-----------|------|------|------|------|------|------|------|
| Aluminum | | | | D | D | | |
| Arsenic | | D, X | D, X | D, X | D, X | | |
| Barium | | | D | D | D | | |
| Beryllium | | | D | D | D | | |
| Boron | | | D | D | D | | |
| Chromium | | | D | | | | |
| Cobalt | | | | D | D | | |
| Copper | | D, X | D, X | D, X | D, X | | |
| Iron | | | D | | | | |
| Lead | | | | | | | |
| Manganese | | | | | | | |
| Mercury | | D, X | D, X | | | D, X | D, X |
| Nickel | | | D, X | D, X | D, X | | |
| Selenium | | | D | | | D | D |
| Strontium | | D | D | D | D | | |
| Vanadium | | D | D | D | D | | |
| Zinc | | | | | D, X | | |

Notes:

CR-A = Clinch River Reach A

CR-B = Clinch River Reach B

ER-A = Emory River Reach A

ER-B = Emory River Reach B

ER-C = Emory River Reach C

TR-A = Tennessee River Reach A

TR-B = Tennessee River Reach B

Statistical significance was considered at an alpha level of 0.10

D = Statistically significantly different than reference location

X = Exceedance of screening criteria in at least one sample

Table S-2. Comparison of Seasonally Exposed Sediment Between Reaches and Reference Locations
Tennessee Valley Authority Kingston, Tennessee

| Analyte | ER-C | ER-B | ER-A | CR-B* | CR-A* |
|-----------|------|------|------|-------|-------|
| Aluminum | | D | D | D | D |
| Arsenic | | D, X | D, X | D, X | D, X |
| Barium | | D | D | D | D |
| Beryllium | | D | D | | |
| Boron | | D | D | D | D |
| Chromium | | D | D, X | D, X | D, X |
| Cobalt | | D | D | D | D |
| Copper | | D, X | D, X | D, X | D, X |
| Iron | | | | | |
| Lead | | D, X | D, X | D, X | D, X |
| Manganese | | | | D, X | D, X |
| Mercury | | | | D, X | D, X |
| Nickel | | D | D | D, X | D, X |
| Selenium | | | | | |
| Strontium | D | D | | D | D |
| Vanadium | D | D | | D | D |
| Zinc | | D, X | | D, X | D, X |

Notes:

CR-A = Clinch River Reach A

CR-B = Clinch River Reach B

ER-A = Emory River Reach A

ER-B = Emory River Reach B

ER-C = Emory River Reach C

* = No Clinch River Reference locations were sampled. Comparison is to Emory River Reference location.

Statistical significance was considered at an alpha level of 0.10

D = Statistically significantly different than reference location

X = Exceedance of screening criteria in at least one sample

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Table S-3. Equilibrium Partitioning Sediment Benchmark Calculations: Seasonally-Exposed Sediment
 Tennessee Valley Authority Kingston, Tennessee

| Fraction Organic Carbon: | CRM_A02 Seasonally Exposed Sediment 0.014 | | | | | | CRM_A03 Seasonally Exposed Sediment 0.0055 | | | | | |
|--|--|------------------------------------|------------------------------------|--|--|-----------------------------------|---|------------------------------------|--|--|------------------|-----------------------------------|
| | | | | | | | | | | | | |
| | Polycyclic Aromatic Hydrocarbons | C _{OC,PAHi,FCVi} (ug/goc) | C _{OC,PAHi,MAXi} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | Percent Contribution to ESBTU (%) | C _{OC,PAHi,FCVi} (ug/goc) | C _{OC,PAHi,MAXi} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | ESBTU (unitless) | Percent Contribution to ESBTU (%) |
| Naphthalene | 385 | 61700 | 0.0008 | 0.0571 | 0.0001 | 3.7% | 385 | 61700 | 0.0024 | 0.4364 | 0.0011 | 2.1% |
| C1-Naphthalenes | 444 | - | 0.0017 | 0.1214 | 0.0003 | 6.8% | 444 | - | 0.0063 | 1.1455 | 0.0026 | 4.7% |
| Acenaphthylene | 452 | 24000 | 0.00071 | 0.0507 | 0.0001 | 2.8% | 452 | 24000 | 0.00064 | 0.1164 | 0.0003 | 0.5% |
| Acenaphthene | 491 | 33400 | 0.00071 | 0.0507 | 0.0001 | 2.6% | 491 | 33400 | 0.00064 | 0.1164 | 0.0002 | 0.4% |
| C2-naphthalenes | 510 | - | 0.004 | 0.2857 | 0.0006 | 14.0% | 510 | - | 0.016 | 2.9091 | 0.0057 | 10.5% |
| Fluorene | 538 | 26000 | 0.00071 | 0.0507 | 0.0001 | 2.4% | 538 | 26000 | 0.00081 | 0.1473 | 0.0003 | 0.5% |
| C3-naphthalenes | 581 | - | 0.0023 | 0.1643 | 0.0003 | 7.1% | 581 | - | 0.014 | 2.5455 | 0.0044 | 8.0% |
| Anthracene | 594 | 1300 | 0.00071 | 0.0507 | 0.0001 | 2.1% | 594 | 1300 | 0.0009 | 0.1636 | 0.0003 | 0.5% |
| Phenanthrene | 596 | 34300 | 0.0012 | 0.0857 | 0.0001 | 3.6% | 596 | 34300 | 0.0065 | 1.1818 | 0.0020 | 3.6% |
| C1-Fluorenes | 611 | - | 0.00071 | 0.0507 | 0.0001 | 2.1% | 611 | - | 0.0015 | 0.2727 | 0.0004 | 0.8% |
| C4-Naphthalenes | 657 | - | 0.0021 | 0.1500 | 0.0002 | 5.7% | 657 | - | 0.0094 | 1.7091 | 0.0026 | 4.8% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.0016 | 0.1143 | 0.0002 | 4.3% | 670 | - | 0.0076 | 1.3818 | 0.0021 | 3.8% |
| C2-Fluorenes | 686 | - | 0.00071 | 0.0507 | 0.0001 | 1.8% | 686 | - | 0.0024 | 0.4364 | 0.0006 | 1.2% |
| Pyrene | 697 | 9090 | 0.0016 | 0.1143 | 0.0002 | 4.1% | 697 | 9090 | 0.011 | 2.0000 | 0.0029 | 5.3% |
| Fluoranthene | 707 | 23870 | 0.002 | 0.1429 | 0.0002 | 5.0% | 707 | 23870 | 0.014 | 2.5455 | 0.0036 | 6.6% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.0012 | 0.0857 | 0.0001 | 2.9% | 746 | - | 0.0063 | 1.1455 | 0.0015 | 2.8% |
| C3-Fluorenes | 769 | - | 0.00071 | 0.0507 | 0.0001 | 1.6% | 769 | - | 0.0037 | 0.6727 | 0.0009 | 1.6% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.0015 | 0.1071 | 0.0001 | 3.5% | 770 | - | 0.011 | 2.0000 | 0.0026 | 4.8% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.00076 | 0.0543 | 0.0001 | 1.6% | 829 | - | 0.0039 | 0.7091 | 0.0009 | 1.6% |
| Benzo(a)anthracene | 841 | 4153 | 0.00078 | 0.0557 | 0.0001 | 1.7% | 841 | 4153 | 0.0066 | 1.2000 | 0.0014 | 2.6% |
| Chrysene | 844 | 826 | 0.0012 | 0.0857 | 0.0001 | 2.5% | 844 | 826 | 0.0081 | 1.4727 | 0.0017 | 3.2% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.00071 | 0.0507 | 0.0001 | 1.4% | 913 | - | 0.0017 | 0.3091 | 0.0003 | 0.6% |
| C1-Chrysenes | 929 | - | 0.00075 | 0.0536 | 0.0001 | 1.4% | 929 | - | 0.0061 | 1.1091 | 0.0012 | 2.2% |
| Benz(a)Pyrene | 965 | 3840 | 0.00087 | 0.0621 | 0.0001 | 1.6% | 965 | 3840 | 0.0074 | 1.3455 | 0.0014 | 2.6% |
| Perylene | 967 | 431 | 0.00071 | 0.0507 | 0.0001 | 1.3% | 967 | 431 | 0.034 | 6.1818 | 0.0064 | 11.7% |
| Benz(e)pyrene | 967 | 4300 | 0.00086 | 0.0614 | 0.0001 | 1.6% | 967 | 4300 | 0.0058 | 1.0545 | 0.0011 | 2.0% |
| Benz(b)fluoranthene | 979 | 2169 | 0.0012 | 0.0857 | 0.0001 | 2.2% | 979 | 2169 | 0.008 | 1.4545 | 0.0015 | 2.7% |
| Benz(k)fluoranthene | 981 | 1220 | 0.00091 | 0.0650 | 0.0001 | 1.7% | 981 | 1220 | 0.0079 | 1.4364 | 0.0015 | 2.7% |
| C2-Chrysenes | 1008 | - | 0.00071 | 0.0507 | 0.0001 | 1.3% | 1008 | - | 0.0045 | 0.8182 | 0.0008 | 1.5% |
| Benz(g,h,i)perylene | 1095 | 648 | 0.00082 | 0.0586 | 0.0001 | 1.3% | 1095 | 648 | 0.0044 | 0.8000 | 0.0007 | 1.3% |
| C3-Chrysenes | 1112 | - | 0.00071 | 0.0507 | 0.0000 | 1.1% | 1112 | - | 0.0026 | 0.4727 | 0.0004 | 0.8% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.00071 | 0.0507 | 0.0000 | 1.1% | 1115 | - | 0.0039 | 0.7091 | 0.0006 | 1.2% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.00071 | 0.0507 | 0.0000 | 1.1% | 1123 | 2389 | 0.0015 | 0.2727 | 0.0002 | 0.4% |
| C4-Chrysenes | 1214 | - | 0.00071 | 0.0507 | 0.0000 | 1.0% | 1214 | - | 0.0013 | 0.2364 | 0.0002 | 0.4% |
| Sum ESBTU_{FCVi} | | | 0.0040 | 100.0% | | | | | | 0.0545 | 100.0% | |
| Sum ESBTU_{FCVi} (2 or 3 Ring PAHs) | | | 0.0027 | 66.4% | | | | | | 0.0262 | 48.0% | |
| Sum ESBTU_{FCVi} (4 Ring PAHs) | | | 0.0009 | 21.7% | | | | | | 0.0149 | 27.3% | |
| Sum ESBTU_{FCVi} (5 or 6 Ring PAHs) | | | 0.0005 | 11.9% | | | | | | 0.0134 | 24.7% | |



Table S-3. Equilibrium Partitioning Sediment Benchmark Calculations: Seasonally-Exposed Sediment
Tennessee Valley Authority Kingston, Tennessee

| Fraction Organic Carbon: | CRM_A10 Seasonally Exposed Sediment | | | | | | CRM_B06 Seasonally Exposed Sediment | | | | | |
|--|-------------------------------------|------------------------------------|------------------------------------|--|--|-----------------------------------|-------------------------------------|------------------------------------|--|--|-----------------------------------|---------------|
| | 0.0086 | | | | | | 0.0071 | | | | | |
| | Polycyclic Aromatic Hydrocarbons | C _{OC,PAHi,FCVi} (ug/goc) | C _{OC,PAHi,MAXi} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | Percent Contribution to ESBTU (%) | C _{OC,PAHi,FCVi} (ug/goc) | C _{OC,PAHi,MAXi} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | Percent Contribution to ESBTU (%) | |
| Naphthalene | 385 | 61700 | 0.0012 | 0.1395 | 0.0004 | 1.2% | 385 | 61700 | 0.00082 | 0.1155 | 0.0003 | 2.6% |
| C1-Naphthalenes | 444 | - | 0.0029 | 0.3372 | 0.0008 | 2.6% | 444 | - | 0.0012 | 0.1690 | 0.0004 | 3.3% |
| Acenaphthylene | 452 | 24000 | 0.00079 | 0.0919 | 0.0002 | 0.7% | 452 | 24000 | 0.00082 | 0.1155 | 0.0003 | 2.2% |
| Acenaphthene | 491 | 33400 | 0.00073 | 0.0849 | 0.0002 | 0.6% | 491 | 33400 | 0.00082 | 0.1155 | 0.0002 | 2.0% |
| #N/A | 510 | - | 0.0074 | 0.8605 | 0.0017 | 5.7% | 510 | - | 0.0027 | 0.3803 | 0.0007 | 6.5% |
| Fluorene | 538 | 26000 | 0.00073 | 0.0849 | 0.0002 | 0.5% | 538 | 26000 | 0.00082 | 0.1155 | 0.0002 | 1.9% |
| C3-Naphthalenes | 581 | - | 0.0065 | 0.7558 | 0.0013 | 4.4% | 581 | - | 0.0017 | 0.2394 | 0.0004 | 3.6% |
| Anthracene | 594 | 1300 | 0.0011 | 0.1279 | 0.0002 | 0.7% | 594 | 1300 | 0.00082 | 0.1155 | 0.0002 | 1.7% |
| Phenanthrene | 596 | 34300 | 0.0081 | 0.9419 | 0.0016 | 5.4% | 596 | 34300 | 0.0011 | 0.1549 | 0.0003 | 2.3% |
| C1-Fluorennes | 611 | - | 0.00073 | 0.0849 | 0.0001 | 0.5% | 611 | - | 0.00082 | 0.1155 | 0.0002 | 1.6% |
| C4-Naphthalenes | 657 | - | 0.0044 | 0.5116 | 0.0008 | 2.6% | 657 | - | 0.0013 | 0.1831 | 0.0003 | 2.4% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.0058 | 0.6744 | 0.0010 | 3.4% | 670 | - | 0.0012 | 0.1690 | 0.0003 | 2.2% |
| C2-Fluorennes | 686 | - | 0.0014 | 0.1628 | 0.0002 | 0.8% | 686 | - | 0.00082 | 0.1155 | 0.0002 | 1.5% |
| Pyrene | 697 | 9090 | 0.013 | 1.5116 | 0.0022 | 7.4% | 697 | 9090 | 0.0028 | 0.3944 | 0.0006 | 4.9% |
| Fluoranthene | 707 | 23870 | 0.018 | 2.0930 | 0.0030 | 10.1% | 707 | 23870 | 0.0028 | 0.3944 | 0.0006 | 4.8% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.0038 | 0.4419 | 0.0006 | 2.0% | 746 | - | 0.0016 | 0.2254 | 0.0003 | 2.6% |
| C3-Fluorennes | 769 | - | 0.00079 | 0.0919 | 0.0001 | 0.4% | 769 | - | 0.00082 | 0.1155 | 0.0002 | 1.3% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.01 | 1.1628 | 0.0015 | 5.1% | 770 | - | 0.003 | 0.4225 | 0.0005 | 4.8% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.0024 | 0.2791 | 0.0003 | 1.1% | 829 | - | 0.00082 | 0.1155 | 0.0001 | 1.2% |
| Benzo(a)anthracene | 841 | 4153 | 0.0083 | 0.9651 | 0.0011 | 3.9% | 841 | 4153 | 0.0013 | 0.1831 | 0.0002 | 1.9% |
| Chrysene | 844 | 826 | 0.0093 | 1.0814 | 0.0013 | 4.4% | 844 | 826 | 0.0021 | 0.2958 | 0.0004 | 3.0% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.00083 | 0.0965 | 0.0001 | 0.4% | 913 | - | 0.014 | 1.9718 | 0.0022 | 18.7% |
| C1-Chrysenes | 929 | - | 0.0082 | 0.9535 | 0.0010 | 3.5% | 929 | - | 0.00099 | 0.1394 | 0.0002 | 1.3% |
| Benzo(a)Pyrene | 965 | 3840 | 0.0091 | 1.0581 | 0.0011 | 3.7% | 965 | 3840 | 0.0014 | 0.1972 | 0.0002 | 1.8% |
| Perylene | 967 | 431 | 0.025 | 2.9070 | 0.0030 | 10.2% | 967 | 431 | 0.0054 | 0.7606 | 0.0008 | 6.8% |
| Benzo(e)pyrene | 967 | 4300 | 0.0067 | 0.7791 | 0.0008 | 2.7% | 967 | 4300 | 0.0016 | 0.2254 | 0.0002 | 2.0% |
| Benzo(b)fluoranthene | 979 | 2169 | 0.011 | 1.2791 | 0.0013 | 4.4% | 979 | 2169 | 0.0026 | 0.3662 | 0.0004 | 3.2% |
| Benzo(k)fluoranthene | 981 | 1220 | 0.0097 | 1.1279 | 0.0011 | 3.9% | 981 | 1220 | 0.0017 | 0.2394 | 0.0002 | 2.1% |
| C2-Chrysenes | 1008 | - | 0.0039 | 0.4535 | 0.0004 | 1.5% | 1008 | - | 0.00082 | 0.1155 | 0.0001 | 1.0% |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.0064 | 0.7442 | 0.0007 | 2.3% | 1095 | 648 | 0.00093 | 0.1310 | 0.0001 | 1.0% |
| C3-Chrysenes | 1112 | - | 0.0015 | 0.1744 | 0.0002 | 0.5% | 1112 | - | 0.00082 | 0.1155 | 0.0001 | 0.9% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.0061 | 0.7093 | 0.0006 | 2.2% | 1115 | - | 0.00093 | 0.1310 | 0.0001 | 1.0% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0022 | 0.2558 | 0.0002 | 0.8% | 1123 | 2389 | 0.00082 | 0.1155 | 0.0001 | 0.9% |
| C4-Chrysenes | 1214 | - | 0.00087 | 0.1012 | 0.0001 | 0.3% | 1214 | - | 0.00082 | 0.1155 | 0.0001 | 0.8% |
| Sum ESBTU_{FCVi} | | | | 0.0294 | 100.0% | | | | | | 0.0115 | 100.0% |
| Sum ESBTU_{FCVi} (2 or 3 Ring PAHs) | | | | 0.0098 | 33.1% | | | | | | 0.0066 | 57.6% |
| Sum ESBTU_{FCVi} (4 Ring PAHs) | | | | 0.0108 | 36.6% | | | | | | 0.0027 | 23.5% |
| Sum ESBTU_{FCVi} (5 or 6 Ring PAHs) | | | | 0.0089 | 30.3% | | | | | | 0.0022 | 18.9% |



Table S-3. Equilibrium Partitioning Sediment Benchmark Calculations: Seasonally-Exposed Sediment
Tennessee Valley Authority Kingston, Tennessee

| Fraction Organic Carbon: | CRM_B08 Seasonally Exposed Sediment | | | | | | CRM_B11 Seasonally Exposed Sediment | | | | | |
|--|---------------------------------------|---------------------------------------|---|---|--------------------------------|---------------------------------|---------------------------------------|---------------------------------------|---|---|---------------------|--|
| | 0.0084 | | | | | | 0.0069 | | | | | |
| | C _{OC,PAHi,FCVi} (ug/goc) | C _{OC,PAHi,MAXi} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | Percent ESBTU (unitless) | Contribution to ESBTU (%) | C _{OC,PAHi,FCVi} (ug/goc) | C _{OC,PAHi,MAXi} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | ESBTU (unitless) | Percent Contribution to ESBTU (%) |
| Naphthalene | 385 | 61700 | 0.00061 | 0.0726 | 0.0002 | 3.5% | 385 | 61700 | 0.0061 | 0.8841 | 0.0023 | 2.4% |
| C1-Naphthalenes | 444 | - | 0.00071 | 0.0845 | 0.0002 | 3.5% | 444 | - | 0.016 | 2.3188 | 0.0052 | 5.4% |
| Acenaphthylene | 452 | 24000 | 0.00061 | 0.0726 | 0.0002 | 3.0% | 452 | 24000 | 0.00068 | 0.0986 | 0.0002 | 0.2% |
| Acenaphthene | 491 | 33400 | 0.00061 | 0.0726 | 0.0001 | 2.8% | 491 | 33400 | 0.00068 | 0.0986 | 0.0002 | 0.2% |
| #N/A | 510 | - | 0.002 | 0.2381 | 0.0005 | 8.7% | 510 | - | 0.04 | 5.7971 | 0.0114 | 11.8% |
| Fluorene | 538 | 26000 | 0.00061 | 0.0726 | 0.0001 | 2.5% | 538 | 26000 | 0.0019 | 0.2754 | 0.0005 | 0.5% |
| C3-Naphthalenes | 581 | - | 0.0017 | 0.2024 | 0.0003 | 6.5% | 581 | - | 0.034 | 4.9275 | 0.0085 | 8.8% |
| Anthracene | 594 | 1300 | 0.00061 | 0.0726 | 0.0001 | 2.3% | 594 | 1300 | 0.0019 | 0.2754 | 0.0005 | 0.5% |
| Phenanthrene | 596 | 34300 | 0.0009 | 0.1071 | 0.0002 | 3.3% | 596 | 34300 | 0.013 | 1.8841 | 0.0032 | 3.3% |
| C1-Fluorenes | 611 | - | 0.00061 | 0.0726 | 0.0001 | 2.2% | 611 | - | 0.0028 | 0.4058 | 0.0007 | 0.7% |
| C4-Naphthalenes | 657 | - | 0.00061 | 0.0726 | 0.0001 | 2.1% | 657 | - | 0.02 | 2.8986 | 0.0044 | 4.6% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.0011 | 0.1310 | 0.0002 | 3.6% | 670 | - | 0.018 | 2.6087 | 0.0039 | 4.1% |
| C2-Fluorenes | 686 | - | 0.00094 | 0.1119 | 0.0002 | 3.0% | 686 | - | 0.0051 | 0.7391 | 0.0011 | 1.1% |
| Pyrene | 697 | 9090 | 0.0015 | 0.1786 | 0.0003 | 4.8% | 697 | 9090 | 0.03 | 4.3478 | 0.0062 | 6.5% |
| Fluoranthene | 707 | 23870 | 0.0016 | 0.1905 | 0.0003 | 5.0% | 707 | 23870 | 0.026 | 3.7681 | 0.0053 | 5.6% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.0011 | 0.1310 | 0.0002 | 3.3% | 746 | - | 0.015 | 2.1739 | 0.0029 | 3.0% |
| C3-Fluorenes | 769 | - | 0.0013 | 0.1548 | 0.0002 | 3.7% | 769 | - | 0.0068 | 0.9855 | 0.0013 | 1.3% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.0014 | 0.1667 | 0.0002 | 4.0% | 770 | - | 0.027 | 3.9130 | 0.0051 | 5.3% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.00091 | 0.1083 | 0.0001 | 2.4% | 829 | - | 0.01 | 1.4493 | 0.0017 | 1.8% |
| Benzo(a)anthracene | 841 | 4153 | 0.0008 | 0.0952 | 0.0001 | 2.1% | 841 | 4153 | 0.015 | 2.1739 | 0.0026 | 2.7% |
| Chrysene | 844 | 826 | 0.0011 | 0.1310 | 0.0002 | 2.9% | 844 | 826 | 0.018 | 2.6087 | 0.0031 | 3.2% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.00093 | 0.1107 | 0.0001 | 2.3% | 913 | - | 0.0091 | 1.3188 | 0.0014 | 1.5% |
| C1-Chrysenes | 929 | - | 0.0014 | 0.1667 | 0.0002 | 3.3% | 929 | - | 0.014 | 2.0290 | 0.0022 | 2.3% |
| Benz(a)Pyrene | 965 | 3840 | 0.00096 | 0.1143 | 0.0001 | 2.2% | 965 | 3840 | 0.014 | 2.0290 | 0.0021 | 2.2% |
| Perylene | 967 | 431 | 0.00061 | 0.0726 | 0.0001 | 1.4% | 967 | 431 | 0.038 | 5.5072 | 0.0057 | 5.9% |
| Benz(e)pyrene | 967 | 4300 | 0.00097 | 0.1155 | 0.0001 | 2.2% | 967 | 4300 | 0.016 | 2.3188 | 0.0024 | 2.5% |
| Benz(b)fluoranthene | 979 | 2169 | 0.0015 | 0.1786 | 0.0002 | 3.4% | 979 | 2169 | 0.023 | 3.3333 | 0.0034 | 3.5% |
| Benz(k)fluoranthene | 981 | 1220 | 0.001 | 0.1190 | 0.0001 | 2.3% | 981 | 1220 | 0.016 | 2.3188 | 0.0024 | 2.5% |
| C2-Chrysenes | 1008 | - | 0.00061 | 0.0726 | 0.0001 | 1.3% | 1008 | - | 0.015 | 2.1739 | 0.0022 | 2.2% |
| Benz(g,h,i)perylene | 1095 | 648 | 0.00067 | 0.0798 | 0.0001 | 1.4% | 1095 | 648 | 0.01 | 1.4493 | 0.0013 | 1.4% |
| C3-Chrysenes | 1112 | - | 0.00061 | 0.0726 | 0.0001 | 1.2% | 1112 | - | 0.0072 | 1.0435 | 0.0009 | 1.0% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.00065 | 0.0774 | 0.0001 | 1.3% | 1115 | - | 0.0086 | 1.2464 | 0.0011 | 1.2% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.00061 | 0.0726 | 0.0001 | 1.2% | 1123 | 2389 | 0.0031 | 0.4493 | 0.0004 | 0.4% |
| C4-Chrysenes | 1214 | - | 0.00061 | 0.0726 | 0.0001 | 1.1% | 1214 | - | 0.002 | 0.2899 | 0.0002 | 0.2% |
| Sum ESBTU_{FCVi} | | | 0.0054 | 100.0% | | | | | | 0.0960 | 100.0% | |
| Sum ESBTU_{FCVi} (2 or 3 Ring PAHs) | | | 0.0032 | 58.8% | | | | | | 0.0494 | 51.4% | |
| Sum ESBTU_{FCVi} (4 Ring PAHs) | | | 0.0014 | 25.8% | | | | | | 0.0278 | 29.0% | |
| Sum ESBTU_{FCVi} (5 or 6 Ring PAHs) | | | 0.0008 | 15.3% | | | | | | 0.0188 | 19.6% | |

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Table S-3. Equilibrium Partitioning Sediment Benchmark Calculations: Seasonally-Exposed Sediment
Tennessee Valley Authority Kingston, Tennessee

| Fraction Organic Carbon: | ERM_A04 Seasonally Exposed Sediment | | | | | | ERM_A08 Seasonally Exposed Sediment | | | | | |
|--|---------------------------------------|---------------------------------------|---|---|---------------------|--|---------------------------------------|---------------------------------------|---|---|---------------------|--|
| | 0.098 | | | | | | 0.013 | | | | | |
| | C _{OC,PAHi,FCVi} (ug/goc) | C _{OC,PAHi,MAXi} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | ESBTU (unitless) | Percent Contribution to ESBTU (%) | C _{OC,PAHi,FCVi} (ug/goc) | C _{OC,PAHi,MAXi} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | ESBTU (unitless) | Percent Contribution to ESBTU (%) |
| Naphthalene | 385 | 61700 | 0.00077 | 0.0079 | 0.0000 | 0.6% | 385 | 61700 | 0.00078 | 0.0600 | 0.0002 | 1.5% |
| C1-Naphthalenes | 444 | - | 0.0013 | 0.0133 | 0.0000 | 0.9% | 444 | - | 0.0011 | 0.0846 | 0.0002 | 1.9% |
| Acenaphthylene | 452 | 24000 | 0.00076 | 0.0078 | 0.0000 | 0.5% | 452 | 24000 | 0.00078 | 0.0600 | 0.0001 | 1.3% |
| Acenaphthene | 491 | 33400 | 0.00076 | 0.0078 | 0.0000 | 0.5% | 491 | 33400 | 0.00078 | 0.0600 | 0.0001 | 1.2% |
| #N/A | 510 | - | 0.0053 | 0.0541 | 0.0001 | 3.2% | 510 | - | 0.0023 | 0.1769 | 0.0003 | 3.4% |
| Fluorene | 538 | 26000 | 0.00076 | 0.0078 | 0.0000 | 0.4% | 538 | 26000 | 0.00078 | 0.0600 | 0.0001 | 1.1% |
| C3-Naphthalenes | 581 | - | 0.003 | 0.0306 | 0.0001 | 1.6% | 581 | - | 0.0018 | 0.1385 | 0.0002 | 2.4% |
| Anthracene | 594 | 1300 | 0.001 | 0.0102 | 0.0000 | 0.5% | 594 | 1300 | 0.00078 | 0.0600 | 0.0001 | 1.0% |
| Phenanthrene | 596 | 34300 | 0.0014 | 0.0143 | 0.0000 | 0.7% | 596 | 34300 | 0.0021 | 0.1615 | 0.0003 | 2.7% |
| C1-Fluorenes | 611 | - | 0.00076 | 0.0078 | 0.0000 | 0.4% | 611 | - | 0.00078 | 0.0600 | 0.0001 | 1.0% |
| C4-Naphthalenes | 657 | - | 0.021 | 0.2143 | 0.0003 | 9.9% | 657 | - | 0.0016 | 0.1231 | 0.0002 | 1.9% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.0019 | 0.0194 | 0.0000 | 0.9% | 670 | - | 0.002 | 0.1538 | 0.0002 | 2.3% |
| C2-Fluorenes | 686 | - | 0.00076 | 0.0078 | 0.0000 | 0.3% | 686 | - | 0.00078 | 0.0600 | 0.0001 | 0.9% |
| Pyrene | 697 | 9090 | 0.017 | 0.1735 | 0.0002 | 7.6% | 697 | 9090 | 0.011 | 0.8462 | 0.0012 | 12.1% |
| Fluoranthene | 707 | 23870 | 0.01 | 0.1020 | 0.0001 | 4.4% | 707 | 23870 | 0.012 | 0.9231 | 0.0013 | 13.0% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.0026 | 0.0265 | 0.0000 | 1.1% | 746 | - | 0.002 | 0.1538 | 0.0002 | 2.1% |
| C3-Fluorenes | 769 | - | 0.00076 | 0.0078 | 0.0000 | 0.3% | 769 | - | 0.00078 | 0.0600 | 0.0001 | 0.8% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.015 | 0.1531 | 0.0002 | 6.0% | 770 | - | 0.0057 | 0.4385 | 0.0006 | 5.7% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.00076 | 0.0078 | 0.0000 | 0.3% | 829 | - | 0.0011 | 0.0846 | 0.0001 | 1.0% |
| Benzo(a)anthracene | 841 | 4153 | 0.0077 | 0.0786 | 0.0001 | 2.8% | 841 | 4153 | 0.0066 | 0.5077 | 0.0006 | 6.0% |
| Chrysene | 844 | 826 | 0.013 | 0.1327 | 0.0002 | 4.8% | 844 | 826 | 0.0061 | 0.4692 | 0.0006 | 5.5% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.067 | 0.6837 | 0.0007 | 22.7% | 913 | - | 0.0009 | 0.0692 | 0.0001 | 0.8% |
| C1-Chrysenes | 929 | - | 0.0099 | 0.1010 | 0.0001 | 3.3% | 929 | - | 0.0043 | 0.3308 | 0.0004 | 3.5% |
| Benz(a)Pyrene | 965 | 3840 | 0.0079 | 0.0806 | 0.0001 | 2.5% | 965 | 3840 | 0.0051 | 0.3923 | 0.0004 | 4.0% |
| Perylene | 967 | 431 | 0.0058 | 0.0592 | 0.0001 | 1.9% | 967 | 431 | 0.0021 | 0.1615 | 0.0002 | 1.7% |
| Benz(e)pyrene | 967 | 4300 | 0.012 | 0.1224 | 0.0001 | 3.8% | 967 | 4300 | 0.0047 | 0.3615 | 0.0004 | 3.7% |
| Benz(b)fluoranthene | 979 | 2169 | 0.027 | 0.2755 | 0.0003 | 8.5% | 979 | 2169 | 0.0086 | 0.6615 | 0.0007 | 6.7% |
| Benz(k)fluoranthene | 981 | 1220 | 0.018 | 0.1837 | 0.0002 | 5.7% | 981 | 1220 | 0.0057 | 0.4385 | 0.0004 | 4.4% |
| C2-Chrysenes | 1008 | - | 0.005 | 0.0510 | 0.0001 | 1.5% | 1008 | - | 0.0021 | 0.1615 | 0.0002 | 1.6% |
| Benz(g,h,i)perylene | 1095 | 648 | 0.0021 | 0.0214 | 0.0000 | 0.6% | 1095 | 648 | 0.0022 | 0.1692 | 0.0002 | 1.5% |
| C3-Chrysenes | 1112 | - | 0.00076 | 0.0078 | 0.0000 | 0.2% | 1112 | - | 0.00078 | 0.0600 | 0.0001 | 0.5% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.0029 | 0.0296 | 0.0000 | 0.8% | 1115 | - | 0.0024 | 0.1846 | 0.0002 | 1.6% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0012 | 0.0122 | 0.0000 | 0.3% | 1123 | 2389 | 0.00094 | 0.0723 | 0.0001 | 0.6% |
| C4-Chrysenes | 1214 | - | 0.00076 | 0.0078 | 0.0000 | 0.2% | 1214 | - | 0.00078 | 0.0600 | 0.0000 | 0.5% |
| Sum ESBTU_{FCVi} | | | 0.0033 | 100.0% | | | | | | 0.0101 | 100.0% | |
| Sum ESBTU_{FCVi} (2 or 3 Ring PAHs) | | | 0.0015 | 45.0% | | | | | | 0.0027 | 27.2% | |
| Sum ESBTU_{FCVi} (4 Ring PAHs) | | | 0.0010 | 30.8% | | | | | | 0.0049 | 48.4% | |
| Sum ESBTU_{FCVi} (5 or 6 Ring PAHs) | | | 0.0008 | 24.2% | | | | | | 0.0025 | 24.4% | |



Table S-3. Equilibrium Partitioning Sediment Benchmark Calculations: Seasonally-Exposed Sediment
Tennessee Valley Authority Kingston, Tennessee

| Fraction Organic Carbon: | ERM_A11 Seasonally Exposed Sediment | | | | | | ERM_B02 Seasonally Exposed Sediment | | | | | |
|--|---------------------------------------|---------------------------------------|---|---|--------------------------------|---------------------|---------------------------------------|---------------------------------------|---|---|---------------------|--------------------------------|
| | 0.01 | | | | | | 0.025 | | | | | |
| | C _{OC,PAHi,FCVi} (ug/goc) | C _{OC,PAHi,MAXi} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | Percent ESBTU (unitless) | Contribution (%) | C _{OC,PAHi,FCVi} (ug/goc) | C _{OC,PAHi,MAXi} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | ESBTU (unitless) | Percent Contribution (%) |
| Naphthalene | 385 | 61700 | 0.00067 | 0.0670 | 0.0002 | 5.5% | 385 | 61700 | 0.0052 | 0.2080 | 0.0005 | 1.1% |
| C1-Naphthalenes | 444 | - | 0.00067 | 0.0670 | 0.0002 | 4.8% | 444 | - | 0.011 | 0.4400 | 0.0010 | 2.0% |
| Acenaphthylene | 452 | 24000 | 0.00067 | 0.0670 | 0.0001 | 4.7% | 452 | 24000 | 0.0029 | 0.1160 | 0.0003 | 0.5% |
| Acenaphthene | 491 | 33400 | 0.00067 | 0.0670 | 0.0001 | 4.3% | 491 | 33400 | 0.0029 | 0.1160 | 0.0002 | 0.5% |
| #N/A | 510 | - | 0.00067 | 0.0670 | 0.0001 | 4.2% | 510 | - | 0.025 | 1.0000 | 0.0020 | 4.1% |
| Fluorene | 538 | 26000 | 0.00067 | 0.0670 | 0.0001 | 3.9% | 538 | 26000 | 0.0041 | 0.1640 | 0.0003 | 0.6% |
| C3-Naphthalenes | 581 | - | 0.00067 | 0.0670 | 0.0001 | 3.6% | 581 | - | 0.019 | 0.7600 | 0.0013 | 2.7% |
| Anthracene | 594 | 1300 | 0.00067 | 0.0670 | 0.0001 | 3.6% | 594 | 1300 | 0.021 | 0.8400 | 0.0014 | 2.9% |
| Phenanthrene | 596 | 34300 | 0.00067 | 0.0670 | 0.0001 | 3.6% | 596 | 34300 | 0.022 | 0.8800 | 0.0015 | 3.1% |
| C1-Fluorennes | 611 | - | 0.00067 | 0.0670 | 0.0001 | 3.5% | 611 | - | 0.0029 | 0.1160 | 0.0002 | 0.4% |
| C4-Naphthalenes | 657 | - | 0.00067 | 0.0670 | 0.0001 | 3.2% | 657 | - | 0.012 | 0.4800 | 0.0007 | 1.5% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.00067 | 0.0670 | 0.0001 | 3.2% | 670 | - | 0.019 | 0.7600 | 0.0011 | 2.3% |
| C2-Fluorennes | 686 | - | 0.00067 | 0.0670 | 0.0001 | 3.1% | 686 | - | 0.0043 | 0.1720 | 0.0003 | 0.5% |
| Pyrene | 697 | 9090 | 0.00067 | 0.0670 | 0.0001 | 3.0% | 697 | 9090 | 0.071 | 2.8400 | 0.0041 | 8.4% |
| Fluoranthene | 707 | 23870 | 0.00067 | 0.0670 | 0.0001 | 3.0% | 707 | 23870 | 0.074 | 2.9600 | 0.0042 | 8.7% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.00067 | 0.0670 | 0.0001 | 2.8% | 746 | - | 0.015 | 0.6000 | 0.0008 | 1.7% |
| C3-Fluorennes | 769 | - | 0.00067 | 0.0670 | 0.0001 | 2.8% | 769 | - | 0.0035 | 0.1400 | 0.0002 | 0.4% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.00067 | 0.0670 | 0.0001 | 2.8% | 770 | - | 0.059 | 2.3600 | 0.0031 | 6.3% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.00067 | 0.0670 | 0.0001 | 2.6% | 829 | - | 0.012 | 0.4800 | 0.0006 | 1.2% |
| Benzo(a)anthracene | 841 | 4153 | 0.00067 | 0.0670 | 0.0001 | 2.5% | 841 | 4153 | 0.055 | 2.2000 | 0.0026 | 5.4% |
| Chrysene | 844 | 826 | 0.00067 | 0.0670 | 0.0001 | 2.5% | 844 | 826 | 0.08 | 3.2000 | 0.0038 | 7.8% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.00067 | 0.0670 | 0.0001 | 2.3% | 913 | - | 0.022 | 0.8800 | 0.0010 | 2.0% |
| C1-Chrysenes | 929 | - | 0.00067 | 0.0670 | 0.0001 | 2.3% | 929 | - | 0.029 | 1.1600 | 0.0012 | 2.6% |
| Benzo(a)Pyrene | 965 | 3840 | 0.00067 | 0.0670 | 0.0001 | 2.2% | 965 | 3840 | 0.061 | 2.4400 | 0.0025 | 5.2% |
| Perylene | 967 | 431 | 0.00067 | 0.0670 | 0.0001 | 2.2% | 967 | 431 | 0.04 | 1.6000 | 0.0017 | 3.4% |
| Benzo(e)pyrene | 967 | 4300 | 0.00067 | 0.0670 | 0.0001 | 2.2% | 967 | 4300 | 0.051 | 2.0400 | 0.0021 | 4.4% |
| Benzo(b)fluoranthene | 979 | 2169 | 0.00067 | 0.0670 | 0.0001 | 2.2% | 979 | 2169 | 0.09 | 3.6000 | 0.0037 | 7.6% |
| Benzo(k)fluoranthene | 981 | 1220 | 0.00067 | 0.0670 | 0.0001 | 2.2% | 981 | 1220 | 0.065 | 2.6000 | 0.0027 | 5.5% |
| C2-Chrysenes | 1008 | - | 0.00067 | 0.0670 | 0.0001 | 2.1% | 1008 | - | 0.023 | 0.9200 | 0.0009 | 1.9% |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.00067 | 0.0670 | 0.0001 | 1.9% | 1095 | 648 | 0.026 | 1.0400 | 0.0009 | 2.0% |
| C3-Chrysenes | 1112 | - | 0.00067 | 0.0670 | 0.0001 | 1.9% | 1112 | - | 0.0029 | 0.1160 | 0.0001 | 0.2% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.00067 | 0.0670 | 0.0001 | 1.9% | 1115 | - | 0.028 | 1.1200 | 0.0010 | 2.1% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.00067 | 0.0670 | 0.0001 | 1.9% | 1123 | 2389 | 0.01 | 0.4000 | 0.0004 | 0.7% |
| C4-Chrysenes | 1214 | - | 0.00067 | 0.0670 | 0.0001 | 1.7% | 1214 | - | 0.0029 | 0.1160 | 0.0001 | 0.2% |
| Sum ESBTU_{FCVi} | | | 0.0032 | 100.0% | | | | | | 0.0483 | 100.0% | |
| Sum ESBTU_{FCVi} (2 or 3 Ring PAHs) | | | 0.0019 | 61.5% | | | | | | 0.0133 | 27.6% | |
| Sum ESBTU_{FCVi} (4 Ring PAHs) | | | 0.0007 | 21.8% | | | | | | 0.0201 | 41.6% | |
| Sum ESBTU_{FCVi} (5 or 6 Ring PAHs) | | | 0.0005 | 16.6% | | | | | | 0.0149 | 30.9% | |

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Table S-3. Equilibrium Partitioning Sediment Benchmark Calculations: Seasonally-Exposed Sediment
 Tennessee Valley Authority Kingston, Tennessee

| Fraction Organic Carbon: | ERM_B07 Seasonally Exposed Sediment | | | | | | ERM_B13 Seasonally Exposed Sediment | | | | | |
|--|---------------------------------------|---------------------------------------|---|---|--------------------------------|---------------------------------|---------------------------------------|---------------------------------------|---|---|---------------------|--|
| | 0.013 | | | | | | 0.0062 | | | | | |
| | C _{OC,PAHi,FCVi} (ug/goc) | C _{OC,PAHi,MAXi} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | Percent ESBTU (unitless) | Contribution to ESBTU (%) | C _{OC,PAHi,FCVi} (ug/goc) | C _{OC,PAHi,MAXi} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | ESBTU (unitless) | Percent Contribution to ESBTU (%) |
| Naphthalene | 385 | 61700 | 0.006 | 0.4615 | 0.0012 | 2.0% | 385 | 61700 | 0.0008 | 0.1290 | 0.0003 | 2.7% |
| C1-Naphthalenes | 444 | - | 0.016 | 1.2308 | 0.0028 | 4.7% | 444 | - | 0.0017 | 0.2742 | 0.0006 | 5.0% |
| Acenaphthylene | 452 | 24000 | 0.0018 | 0.1385 | 0.0003 | 0.5% | 452 | 24000 | 0.00065 | 0.1048 | 0.0002 | 1.9% |
| Acenaphthene | 491 | 33400 | 0.0019 | 0.1462 | 0.0003 | 0.5% | 491 | 33400 | 0.00065 | 0.1048 | 0.0002 | 1.7% |
| #N/A | 510 | - | 0.042 | 3.2308 | 0.0063 | 10.8% | 510 | - | 0.0041 | 0.6613 | 0.0013 | 10.6% |
| Fluorene | 538 | 26000 | 0.0029 | 0.2231 | 0.0004 | 0.7% | 538 | 26000 | 0.00065 | 0.1048 | 0.0002 | 1.6% |
| C3-Naphthalenes | 581 | - | 0.031 | 2.3846 | 0.0041 | 7.0% | 581 | - | 0.0022 | 0.3548 | 0.0006 | 5.0% |
| Anthracene | 594 | 1300 | 0.0043 | 0.3308 | 0.0006 | 0.9% | 594 | 1300 | 0.00065 | 0.1048 | 0.0002 | 1.4% |
| Phenanthrene | 596 | 34300 | 0.026 | 2.0000 | 0.0034 | 5.7% | 596 | 34300 | 0.0016 | 0.2581 | 0.0004 | 3.5% |
| C1-Fluorenes | 611 | - | 0.003 | 0.2308 | 0.0004 | 0.6% | 611 | - | 0.00065 | 0.1048 | 0.0002 | 1.4% |
| C4-Naphthalenes | 657 | - | 0.019 | 1.4615 | 0.0022 | 3.8% | 657 | - | 0.0017 | 0.2742 | 0.0004 | 3.4% |
| C1-Phenanthenes/Anthracenes | 670 | - | 0.022 | 1.6923 | 0.0025 | 4.3% | 670 | - | 0.002 | 0.3226 | 0.0005 | 3.9% |
| C2-Fluorenes | 686 | - | 0.0056 | 0.4308 | 0.0006 | 1.1% | 686 | - | 0.00065 | 0.1048 | 0.0002 | 1.2% |
| Pyrene | 697 | 9090 | 0.037 | 2.8462 | 0.0041 | 7.0% | 697 | 9090 | 0.0037 | 0.5968 | 0.0009 | 7.0% |
| Fluoranthene | 707 | 23870 | 0.041 | 3.1538 | 0.0045 | 7.6% | 707 | 23870 | 0.0037 | 0.5968 | 0.0008 | 6.9% |
| C2-Phenanthenes/Anthracenes | 746 | - | 0.015 | 1.1538 | 0.0015 | 2.6% | 746 | - | 0.0016 | 0.2581 | 0.0003 | 2.8% |
| C3-Fluorenes | 769 | - | 0.0043 | 0.3308 | 0.0004 | 0.7% | 769 | - | 0.00065 | 0.1048 | 0.0001 | 1.1% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.024 | 1.8462 | 0.0024 | 4.1% | 770 | - | 0.0031 | 0.5000 | 0.0006 | 5.3% |
| C3-Phenanthenes/Anthracenes | 829 | - | 0.0078 | 0.6000 | 0.0007 | 1.2% | 829 | - | 0.00065 | 0.1048 | 0.0001 | 1.0% |
| Benzo(a)anthracene | 841 | 4153 | 0.02 | 1.5385 | 0.0018 | 3.1% | 841 | 4153 | 0.002 | 0.3226 | 0.0004 | 3.1% |
| Chrysene | 844 | 826 | 0.022 | 1.6923 | 0.0020 | 3.4% | 844 | 826 | 0.0022 | 0.3548 | 0.0004 | 3.4% |
| C4-Phenanthenes/Anthracenes | 913 | - | 0.018 | 1.3846 | 0.0015 | 2.6% | 913 | - | 0.0011 | 0.1774 | 0.0002 | 1.6% |
| C1-Chrysenes | 929 | - | 0.0097 | 0.7462 | 0.0008 | 1.4% | 929 | - | 0.002 | 0.3226 | 0.0003 | 2.8% |
| Benz(a)Pyrene | 965 | 3840 | 0.018 | 1.3846 | 0.0014 | 2.4% | 965 | 3840 | 0.0018 | 0.2903 | 0.0003 | 2.5% |
| Perylene | 967 | 431 | 0.065 | 5.0000 | 0.0052 | 8.8% | 967 | 431 | 0.0025 | 0.4032 | 0.0004 | 3.4% |
| Benz(e)pyrene | 967 | 4300 | 0.016 | 1.2308 | 0.0013 | 2.2% | 967 | 4300 | 0.0018 | 0.2903 | 0.0003 | 2.5% |
| Benz(b)fluoranthene | 979 | 2169 | 0.026 | 2.0000 | 0.0020 | 3.5% | 979 | 2169 | 0.0031 | 0.5000 | 0.0005 | 4.2% |
| Benz(k)fluoranthene | 981 | 1220 | 0.018 | 1.3846 | 0.0014 | 2.4% | 981 | 1220 | 0.002 | 0.3226 | 0.0003 | 2.7% |
| C2-Chrysenes | 1008 | - | 0.0098 | 0.7538 | 0.0007 | 1.3% | 1008 | - | 0.001 | 0.1613 | 0.0002 | 1.3% |
| Benz(g,h,i)perylene | 1095 | 648 | 0.0091 | 0.7000 | 0.0006 | 1.1% | 1095 | 648 | 0.0011 | 0.1774 | 0.0002 | 1.3% |
| C3-Chrysenes | 1112 | - | 0.0018 | 0.1385 | 0.0001 | 0.2% | 1112 | - | 0.00065 | 0.1048 | 0.0001 | 0.8% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.0086 | 0.6615 | 0.0006 | 1.0% | 1115 | - | 0.0011 | 0.1774 | 0.0002 | 1.3% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0031 | 0.2385 | 0.0002 | 0.4% | 1123 | 2389 | 0.00065 | 0.1048 | 0.0001 | 0.8% |
| C4-Chrysenes | 1214 | - | 0.0018 | 0.1385 | 0.0001 | 0.2% | 1214 | - | 0.00065 | 0.1048 | 0.0001 | 0.7% |
| Sum ESBTU_{FCVi} | | | 0.0587 | 100.0% | | | | | | 0.0122 | 100.0% | |
| Sum ESBTU_{FCVi} (2 or 3 Ring PAHs) | | | 0.0293 | 50.0% | | | | | | 0.0061 | 50.1% | |
| Sum ESBTU_{FCVi} (4 Ring PAHs) | | | 0.0166 | 28.2% | | | | | | 0.0038 | 31.4% | |
| Sum ESBTU_{FCVi} (5 or 6 Ring PAHs) | | | 0.0128 | 21.8% | | | | | | 0.0023 | 18.5% | |

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Table S-3. Equilibrium Partitioning Sediment Benchmark Calculations: Seasonally-Exposed Sediment
 Tennessee Valley Authority Kingston, Tennessee

| Fraction Organic Carbon: | ERM_INT01 Seasonally Exposed Sediment 0.0051 | | | | | | ERM_C01 Seasonally Exposed Sediment 0.00000012 | | | | | |
|--|---|--|------------------------------------|--|-----------------------------------|------------------|---|------------------------------------|--|-----------------------------------|---------------|------|
| | Polycyclic Aromatic Hydrocarbons | Dry Weight Sediment Concentration (ug/g) | | | Percent Contribution to ESBTU (%) | ESBTU (unitless) | Dry Weight Sediment Concentration (ug/g) | | | Percent Contribution to ESBTU (%) | | |
| | | C _{OC,PAHi,FCVi} (ug/goc) | C _{OC,PAHi,MAXi} (ug/goc) | Organic Carbon Normalized Concentration (ug/goc) | | | C _{OC,PAHi,FCVi} (ug/goc) | C _{OC,PAHi,MAXi} (ug/goc) | Organic Carbon Normalized Concentration (ug/goc) | | | |
| Naphthalene | 385 | 61700 | 0.0016 | 0.3137 | 0.0008 | 1.8% | 385 | 61700 | 0.0007 | 0.0583 | 0.0002 | 2.5% |
| C1-Naphthalenes | 444 | - | 0.0052 | 1.0196 | 0.0023 | 5.1% | 444 | - | 0.0012 | 0.1000 | 0.0002 | 3.6% |
| Acenaphthylene | 452 | 24000 | 0.00066 | 0.1294 | 0.0003 | 0.6% | 452 | 24000 | 0.0007 | 0.0583 | 0.0001 | 2.1% |
| Acenaphthene | 491 | 33400 | 0.00066 | 0.1294 | 0.0003 | 0.6% | 491 | 33400 | 0.0007 | 0.0583 | 0.0001 | 1.9% |
| #N/A | 510 | - | 0.014 | 2.7451 | 0.0054 | 11.9% | 510 | - | 0.0029 | 0.2417 | 0.0005 | 7.7% |
| Fluorene | 538 | 26000 | 0.00075 | 0.1471 | 0.0003 | 0.6% | 538 | 26000 | 0.0007 | 0.0583 | 0.0001 | 1.8% |
| C3-Naphthalenes | 581 | - | 0.014 | 2.7451 | 0.0047 | 10.4% | 581 | - | 0.0028 | 0.2333 | 0.0004 | 6.5% |
| Anthracene | 594 | 1300 | 0.00066 | 0.1294 | 0.0002 | 0.5% | 594 | 1300 | 0.0007 | 0.0583 | 0.0001 | 1.6% |
| Phenanthrene | 596 | 34300 | 0.0081 | 1.5882 | 0.0027 | 5.9% | 596 | 34300 | 0.0018 | 0.1500 | 0.0003 | 4.1% |
| C1-Fluorenes | 611 | - | 0.0015 | 0.2941 | 0.0005 | 1.1% | 611 | - | 0.0007 | 0.0583 | 0.0001 | 1.5% |
| C4-Naphthalenes | 657 | - | 0.0095 | 1.8627 | 0.0028 | 6.2% | 657 | - | 0.0014 | 0.1167 | 0.0002 | 2.9% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.013 | 2.5490 | 0.0038 | 8.4% | 670 | - | 0.0017 | 0.1417 | 0.0002 | 3.4% |
| C2-Fluorenes | 686 | - | 0.0039 | 0.7647 | 0.0011 | 2.5% | 686 | - | 0.0007 | 0.0583 | 0.0001 | 1.4% |
| Pyrene | 697 | 9090 | 0.0063 | 1.2353 | 0.0018 | 3.9% | 697 | 9090 | 0.0033 | 0.2750 | 0.0004 | 6.4% |
| Fluoranthene | 707 | 23870 | 0.0064 | 1.2549 | 0.0018 | 3.9% | 707 | 23870 | 0.0038 | 0.3167 | 0.0004 | 7.3% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.0085 | 1.6667 | 0.0022 | 4.9% | 746 | - | 0.0019 | 0.1583 | 0.0002 | 3.4% |
| C3-Fluorenes | 769 | - | 0.0024 | 0.4706 | 0.0006 | 1.3% | 769 | - | 0.0007 | 0.0583 | 0.0001 | 1.2% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.01 | 1.9608 | 0.0025 | 5.6% | 770 | - | 0.0028 | 0.2333 | 0.0003 | 4.9% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.0048 | 0.9412 | 0.0011 | 2.5% | 829 | - | 0.00081 | 0.0675 | 0.0001 | 1.3% |
| Benzo(a)anthracene | 841 | 4153 | 0.0031 | 0.6078 | 0.0007 | 1.6% | 841 | 4153 | 0.0017 | 0.1417 | 0.0002 | 2.7% |
| Chryseine | 844 | 826 | 0.0055 | 1.0784 | 0.0013 | 2.8% | 844 | 826 | 0.002 | 0.1667 | 0.0002 | 3.2% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.0038 | 0.7451 | 0.0008 | 1.8% | 913 | - | 0.0015 | 0.1250 | 0.0001 | 2.2% |
| C1-Chrysenes | 929 | - | 0.0048 | 0.9412 | 0.0010 | 2.2% | 929 | - | 0.0007 | 0.0583 | 0.0001 | 1.0% |
| Benz(a)Pyrene | 965 | 3840 | 0.0024 | 0.4706 | 0.0005 | 1.1% | 965 | 3840 | 0.0017 | 0.1417 | 0.0001 | 2.4% |
| Perylene | 967 | 431 | 0.0051 | 1.0000 | 0.0010 | 2.3% | 967 | 431 | 0.0066 | 0.5500 | 0.0006 | 9.2% |
| Benz(e)pyrene | 967 | 4300 | 0.0059 | 1.1569 | 0.0012 | 2.6% | 967 | 4300 | 0.0016 | 0.1333 | 0.0001 | 2.2% |
| Benz(b)fluoranthene | 979 | 2169 | 0.0052 | 1.0196 | 0.0010 | 2.3% | 979 | 2169 | 0.0026 | 0.2167 | 0.0002 | 3.6% |
| Benz(k)fluoranthene | 981 | 1220 | 0.0023 | 0.4510 | 0.0005 | 1.0% | 981 | 1220 | 0.0016 | 0.1333 | 0.0001 | 2.2% |
| C2-Chrysenes | 1008 | - | 0.0045 | 0.8824 | 0.0009 | 1.9% | 1008 | - | 0.0007 | 0.0583 | 0.0001 | 0.9% |
| Benz(g,h,i)perylene | 1095 | 648 | 0.0034 | 0.6667 | 0.0006 | 1.3% | 1095 | 648 | 0.00097 | 0.0808 | 0.0001 | 1.2% |
| C3-Chrysenes | 1112 | - | 0.00066 | 0.1294 | 0.0001 | 0.3% | 1112 | - | 0.0007 | 0.0583 | 0.0001 | 0.9% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.0015 | 0.2941 | 0.0003 | 0.6% | 1115 | - | 0.00091 | 0.0758 | 0.0001 | 1.1% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.00073 | 0.1431 | 0.0001 | 0.3% | 1123 | 2389 | 0.0007 | 0.0583 | 0.0001 | 0.8% |
| C4-Chrysenes | 1214 | - | 0.00066 | 0.1294 | 0.0001 | 0.2% | 1214 | - | 0.0007 | 0.0583 | 0.0000 | 0.8% |
| Sum ESBTU_{FCVi} | | | 0.0454 | 100.0% | | | | | | 0.0062 | 100.0% | |
| Sum ESBTU_{FCVi} (2 or 3 Ring PAHs) | | | 0.0300 | 66.0% | | | | | | 0.0030 | 49.2% | |
| Sum ESBTU_{FCVi} (4 Ring PAHs) | | | 0.0102 | 22.5% | | | | | | 0.0017 | 28.1% | |
| Sum ESBTU_{FCVi} (5 or 6 Ring PAHs) | | | 0.0052 | 11.5% | | | | | | 0.0014 | 22.8% | |



Table S-3. Equilibrium Partitioning Sediment Benchmark Calculations: Seasonally-Exposed Sediment
Tennessee Valley Authority Kingston, Tennessee

| Fraction Organic Carbon: | ERM_C06 Seasonally Exposed Sediment | | | | | | ERM_RR01 Seasonally Exposed Sediment | | | | | |
|--|---------------------------------------|---------------------------------------|---|---|---------------------|--|---------------------------------------|---------------------------------------|---|---|---------------------|--|
| | 0.021 | | | | | | 0.0033 | | | | | |
| | C _{OC,PAHi,FCVi} (ug/goc) | C _{OC,PAHi,MAXi} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | ESBTU (unitless) | Percent Contribution to ESBTU (%) | C _{OC,PAHi,FCVi} (ug/goc) | C _{OC,PAHi,MAXi} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | ESBTU (unitless) | Percent Contribution to ESBTU (%) |
| Naphthalene | 385 | 61700 | 0.0088 | 0.4190 | 0.0011 | 2.8% | 385 | 61700 | 0.00061 | 0.1848 | 0.0005 | 3.3% |
| C1-Naphthalenes | 444 | - | 0.021 | 1.0000 | 0.0023 | 5.7% | 444 | - | 0.00061 | 0.1848 | 0.0004 | 2.9% |
| Acenaphthylene | 452 | 24000 | 0.0016 | 0.0762 | 0.0002 | 0.4% | 452 | 24000 | 0.00061 | 0.1848 | 0.0004 | 2.8% |
| Acenaphthene | 491 | 33400 | 0.0016 | 0.0762 | 0.0002 | 0.4% | 491 | 33400 | 0.00061 | 0.1848 | 0.0004 | 2.6% |
| #N/A | 510 | - | 0.045 | 2.1429 | 0.0042 | 10.7% | 510 | - | 0.00091 | 0.2758 | 0.0005 | 3.7% |
| Fluorene | 538 | 26000 | 0.0024 | 0.1143 | 0.0002 | 0.5% | 538 | 26000 | 0.00061 | 0.1848 | 0.0003 | 2.4% |
| C3-Naphthalenes | 581 | - | 0.031 | 1.4762 | 0.0025 | 6.5% | 581 | - | 0.00061 | 0.1848 | 0.0003 | 2.2% |
| Anthracene | 594 | 1300 | 0.0022 | 0.1048 | 0.0002 | 0.4% | 594 | 1300 | 0.00061 | 0.1848 | 0.0003 | 2.2% |
| Phenanthrene | 596 | 34300 | 0.025 | 1.1905 | 0.0020 | 5.1% | 596 | 34300 | 0.0022 | 0.6667 | 0.0011 | 7.7% |
| C1-Fluorenes | 611 | - | 0.0027 | 0.1286 | 0.0002 | 0.5% | 611 | - | 0.00061 | 0.1848 | 0.0003 | 2.1% |
| C4-Naphthalenes | 657 | - | 0.018 | 0.8571 | 0.0013 | 3.3% | 657 | - | 0.00061 | 0.1848 | 0.0003 | 1.9% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.022 | 1.0476 | 0.0016 | 4.0% | 670 | - | 0.00078 | 0.2364 | 0.0004 | 2.4% |
| C2-Fluorenes | 686 | - | 0.0016 | 0.0762 | 0.0001 | 0.3% | 686 | - | 0.00061 | 0.1848 | 0.0003 | 1.9% |
| Pyrene | 697 | 9090 | 0.041 | 1.9524 | 0.0028 | 7.1% | 697 | 9090 | 0.0029 | 0.8788 | 0.0013 | 8.7% |
| Fluoranthene | 707 | 23870 | 0.049 | 2.3333 | 0.0033 | 8.4% | 707 | 23870 | 0.0032 | 0.9697 | 0.0014 | 9.5% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.016 | 0.7619 | 0.0010 | 2.6% | 746 | - | 0.00061 | 0.1848 | 0.0002 | 1.7% |
| C3-Fluorenes | 769 | - | 0.0016 | 0.0762 | 0.0001 | 0.3% | 769 | - | 0.00061 | 0.1848 | 0.0002 | 1.7% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.025 | 1.1905 | 0.0015 | 3.9% | 770 | - | 0.002 | 0.6061 | 0.0008 | 5.4% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.0091 | 0.4333 | 0.0005 | 1.3% | 829 | - | 0.00061 | 0.1848 | 0.0002 | 1.5% |
| Benzo(a)anthracene | 841 | 4153 | 0.019 | 0.9048 | 0.0011 | 2.7% | 841 | 4153 | 0.0013 | 0.3939 | 0.0005 | 3.2% |
| Chrysene | 844 | 826 | 0.027 | 1.2857 | 0.0015 | 3.9% | 844 | 826 | 0.0016 | 0.4848 | 0.0006 | 4.0% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.045 | 2.1429 | 0.0023 | 6.0% | 913 | - | 0.00061 | 0.1848 | 0.0002 | 1.4% |
| C1-Chrysenes | 929 | - | 0.01 | 0.4762 | 0.0005 | 1.3% | 929 | - | 0.00061 | 0.1848 | 0.0002 | 1.4% |
| Benzo(a)Pyrene | 965 | 3840 | 0.021 | 1.0000 | 0.0010 | 2.6% | 965 | 3840 | 0.0015 | 0.4545 | 0.0005 | 3.3% |
| Perylene | 967 | 431 | 0.037 | 1.7619 | 0.0018 | 4.6% | 967 | 431 | 0.00061 | 0.1848 | 0.0002 | 1.3% |
| Benzo(e)pyrene | 967 | 4300 | 0.021 | 1.0000 | 0.0010 | 2.6% | 967 | 4300 | 0.0012 | 0.3636 | 0.0004 | 2.6% |
| Benzo(b)fluoranthene | 979 | 2169 | 0.036 | 1.7143 | 0.0018 | 4.5% | 979 | 2169 | 0.0019 | 0.5758 | 0.0006 | 4.1% |
| Benzo(k)fluoranthene | 981 | 1220 | 0.023 | 1.0952 | 0.0011 | 2.8% | 981 | 1220 | 0.0017 | 0.5152 | 0.0005 | 3.6% |
| C2-Chrysenes | 1008 | - | 0.011 | 0.5238 | 0.0005 | 1.3% | 1008 | - | 0.00061 | 0.1848 | 0.0002 | 1.3% |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.011 | 0.5238 | 0.0005 | 1.2% | 1095 | 648 | 0.001 | 0.3030 | 0.0003 | 1.9% |
| C3-Chrysenes | 1112 | - | 0.0016 | 0.0762 | 0.0001 | 0.2% | 1112 | - | 0.00061 | 0.1848 | 0.0002 | 1.1% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.011 | 0.5238 | 0.0005 | 1.2% | 1115 | - | 0.001 | 0.3030 | 0.0003 | 1.9% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0031 | 0.1476 | 0.0001 | 0.3% | 1123 | 2389 | 0.00061 | 0.1848 | 0.0002 | 1.1% |
| C4-Chrysenes | 1214 | - | 0.0016 | 0.0762 | 0.0001 | 0.2% | 1214 | - | 0.00061 | 0.1848 | 0.0002 | 1.1% |
| Sum ESBTU_{FCVi} | | | 0.0392 | 100.0% | | | | | | 0.0145 | 100.0% | |
| Sum ESBTU_{FCVi} (2 or 3 Ring PAHs) | | | 0.0200 | 50.9% | | | | | | 0.0064 | 44.5% | |
| Sum ESBTU_{FCVi} (4 Ring PAHs) | | | 0.0114 | 29.1% | | | | | | 0.0052 | 35.7% | |
| Sum ESBTU_{FCVi} (5 or 6 Ring PAHs) | | | 0.0078 | 20.0% | | | | | | 0.0029 | 19.8% | |

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Table S-3. Equilibrium Partitioning Sediment Benchmark Calculations: Seasonally-Exposed Sediment
Tennessee Valley Authority Kingston, Tennessee

| Fraction Organic Carbon: | | ERM_RR03 Seasonally Exposed Sediment 0.033 | | | | |
|--|---------------------------------|---|---|---|---------------------|-----------------------------------|
| Polycyclic Aromatic Hydrocarbons | $C_{OC,PAH_i,FCVi}$ (ug/goc) | $C_{OC,PAH_i,MAXi}$ (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | ESBTU (unitless) | Percent Contribution to ESBTU (%) |
| Naphthalene | 385 | 61700 | 0.0039 | 0.1182 | 0.0003 | 1.7% |
| C1-Naphthalenes | 444 | - | 0.011 | 0.3333 | 0.0008 | 4.2% |
| Acenaphthylene | 452 | 24000 | 0.00084 | 0.0255 | 0.0001 | 0.3% |
| Acenaphthene | 491 | 33400 | 0.00084 | 0.0255 | 0.0001 | 0.3% |
| #N/A | 510 | - | 0.028 | 0.8485 | 0.0017 | 9.3% |
| Fluorene | 538 | 26000 | 0.0022 | 0.0667 | 0.0001 | 0.7% |
| C3-Naphthalenes | 581 | - | 0.022 | 0.6667 | 0.0011 | 6.4% |
| Anthracene | 594 | 1300 | 0.0023 | 0.0697 | 0.0001 | 0.7% |
| Phenanthrene | 596 | 34300 | 0.017 | 0.5152 | 0.0009 | 4.9% |
| C1-Fluorennes | 611 | - | 0.002 | 0.0606 | 0.0001 | 0.6% |
| C4-Naphthalenes | 657 | - | 0.013 | 0.3939 | 0.0006 | 3.4% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.015 | 0.4545 | 0.0007 | 3.8% |
| C2-Fluorennes | 686 | - | 0.0044 | 0.1333 | 0.0002 | 1.1% |
| Pyrene | 697 | 9090 | 0.033 | 1.0000 | 0.0014 | 8.1% |
| Fluoranthene | 707 | 23870 | 0.034 | 1.0303 | 0.0015 | 8.2% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.011 | 0.3333 | 0.0004 | 2.5% |
| C3-Fluorennes | 769 | - | 0.0026 | 0.0788 | 0.0001 | 0.6% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.023 | 0.6970 | 0.0009 | 5.1% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.005 | 0.1515 | 0.0002 | 1.0% |
| Benzo(a)anthracene | 841 | 4153 | 0.016 | 0.4848 | 0.0006 | 3.2% |
| Chrysene | 844 | 826 | 0.019 | 0.5758 | 0.0007 | 3.8% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.025 | 0.7576 | 0.0008 | 4.7% |
| C1-Chrysenes | 929 | - | 0.0084 | 0.2545 | 0.0003 | 1.5% |
| Benzo(a)Pyrene | 965 | 3840 | 0.016 | 0.4848 | 0.0005 | 2.8% |
| Perylene | 967 | 431 | 0.041 | 1.2424 | 0.0013 | 7.2% |
| Benzo(e)pyrene | 967 | 4300 | 0.015 | 0.4545 | 0.0005 | 2.6% |
| Benzo(b)fluoranthene | 979 | 2169 | 0.028 | 0.8485 | 0.0009 | 4.9% |
| Benzo(k)fluoranthene | 981 | 1220 | 0.017 | 0.5152 | 0.0005 | 3.0% |
| C2-Chrysenes | 1008 | - | 0.0045 | 0.1364 | 0.0001 | 0.8% |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.0065 | 0.1970 | 0.0002 | 1.0% |
| C3-Chrysenes | 1112 | - | 0.00084 | 0.0255 | 0.0000 | 0.1% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.0068 | 0.2061 | 0.0002 | 1.0% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0022 | 0.0667 | 0.0001 | 0.3% |
| C4-Chrysenes | 1214 | - | 0.00084 | 0.0255 | 0.0000 | 0.1% |
| Sum ESBTU _{FCVi} | | | | 0.0178 | 100.0% | |
| Sum ESBTU _{FCVi} (2 or 3 Ring PAHs) | | | | 0.0082 | 46.2% | |
| Sum ESBTU _{FCVi} (4 Ring PAHs) | | | | 0.0055 | 31.0% | |
| Sum ESBTU _{FCVi} (5 or 6 Ring PAHs) | | | | 0.0041 | 22.9% | |

Notes:

PAH = Polycyclic aromatic hydrocarbons.

ug/goc = Micrograms per grams organic carbon.

ug/g = Micrograms per gram sediment.

% = Percent.

 $C_{OC,PAH_i,FCVi}$ = Critical concentration of a PAH in sediment related to the final chronic value (FCV). $C_{OC,PAH_i,MAXi}$ = Aqueous solubility of a given PAH.ESBTU = Ratio of the organic carbon-normalized sediment concentration to the critical concentration ($C_{OC,PAH_i,FCVi}$) of each PAH.Sum ESBTU_{FCVi} = Sum total of ESBTU_{FCVi} for 34 PAHs. ESBTU_{FCVi} for each PAH represents the organic-carbon normalized sediment concentration divideddivided by the critical concentration of each PAH in sediment ($C_{OC,PAH_i,FCVi}$). ESBTU_{FCVi} were also calculated specifically for 2 or 3 ring PAHs, 4 ring PAHs and

5 or 6 ring PAHs.



Table S-4. Equilibrium Partitioning Sediment Benchmark Calculations: Submerged Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | ERM_A21 Submerged Sediment 0.017 | | | | | | ERM_A23 Submerged Sediment 0.022 | | | | | | | |
|---|--|---------------------------|---------------------------|---|---|-------------------------------------|-------------------------------------|---------------------------|---|---|-------------------------------------|---------------|------------|-----|
| | Polycyclic Aromatic Hydrocarbons | C _{OC,PAHi,FCVi} | C _{OC,PAHi,MAXi} | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | C _{OC,PAHi,FCVi} | C _{OC,PAHi,MAXi} | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | | | |
| | | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) | | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) |
| Naphthalene | | 385 | 61700 | 0.0047 | 0.2765 | 0.0007 | 3.2% | 385 | 61700 | 0.0039 | 0.1773 | 0.0005 | 2.5% | |
| C1-Naphthalenes | | 444 | - | 0.01 | 0.5882 | 0.0013 | 5.9% | 444 | - | 0.0086 | 0.3909 | 0.0009 | 4.9% | |
| Acenaphthylene | | 452 | 24000 | 0.0009 | 0.0529 | 0.0001 | 0.5% | 452 | 24000 | 0.00098 | 0.0445 | 0.0001 | 0.5% | |
| Acenaphthene | | 491 | 33400 | 0.00097 | 0.0571 | 0.0001 | 0.5% | 491 | 33400 | 0.00098 | 0.0445 | 0.0001 | 0.5% | |
| C2-naphthalenes | | 510 | - | 0.024 | 1.4118 | 0.0028 | 12.3% | 510 | - | 0.021 | 0.9545 | 0.0019 | 10.3% | |
| Fluorene | | 538 | 26000 | 0.0014 | 0.0824 | 0.0002 | 0.7% | 538 | 26000 | 0.0019 | 0.0864 | 0.0002 | 0.9% | |
| C3-Naphthalenes | | 581 | - | 0.019 | 1.1176 | 0.0019 | 8.6% | 581 | - | 0.018 | 0.8182 | 0.0014 | 7.8% | |
| Anthracene | | 594 | 1300 | 0.0013 | 0.0765 | 0.0001 | 0.6% | 594 | 1300 | 0.0068 | 0.3091 | 0.0005 | 2.9% | |
| Phenanthrene | | 596 | 34300 | 0.0097 | 0.5706 | 0.0010 | 4.3% | 596 | 34300 | 0.0099 | 0.4500 | 0.0008 | 4.2% | |
| C1-Fluorenes | | 611 | - | 0.0015 | 0.0882 | 0.0001 | 0.6% | 611 | - | 0.0012 | 0.0545 | 0.0001 | 0.5% | |
| C4-Naphthalenes | | 657 | - | 0.011 | 0.6471 | 0.0010 | 4.4% | 657 | - | 0.0095 | 0.4318 | 0.0007 | 3.6% | |
| C1-Phenanthrenes/Anthracenes | | 670 | - | 0.01 | 0.5882 | 0.0009 | 3.9% | 670 | - | 0.0094 | 0.4273 | 0.0006 | 3.5% | |
| C2-Fluorenes | | 686 | - | 0.003 | 0.1765 | 0.0003 | 1.1% | 686 | - | 0.0027 | 0.1227 | 0.0002 | 1.0% | |
| Pyrene | | 697 | 9090 | 0.02 | 1.1765 | 0.0017 | 7.5% | 697 | 9090 | 0.017 | 0.7727 | 0.0011 | 6.1% | |
| Fluoranthene | | 707 | 23870 | 0.019 | 1.1176 | 0.0016 | 7.0% | 707 | 23870 | 0.017 | 0.7727 | 0.0011 | 6.0% | |
| C2-Phenanthrenes/Anthracenes | | 746 | - | 0.0078 | 0.4588 | 0.0006 | 2.7% | 746 | - | 0.0072 | 0.3273 | 0.0004 | 2.4% | |
| C3-Fluorenes | | 769 | - | 0.0022 | 0.1294 | 0.0002 | 0.7% | 769 | - | 0.0024 | 0.1091 | 0.0001 | 0.8% | |
| C1-Fluoranthenes/Pyrenes | | 770 | - | 0.014 | 0.8235 | 0.0011 | 4.8% | 770 | - | 0.013 | 0.5909 | 0.0008 | 4.2% | |
| C3-Phenanthrenes/Anthracenes | | 829 | - | 0.0037 | 0.2176 | 0.0003 | 1.2% | 829 | - | 0.0039 | 0.1773 | 0.0002 | 1.2% | |
| Benzo(a)anthracene | | 841 | 4153 | 0.01 | 0.5882 | 0.0007 | 3.1% | 841 | 4153 | 0.008 | 0.3636 | 0.0004 | 2.4% | |
| Chrysene | | 844 | 826 | 0.011 | 0.6471 | 0.0008 | 3.4% | 844 | 826 | 0.01 | 0.4545 | 0.0005 | 3.0% | |
| C4-Phenanthrenes/Anthracenes | | 913 | - | 0.0068 | 0.4000 | 0.0004 | 1.9% | 913 | - | 0.038 | 1.7273 | 0.0019 | 10.5% | |
| C1-Chrysenes | | 929 | - | 0.0056 | 0.3294 | 0.0004 | 1.6% | 929 | - | 0.012 | 0.5455 | 0.0006 | 3.2% | |
| Benzo(a)Pyrene | | 965 | 3840 | 0.011 | 0.6471 | 0.0007 | 3.0% | 965 | 3840 | 0.0089 | 0.4045 | 0.0004 | 2.3% | |
| Perylene | | 967 | 431 | 0.0084 | 0.4941 | 0.0005 | 2.3% | 967 | 431 | 0.0097 | 0.4409 | 0.0005 | 2.5% | |
| Benzo(e)pyrene | | 967 | 4300 | 0.0095 | 0.5588 | 0.0006 | 2.6% | 967 | 4300 | 0.0089 | 0.4045 | 0.0004 | 2.3% | |
| Benzo(b)fluoranthene | | 979 | 2169 | 0.015 | 0.8824 | 0.0009 | 4.0% | 979 | 2169 | 0.014 | 0.6364 | 0.0007 | 3.6% | |
| Benzo(k)fluoranthene | | 981 | 1220 | 0.012 | 0.7059 | 0.0007 | 3.2% | 981 | 1220 | 0.0096 | 0.4364 | 0.0004 | 2.5% | |
| C2-Chrysenes | | 1008 | - | 0.0053 | 0.3118 | 0.0003 | 1.4% | 1008 | - | 0.0029 | 0.1318 | 0.0001 | 0.7% | |
| Benzo(g,h,i)perylene | | 1095 | 648 | 0.0048 | 0.2824 | 0.0003 | 1.1% | 1095 | 648 | 0.0053 | 0.2409 | 0.0002 | 1.2% | |
| C3-Chrysenes | | 1112 | - | 0.0009 | 0.0529 | 0.0000 | 0.2% | 1112 | - | 0.00098 | 0.0445 | 0.0000 | 0.2% | |
| Indeno(1,2,3-cd)pyrene | | 1115 | - | 0.0046 | 0.2706 | 0.0002 | 1.1% | 1115 | - | 0.0049 | 0.2227 | 0.0002 | 1.1% | |
| Dibenz(a,h)anthracene | | 1123 | 2389 | 0.0015 | 0.0882 | 0.0001 | 0.3% | 1123 | 2389 | 0.0016 | 0.0727 | 0.0001 | 0.4% | |
| C4-Chrysenes | | 1214 | - | 0.0009 | 0.0529 | 0.0000 | 0.2% | 1214 | - | 0.00098 | 0.0445 | 0.0000 | 0.2% | |
| Sum ESBTU_{FCVi} | | | | | 0.0225 | 100.0% | | | | | 0.0181 | 100.0% | | |
| Sum ESBTU_{FCVi} (2 or 3 Ring PAHs) | | | | | 0.0120 | 53.2% | | | | | 0.0105 | 58.0% | | |
| Sum ESBTU_{FCVi} (4 Ring PAHs) | | | | | 0.0066 | 29.2% | | | | | 0.0047 | 26.2% | | |
| Sum ESBTU_{FCVi} (5 or 6 Ring PAHs) | | | | | 0.0040 | 17.6% | | | | | 0.0029 | 15.9% | | |



Table S-4. Equilibrium Partitioning Sediment Benchmark Calculations: Submerged Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | ERM_A40 Submerged Sediment 0.024 | | | | | | ERM_B11 Submerged Sediment 0.019 | | | | | | |
|---|-------------------------------------|----------|-----------------------------------|---|-------------------------------|-------|--|----------|-----------------------------------|---|-------------------------------|---------------|-------|
| | Polycyclic Aromatic Hydrocarbons | | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | ESBTU | C _{OC,PAHi,FCVi} C _{OC,PAHi,MAX} | | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | ESBTU | |
| | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) | | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) |
| Naphthalene | 385 | 61700 | 0.018 | 0.7500 | 0.0019 | 4.0% | | 385 | 61700 | 0.012 | 0.6316 | 0.0016 | 2.6% |
| C1-Naphthalenes | 444 | - | 0.039 | 1.6250 | 0.0037 | 7.6% | | 444 | - | 0.033 | 1.7368 | 0.0039 | 6.2% |
| Acenaphthylene | 452 | 24000 | 0.0017 | 0.0708 | 0.0002 | 0.3% | | 452 | 24000 | 0.0015 | 0.0789 | 0.0002 | 0.3% |
| Acenaphthene | 491 | 33400 | 0.0021 | 0.0875 | 0.0002 | 0.4% | | 491 | 33400 | 0.0011 | 0.0579 | 0.0001 | 0.2% |
| #N/A | 510 | - | 0.084 | 3.5000 | 0.0069 | 14.2% | | 510 | - | 0.074 | 3.8947 | 0.0076 | 12.2% |
| Fluorene | 538 | 26000 | 0.0035 | 0.1458 | 0.0003 | 0.6% | | 538 | 26000 | 0.0035 | 0.1842 | 0.0003 | 0.5% |
| C3-Naphthalenes | 581 | - | 0.06 | 2.5000 | 0.0043 | 8.9% | | 581 | - | 0.052 | 2.7368 | 0.0047 | 7.5% |
| Anthracene | 594 | 1300 | 0.0031 | 0.1292 | 0.0002 | 0.4% | | 594 | 1300 | 0.0028 | 0.1474 | 0.0002 | 0.4% |
| Phenanthrene | 596 | 34300 | 0.031 | 1.2917 | 0.0022 | 4.5% | | 596 | 34300 | 0.024 | 1.2632 | 0.0021 | 3.4% |
| C1-Fluorenes | 611 | - | 0.0049 | 0.2042 | 0.0003 | 0.7% | | 611 | - | 0.0041 | 0.2158 | 0.0004 | 0.6% |
| C4-Naphthalenes | 657 | - | 0.038 | 1.5833 | 0.0024 | 5.0% | | 657 | - | 0.032 | 1.6842 | 0.0026 | 4.1% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.035 | 1.4583 | 0.0022 | 4.5% | | 670 | - | 0.039 | 2.0526 | 0.0031 | 4.9% |
| C2-Fluorenes | 686 | - | 0.013 | 0.5417 | 0.0008 | 1.6% | | 686 | - | 0.0093 | 0.4895 | 0.0007 | 1.1% |
| Pyrene | 697 | 9090 | 0.054 | 2.2500 | 0.0032 | 6.7% | | 697 | 9090 | 0.037 | 1.9474 | 0.0028 | 4.5% |
| Fluoranthene | 707 | 23870 | 0.054 | 2.2500 | 0.0032 | 6.6% | | 707 | 23870 | 0.047 | 2.4737 | 0.0035 | 5.6% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.024 | 1.0000 | 0.0013 | 2.8% | | 746 | - | 0.022 | 1.1579 | 0.0016 | 2.5% |
| C3-Fluorenes | 769 | - | 0.0097 | 0.4042 | 0.0005 | 1.1% | | 769 | - | 0.0085 | 0.4474 | 0.0006 | 0.9% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.037 | 1.5417 | 0.0020 | 4.1% | | 770 | - | 0.035 | 1.8421 | 0.0024 | 3.8% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.012 | 0.5000 | 0.0006 | 1.2% | | 829 | - | 0.01 | 0.5263 | 0.0006 | 1.0% |
| Benzo(a)anthracene | 841 | 4153 | 0.021 | 0.8750 | 0.0010 | 2.1% | | 841 | 4153 | 0.02 | 1.0526 | 0.0013 | 2.0% |
| Chrysene | 844 | 826 | 0.027 | 1.1250 | 0.0013 | 2.8% | | 844 | 826 | 0.027 | 1.4211 | 0.0017 | 2.7% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.019 | 0.7917 | 0.0009 | 1.8% | | 913 | - | 0.015 | 0.7895 | 0.0009 | 1.4% |
| C1-Chrysenes | 929 | - | 0.027 | 1.1250 | 0.0012 | 2.5% | | 929 | - | 0.011 | 0.5789 | 0.0006 | 1.0% |
| Benzo(a)Pyrene | 965 | 3840 | 0.02 | 0.8333 | 0.0009 | 1.8% | | 965 | 3840 | 0.022 | 1.1579 | 0.0012 | 1.9% |
| Perylene | 967 | 431 | 0.036 | 1.5000 | 0.0016 | 3.2% | | 967 | 431 | 0.21 | 11.0526 | 0.0114 | 18.2% |
| Benzo(e)pyrene | 967 | 4300 | 0.023 | 0.9583 | 0.0010 | 2.0% | | 967 | 4300 | 0.021 | 1.1053 | 0.0011 | 1.8% |
| Benzo(b)fluoranthene | 979 | 2169 | 0.038 | 1.5833 | 0.0016 | 3.3% | | 979 | 2169 | 0.03 | 1.5789 | 0.0016 | 2.6% |
| Benzo(k)fluoranthene | 981 | 1220 | 0.027 | 1.1250 | 0.0011 | 2.4% | | 981 | 1220 | 0.025 | 1.3158 | 0.0013 | 2.1% |
| C2-Chrysenes | 1008 | - | 0.013 | 0.5417 | 0.0005 | 1.1% | | 1008 | - | 0.015 | 0.7895 | 0.0008 | 1.2% |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.068 | 0.2833 | 0.0003 | 0.5% | | 1095 | 648 | 0.011 | 0.5789 | 0.0005 | 0.8% |
| C3-Chrysenes | 1112 | - | 0.0062 | 0.2583 | 0.0002 | 0.5% | | 1112 | - | 0.0084 | 0.4421 | 0.0004 | 0.6% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.0065 | 0.2708 | 0.0002 | 0.5% | | 1115 | - | 0.0099 | 0.5211 | 0.0005 | 0.7% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0024 | 0.1000 | 0.0001 | 0.2% | | 1123 | 2389 | 0.0032 | 0.1684 | 0.0001 | 0.2% |
| C4-Chrysenes | 1214 | - | 0.0019 | 0.0792 | 0.0001 | 0.1% | | 1214 | - | 0.0036 | 0.1895 | 0.0002 | 0.2% |
| Sum ESBTU_{FCVi} | | | | 0.0484 | 100.0% | | | | | | 0.0627 | 100.0% | |
| Sum ESBTU_{FCVi} (2 or 3 Ring PAHs) | | | | 0.0288 | 59.5% | | | | | | 0.0312 | 49.8% | |
| Sum ESBTU_{FCVi} (4 Ring PAHs) | | | | 0.0128 | 26.5% | | | | | | 0.0136 | 21.7% | |
| Sum ESBTU_{FCVi} (5 or 6 Ring PAHs) | | | | 0.0068 | 14.0% | | | | | | 0.0179 | 28.5% | |



Table S-4. Equilibrium Partitioning Sediment Benchmark Calculations: Submerged Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | ERM_B16 Submerged Sediment 0.023 | | | | | | ERM_B28 Submerged Sediment 0.021 | | | | | | | |
|---|-------------------------------------|--------------------------|-----------------------------------|---|-------------------------------|------------|-------------------------------------|---------------------------|-----------------------------------|---|-------------------------------|---------------|------------|-----|
| | Polycyclic Aromatic Hydrocarbons | | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | ESBTU | | | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | ESBTU | | |
| | C _{OC,PAHi,FCVi} | C _{OC,PAHi,MAX} | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) | C _{OC,PAHi,FCVi} | C _{OC,PAHi,MAX} | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) |
| Naphthalene | 385 | 61700 | 0.013 | 0.5652 | 0.0015 | 2.7% | | 385 | 61700 | 0.01 | 0.4762 | 0.0012 | 3.1% | |
| C1-Naphthalenes | 444 | - | 0.033 | 1.4348 | 0.0032 | 6.0% | | 444 | - | 0.025 | 1.1905 | 0.0027 | 6.8% | |
| Acenaphthylene | 452 | 24000 | 0.0017 | 0.0739 | 0.0002 | 0.3% | | 452 | 24000 | 0.0013 | 0.0619 | 0.0001 | 0.3% | |
| Acenaphthene | 491 | 33400 | 0.0012 | 0.0522 | 0.0001 | 0.2% | | 491 | 33400 | 0.0011 | 0.0524 | 0.0001 | 0.3% | |
| #N/A | 510 | - | 0.076 | 3.3043 | 0.0065 | 12.1% | | 510 | - | 0.054 | 2.5714 | 0.0050 | 12.8% | |
| Fluorene | 538 | 26000 | 0.0036 | 0.1565 | 0.0003 | 0.5% | | 538 | 26000 | 0.0024 | 0.1143 | 0.0002 | 0.5% | |
| C3-Naphthalenes | 581 | - | 0.055 | 2.3913 | 0.0041 | 7.7% | | 581 | - | 0.039 | 1.8571 | 0.0032 | 8.1% | |
| Anthracene | 594 | 1300 | 0.0032 | 0.1391 | 0.0002 | 0.4% | | 594 | 1300 | 0.0036 | 0.1714 | 0.0003 | 0.7% | |
| Phenanthrene | 596 | 34300 | 0.023 | 1.0000 | 0.0017 | 3.1% | | 596 | 34300 | 0.022 | 1.0476 | 0.0018 | 4.5% | |
| C1-Fluorenes | 611 | - | 0.0044 | 0.1913 | 0.0003 | 0.6% | | 611 | - | 0.0031 | 0.1476 | 0.0002 | 0.6% | |
| C4-Naphthalenes | 657 | - | 0.034 | 1.4783 | 0.0023 | 4.2% | | 657 | - | 0.024 | 1.1429 | 0.0017 | 4.4% | |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.034 | 1.4783 | 0.0022 | 4.1% | | 670 | - | 0.029 | 1.3810 | 0.0021 | 5.2% | |
| C2-Fluorenes | 686 | - | 0.0096 | 0.4174 | 0.0006 | 1.1% | | 686 | - | 0.0075 | 0.3571 | 0.0005 | 1.3% | |
| Pyrene | 697 | 9090 | 0.035 | 1.5217 | 0.0022 | 4.1% | | 697 | 9090 | 0.032 | 1.5238 | 0.0022 | 5.5% | |
| Fluoranthene | 707 | 23870 | 0.047 | 2.0435 | 0.0029 | 5.4% | | 707 | 23870 | 0.043 | 2.0476 | 0.0029 | 7.3% | |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.022 | 0.9565 | 0.0013 | 2.4% | | 746 | - | 0.015 | 0.7143 | 0.0010 | 2.4% | |
| C3-Fluorenes | 769 | - | 0.0077 | 0.3348 | 0.0004 | 0.8% | | 769 | - | 0.0073 | 0.3476 | 0.0005 | 1.1% | |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.036 | 1.5652 | 0.0020 | 3.8% | | 770 | - | 0.026 | 1.2381 | 0.0016 | 4.1% | |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.011 | 0.4783 | 0.0006 | 1.1% | | 829 | - | 0.0079 | 0.3762 | 0.0005 | 1.2% | |
| Benz(a)anthracene | 841 | 4153 | 0.021 | 0.9130 | 0.0011 | 2.0% | | 841 | 4153 | 0.017 | 0.8095 | 0.0010 | 2.4% | |
| Chrysene | 844 | 826 | 0.028 | 1.2174 | 0.0014 | 2.7% | | 844 | 826 | 0.023 | 1.0952 | 0.0013 | 3.3% | |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.012 | 0.5217 | 0.0006 | 1.1% | | 913 | - | 0.026 | 1.2381 | 0.0014 | 3.4% | |
| C1-Chrysenes | 929 | - | 0.021 | 0.9130 | 0.0010 | 1.8% | | 929 | - | 0.0079 | 0.3762 | 0.0004 | 1.0% | |
| Benzo(a)Pyrene | 965 | 3840 | 0.021 | 0.9130 | 0.0009 | 1.8% | | 965 | 3840 | 0.018 | 0.8571 | 0.0009 | 2.3% | |
| Perylene | 967 | 431 | 0.24 | 10.4348 | 0.0108 | 20.1% | | 967 | 431 | 0.039 | 1.8571 | 0.0019 | 4.9% | |
| Benzo(e)pyrene | 967 | 4300 | 0.021 | 0.9130 | 0.0009 | 1.8% | | 967 | 4300 | 0.018 | 0.8571 | 0.0009 | 2.2% | |
| Benzo(b)fluoranthene | 979 | 2169 | 0.029 | 1.2609 | 0.0013 | 2.4% | | 979 | 2169 | 0.026 | 1.2381 | 0.0013 | 3.2% | |
| Benzo(k)fluoranthene | 981 | 1220 | 0.025 | 1.0870 | 0.0011 | 2.1% | | 981 | 1220 | 0.022 | 1.0476 | 0.0011 | 2.7% | |
| C2-Chrysenes | 1008 | - | 0.015 | 0.6522 | 0.0006 | 1.2% | | 1008 | - | 0.011 | 0.5238 | 0.0005 | 1.3% | |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.01 | 0.4348 | 0.0004 | 0.7% | | 1095 | 648 | 0.0085 | 0.4048 | 0.0004 | 0.9% | |
| C3-Chrysenes | 1112 | - | 0.0085 | 0.3696 | 0.0003 | 0.6% | | 1112 | - | 0.0053 | 0.2524 | 0.0002 | 0.6% | |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.0091 | 0.3957 | 0.0004 | 0.7% | | 1115 | - | 0.0075 | 0.3571 | 0.0003 | 0.8% | |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0032 | 0.1391 | 0.0001 | 0.2% | | 1123 | 2389 | 0.0027 | 0.1286 | 0.0001 | 0.3% | |
| C4-Chrysenes | 1214 | - | 0.0039 | 0.1696 | 0.0001 | 0.3% | | 1214 | - | 0.001 | 0.0476 | 0.0000 | 0.1% | |
| Sum ESBTU_{FCVi} | | | | 0.0537 | 100.0% | | | | | | 0.0394 | 100.0% | | |
| Sum ESBTU_{FCVi} (2 or 3 Ring PAHs) | | | | 0.0260 | 48.4% | | | | | | 0.0224 | 56.9% | | |
| Sum ESBTU_{FCVi} (4 Ring PAHs) | | | | 0.0117 | 21.9% | | | | | | 0.0101 | 25.7% | | |
| Sum ESBTU_{FCVi} (5 or 6 Ring PAHs) | | | | 0.0160 | 29.7% | | | | | | 0.0068 | 17.3% | | |



Table S-4. Equilibrium Partitioning Sediment Benchmark Calculations: Submerged Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | ERM_B32 Submerged Sediment 0.0048 | | | | | | ERM_C10 Submerged Sediment 0.016 | | | | | |
|---|--------------------------------------|----------|-----------------------------------|---|-------------------------------|-------|-------------------------------------|----------|--------------------------|-----------------------------------|---|-------------------------------|
| | Polycyclic Aromatic Hydrocarbons | | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | ESBTU | C _{OC,PAHi,FCVi} | | C _{OC,PAHi,MAX} | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU |
| | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) |
| Naphthalene | 385 | 61700 | 0.0044 | 0.9167 | 0.0024 | 6.2% | 385 | 61700 | 0.011 | 0.6875 | 0.0018 | 3.8% |
| C1-Naphthalenes | 444 | - | 0.0089 | 1.8542 | 0.0042 | 10.8% | 444 | - | 0.027 | 1.6875 | 0.0038 | 8.0% |
| Acenaphthylene | 452 | 24000 | R | R | 0.0% | | 452 | 24000 | 0.0023 | 0.1438 | 0.0003 | 0.7% |
| Acenaphthene | 491 | 33400 | R | R | 0.0% | | 491 | 33400 | 0.0023 | 0.1438 | 0.0003 | 0.6% |
| #N/A | 510 | - | 0.028 | 5.8333 | 0.0114 | 29.6% | 510 | - | 0.07 | 4.3750 | 0.0086 | 18.1% |
| Fluorene | 538 | 26000 | R | R | 0.0% | | 538 | 26000 | 0.0026 | 0.1625 | 0.0003 | 0.6% |
| C3-Naphthalenes | 581 | - | 0.025 | 5.2083 | 0.0090 | 23.2% | 581 | - | 0.061 | 3.8125 | 0.0066 | 13.8% |
| Anthracene | 594 | 1300 | R | R | 0.0% | | 594 | 1300 | 0.0023 | 0.1438 | 0.0002 | 0.5% |
| Phenanthrene | 596 | 34300 | 0.0015 | 0.3125 | 0.0005 | 1.4% | 596 | 34300 | 0.015 | 0.9375 | 0.0016 | 3.3% |
| C1-Fluorenes | 611 | - | 0.0011 | 0.2292 | 0.0004 | 1.0% | 611 | - | 0.004 | 0.2500 | 0.0004 | 0.9% |
| C4-Naphthalenes | 657 | - | 0.018 | 3.7500 | 0.0057 | 14.8% | 657 | - | 0.041 | 2.5625 | 0.0039 | 8.2% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.0037 | 0.7708 | 0.0012 | 3.0% | 670 | - | 0.031 | 1.9375 | 0.0029 | 6.1% |
| C2-Fluorennes | 686 | - | 0.0025 | 0.5208 | 0.0008 | 2.0% | 686 | - | 0.0023 | 0.1438 | 0.0002 | 0.4% |
| Pyrene | 697 | 9090 | R | R | 0.0% | | 697 | 9090 | 0.018 | 1.1250 | 0.0016 | 3.4% |
| Fluoranthene | 707 | 23870 | R | R | 0.0% | | 707 | 23870 | 0.022 | 1.3750 | 0.0019 | 4.1% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.0033 | 0.6875 | 0.0009 | 2.4% | 746 | - | 0.021 | 1.3125 | 0.0018 | 3.7% |
| C3-Fluorennes | 769 | - | 0.0033 | 0.6875 | 0.0009 | 2.3% | 769 | - | 0.0023 | 0.1438 | 0.0002 | 0.4% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.00094 | 0.1958 | 0.0003 | 0.7% | 770 | - | 0.019 | 1.1875 | 0.0015 | 3.3% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.0022 | 0.4583 | 0.0006 | 1.4% | 829 | - | 0.013 | 0.8125 | 0.0010 | 2.1% |
| Benz(a)anthracene | 841 | 4153 | R | R | 0.0% | | 841 | 4153 | 0.0066 | 0.4125 | 0.0005 | 1.0% |
| Chrysene | 844 | 826 | R | R | 0.0% | | 844 | 826 | 0.0092 | 0.5750 | 0.0007 | 1.4% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.0022 | 0.4583 | 0.0005 | 1.3% | 913 | - | 0.017 | 1.0625 | 0.0012 | 2.5% |
| C1-Chrysenes | 929 | - | R | R | 0.0% | | 929 | - | 0.018 | 1.1250 | 0.0012 | 2.6% |
| Benz(a)Pyrene | 965 | 3840 | R | R | 0.0% | | 965 | 3840 | 0.0041 | 0.2563 | 0.0003 | 0.6% |
| Perylene | 967 | 431 | R | R | 0.0% | | 967 | 431 | 0.036 | 2.2500 | 0.0023 | 4.9% |
| Benzo(e)pyrene | 967 | 4300 | R | R | 0.0% | | 967 | 4300 | 0.0071 | 0.4438 | 0.0005 | 1.0% |
| Benzo(b)fluoranthene | 979 | 2169 | R | R | 0.0% | | 979 | 2169 | 0.0087 | 0.5438 | 0.0006 | 1.2% |
| Benzo(k)fluoranthene | 981 | 1220 | R | R | 0.0% | | 981 | 1220 | 0.0054 | 0.3375 | 0.0003 | 0.7% |
| C2-Chrysenes | 1008 | - | R | R | 0.0% | | 1008 | - | 0.0053 | 0.3313 | 0.0003 | 0.7% |
| Benzo(g,h,i)perylene | 1095 | 648 | R | R | 0.0% | | 1095 | 648 | 0.0036 | 0.2250 | 0.0002 | 0.4% |
| C3-Chrysenes | 1112 | - | R | R | 0.0% | | 1112 | - | 0.0023 | 0.1438 | 0.0001 | 0.3% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | R | R | 0.0% | | 1115 | - | 0.0024 | 0.1500 | 0.0001 | 0.3% |
| Dibenz(a,h)anthracene | 1123 | 2389 | R | R | 0.0% | | 1123 | 2389 | 0.0023 | 0.1438 | 0.0001 | 0.3% |
| C4-Chrysenes | 1214 | - | R | R | 0.0% | | 1214 | - | 0.0023 | 0.1438 | 0.0001 | 0.2% |
| Sum ESBTU_{FCVi} | | | | 0.0386 | 100.0% | | | | | 0.0474 | 100.0% | |
| Sum ESBTU_{FCVi} (2 or 3 Ring PAHs) | | | | 0.0383 | 99.3% | | | | | 0.0350 | 73.7% | |
| Sum ESBTU_{FCVi} (4 Ring PAHs) | | | | 0.0003 | 0.7% | | | | | 0.0081 | 17.0% | |
| Sum ESBTU_{FCVi} (5 or 6 Ring PAHs) | | | | 0.0000 | 0.0% | | | | | 0.0044 | 9.3% | |



Table S-4. Equilibrium Partitioning Sediment Benchmark Calculations: Submerged Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | ERM_C21 Submerged Sediment 0.033 | | | | | | ERM_C29 Submerged Sediment 0.027 | | | | | |
|---|-------------------------------------|----------|-----------------------------------|---|-------------------------------|-------|-------------------------------------|----------|--------------------------|-----------------------------------|---|-------------------------------|
| | Polycyclic Aromatic Hydrocarbons | | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | ESBTU | C _{OC,PAHi,FCVI} | | C _{OC,PAHi,MAX} | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU |
| | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) |
| Naphthalene | 385 | 61700 | 0.0094 | 0.2848 | 0.0007 | 1.8% | 385 | 61700 | 0.0096 | 0.3556 | 0.0009 | 2.4% |
| C1-Naphthalenes | 444 | - | 0.025 | 0.7576 | 0.0017 | 4.1% | 444 | - | 0.024 | 0.8889 | 0.0020 | 5.1% |
| Acenaphthylene | 452 | 24000 | 0.0028 | 0.0848 | 0.0002 | 0.5% | 452 | 24000 | 0.0014 | 0.0519 | 0.0001 | 0.3% |
| Acenaphthene | 491 | 33400 | 0.0014 | 0.0424 | 0.0001 | 0.2% | 491 | 33400 | 0.0014 | 0.0519 | 0.0001 | 0.3% |
| #N/A | 510 | - | 0.056 | 1.6970 | 0.0033 | 8.1% | 510 | - | 0.049 | 1.8148 | 0.0036 | 9.1% |
| Fluorene | 538 | 26000 | 0.004 | 0.1212 | 0.0002 | 0.5% | 538 | 26000 | 0.0029 | 0.1074 | 0.0002 | 0.5% |
| C3-Naphthalenes | 581 | - | 0.042 | 1.2727 | 0.0022 | 5.3% | 581 | - | 0.034 | 1.2593 | 0.0022 | 5.6% |
| Anthracene | 594 | 1300 | 0.0081 | 0.2455 | 0.0004 | 1.0% | 594 | 1300 | 0.0027 | 0.1000 | 0.0002 | 0.4% |
| Phenanthrene | 596 | 34300 | 0.034 | 1.0303 | 0.0017 | 4.2% | 596 | 34300 | 0.017 | 0.6296 | 0.0011 | 2.7% |
| C1-Fluorenes | 611 | - | 0.0043 | 0.1303 | 0.0002 | 0.5% | 611 | - | 0.0032 | 0.1185 | 0.0002 | 0.5% |
| C4-Naphthalenes | 657 | - | 0.026 | 0.7879 | 0.0012 | 2.9% | 657 | - | 0.019 | 0.7037 | 0.0011 | 2.7% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.035 | 1.0606 | 0.0016 | 3.8% | 670 | - | 0.022 | 0.8148 | 0.0012 | 3.1% |
| C2-Fluorenes | 686 | - | 0.008 | 0.2424 | 0.0004 | 0.9% | 686 | - | 0.0071 | 0.2630 | 0.0004 | 1.0% |
| Pyrene | 697 | 9090 | 0.067 | 2.0303 | 0.0029 | 7.1% | 697 | 9090 | 0.032 | 1.1852 | 0.0017 | 4.4% |
| Fluoranthene | 707 | 23870 | 0.092 | 2.7879 | 0.0039 | 9.6% | 707 | 23870 | 0.039 | 1.4444 | 0.0020 | 5.2% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.023 | 0.6970 | 0.0009 | 2.3% | 746 | - | 0.015 | 0.5556 | 0.0007 | 1.9% |
| C3-Fluorenes | 769 | - | 0.0071 | 0.2152 | 0.0003 | 0.7% | 769 | - | 0.0065 | 0.2407 | 0.0003 | 0.8% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.055 | 1.6667 | 0.0022 | 5.3% | 770 | - | 0.029 | 1.0741 | 0.0014 | 3.6% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.01 | 0.3030 | 0.0004 | 0.9% | 829 | - | 0.0074 | 0.2741 | 0.0003 | 0.8% |
| Benzo(a)anthracene | 841 | 4153 | 0.049 | 1.4848 | 0.0018 | 4.3% | 841 | 4153 | 0.017 | 0.6296 | 0.0007 | 1.9% |
| Chrysene | 844 | 826 | 0.051 | 1.5455 | 0.0018 | 4.4% | 844 | 826 | 0.023 | 0.8519 | 0.0010 | 2.6% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.02 | 0.6061 | 0.0007 | 1.6% | 913 | - | 0.0094 | 0.3481 | 0.0004 | 1.0% |
| C1-Chrysenes | 929 | - | 0.016 | 0.4848 | 0.0005 | 1.3% | 929 | - | 0.014 | 0.5185 | 0.0006 | 1.4% |
| Benzo(a)Pyrene | 965 | 3840 | 0.046 | 1.3939 | 0.0014 | 3.5% | 965 | 3840 | 0.02 | 0.7407 | 0.0008 | 2.0% |
| Perylene | 967 | 431 | 0.14 | 4.2424 | 0.0044 | 10.6% | 967 | 431 | 0.31 | 11.4815 | 0.0119 | 30.4% |
| Benzo(e)pyrene | 967 | 4300 | 0.035 | 1.0606 | 0.0011 | 2.7% | 967 | 4300 | 0.02 | 0.7407 | 0.0008 | 2.0% |
| Benzo(b)fluoranthene | 979 | 2169 | 0.053 | 1.6061 | 0.0016 | 4.0% | 979 | 2169 | 0.027 | 1.0000 | 0.0010 | 2.6% |
| Benzo(k)fluoranthene | 981 | 1220 | 0.048 | 1.4545 | 0.0015 | 3.6% | 981 | 1220 | 0.023 | 0.8519 | 0.0009 | 2.2% |
| C2-Chrysenes | 1008 | - | 0.016 | 0.4848 | 0.0005 | 1.2% | 1008 | - | 0.01 | 0.3704 | 0.0004 | 0.9% |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.018 | 0.5455 | 0.0005 | 1.2% | 1095 | 648 | 0.012 | 0.4444 | 0.0004 | 1.0% |
| C3-Chrysenes | 1112 | - | 0.007 | 0.2121 | 0.0002 | 0.5% | 1112 | - | 0.0014 | 0.0519 | 0.0000 | 0.1% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.017 | 0.5152 | 0.0005 | 1.1% | 1115 | - | 0.01 | 0.3704 | 0.0003 | 0.9% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0062 | 0.1879 | 0.0002 | 0.4% | 1123 | 2389 | 0.0038 | 0.1407 | 0.0001 | 0.3% |
| C4-Chrysenes | 1214 | - | 0.0011 | 0.0333 | 0.0000 | 0.1% | 1214 | - | 0.0014 | 0.0519 | 0.0000 | 0.1% |
| Sum ESBTU_{FCVI} | | | | 0.0412 | 100.0% | | | | | 0.0390 | 100.0% | |
| Sum ESBTU_{FCVI} (2 or 3 Ring PAHs) | | | | 0.0162 | 39.3% | | | | | 0.0149 | 38.3% | |
| Sum ESBTU_{FCVI} (4 Ring PAHs) | | | | 0.0138 | 33.6% | | | | | 0.0079 | 20.3% | |
| Sum ESBTU_{FCVI} (5 or 6 Ring PAHs) | | | | 0.0112 | 27.1% | | | | | 0.0162 | 41.4% | |



Table S-4. Equilibrium Partitioning Sediment Benchmark Calculations: Submerged Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | ERM_RR11 Submerged Sediment 0.025 | | | | | | INTAKE_03 Submerged Sediment 0.012 | | | | | |
|---|--------------------------------------|----------|-----------------------------------|---|-------------------------------|-------|--|----------|-----------------------------------|---|-------------------------------|-------|
| | Polycyclic Aromatic Hydrocarbons | | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | ESBTU | C _{OC,PAHi,FCVi} C _{OC,PAHi,MAX} | | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | ESBTU |
| | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) |
| Naphthalene | 385 | 61700 | 0.016 | 0.6400 | 0.0017 | 2.6% | 385 | 61700 | 0.0047 | 0.3917 | 0.0010 | 3.3% |
| C1-Naphthalenes | 444 | - | 0.039 | 1.5600 | 0.0035 | 5.6% | 444 | - | 0.01 | 0.8333 | 0.0019 | 6.1% |
| Acenaphthylene | 452 | 24000 | 0.0022 | 0.0880 | 0.0002 | 0.3% | 452 | 24000 | 0.0014 | 0.1167 | 0.0003 | 0.8% |
| Acenaphthene | 491 | 33400 | 0.003 | 0.1200 | 0.0002 | 0.4% | 491 | 33400 | 0.0014 | 0.1167 | 0.0002 | 0.8% |
| #N/A | 510 | - | 0.081 | 3.2400 | 0.0064 | 10.1% | 510 | - | 0.026 | 2.1667 | 0.0042 | 13.7% |
| Fluorene | 538 | 26000 | 0.0056 | 0.2240 | 0.0004 | 0.7% | 538 | 26000 | 0.0014 | 0.1167 | 0.0002 | 0.7% |
| C3-Naphthalenes | 581 | - | 0.058 | 2.3200 | 0.0040 | 6.4% | 581 | - | 0.023 | 1.9167 | 0.0033 | 10.7% |
| Anthracene | 594 | 1300 | 0.009 | 0.3600 | 0.0006 | 1.0% | 594 | 1300 | 0.0014 | 0.1167 | 0.0002 | 0.6% |
| Phenanthrene | 596 | 34300 | 0.057 | 2.2800 | 0.0038 | 6.1% | 596 | 34300 | 0.01 | 0.8333 | 0.0014 | 4.5% |
| C1-Fluorenes | 611 | - | 0.0034 | 0.1360 | 0.0002 | 0.4% | 611 | - | 0.002 | 0.1667 | 0.0003 | 0.9% |
| C4-Naphthalenes | 657 | - | 0.028 | 1.1200 | 0.0017 | 2.7% | 657 | - | 0.015 | 1.2500 | 0.0019 | 6.1% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.038 | 1.5200 | 0.0023 | 3.6% | 670 | - | 0.013 | 1.0833 | 0.0016 | 5.2% |
| C2-Fluorenes | 686 | - | 0.00092 | 0.0368 | 0.0001 | 0.1% | 686 | - | 0.0039 | 0.3250 | 0.0005 | 1.5% |
| Pyrene | 697 | 9090 | 0.14 | 5.6000 | 0.0080 | 12.8% | 697 | 9090 | 0.015 | 1.2500 | 0.0018 | 5.8% |
| Fluoranthene | 707 | 23870 | 0.089 | 3.5600 | 0.0050 | 8.0% | 707 | 23870 | 0.018 | 1.5000 | 0.0021 | 6.9% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.019 | 0.7600 | 0.0010 | 1.6% | 746 | - | 0.009 | 0.7500 | 0.0010 | 3.2% |
| C3-Fluorenes | 769 | - | 0.00092 | 0.0368 | 0.0000 | 0.1% | 769 | - | 0.0032 | 0.2667 | 0.0003 | 1.1% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.056 | 2.2400 | 0.0029 | 4.6% | 770 | - | 0.012 | 1.0000 | 0.0013 | 4.2% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.0085 | 0.3400 | 0.0004 | 0.7% | 829 | - | 0.0049 | 0.4083 | 0.0005 | 1.6% |
| Benz(a)anthracene | 841 | 4153 | 0.043 | 1.7200 | 0.0020 | 3.3% | 841 | 4153 | 0.0059 | 0.4917 | 0.0006 | 1.9% |
| Chrysene | 844 | 826 | 0.058 | 2.3200 | 0.0027 | 4.4% | 844 | 826 | 0.0085 | 0.7083 | 0.0008 | 2.7% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.024 | 0.9600 | 0.0011 | 1.7% | 913 | - | 0.0058 | 0.4833 | 0.0005 | 1.7% |
| C1-Chrysenes | 929 | - | 0.034 | 1.3600 | 0.0015 | 2.3% | 929 | - | 0.0059 | 0.4917 | 0.0005 | 1.7% |
| Benzo(a)Pyrene | 965 | 3840 | 0.041 | 1.6400 | 0.0017 | 2.7% | 965 | 3840 | 0.0052 | 0.4333 | 0.0004 | 1.5% |
| Perylene | 967 | 431 | 0.07 | 2.8000 | 0.0029 | 4.6% | 967 | 431 | 0.012 | 1.0000 | 0.0010 | 3.3% |
| Benzo(e)pyrene | 967 | 4300 | 0.04 | 1.6000 | 0.0017 | 2.6% | 967 | 4300 | 0.0066 | 0.5500 | 0.0006 | 1.8% |
| Benzo(b)fluoranthene | 979 | 2169 | 0.067 | 2.6800 | 0.0027 | 4.4% | 979 | 2169 | 0.0085 | 0.7083 | 0.0007 | 2.3% |
| Benzo(k)fluoranthene | 981 | 1220 | 0.045 | 1.8000 | 0.0018 | 2.9% | 981 | 1220 | 0.0071 | 0.5917 | 0.0006 | 1.9% |
| C2-Chrysenes | 1008 | - | 0.016 | 0.6400 | 0.0006 | 1.0% | 1008 | - | 0.0044 | 0.3667 | 0.0004 | 1.2% |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.016 | 0.6400 | 0.0006 | 0.9% | 1095 | 648 | 0.0028 | 0.2333 | 0.0002 | 0.7% |
| C3-Chrysenes | 1112 | - | 0.00092 | 0.0368 | 0.0000 | 0.1% | 1112 | - | 0.0014 | 0.1167 | 0.0001 | 0.3% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.017 | 0.6800 | 0.0006 | 1.0% | 1115 | - | 0.002 | 0.1667 | 0.0001 | 0.5% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0056 | 0.2240 | 0.0002 | 0.3% | 1123 | 2389 | 0.0014 | 0.1167 | 0.0001 | 0.3% |
| C4-Chrysenes | 1214 | - | 0.00092 | 0.0368 | 0.0000 | 0.0% | 1214 | - | 0.0014 | 0.1167 | 0.0001 | 0.3% |
| Sum ESBTU_{FCVi} | | | | 0.0627 | 100.0% | | | | | 0.0310 | 100.0% | |
| Sum ESBTU_{FCVi} (2 or 3 Ring PAHs) | | | | 0.0276 | 44.0% | | | | | 0.0194 | 62.6% | |
| Sum ESBTU_{FCVi} (4 Ring PAHs) | | | | 0.0229 | 36.6% | | | | | 0.0077 | 25.0% | |
| Sum ESBTU_{FCVi} (5 or 6 Ring PAHs) | | | | 0.0122 | 19.5% | | | | | 0.0038 | 12.4% | |



Table S-4. Equilibrium Partitioning Sediment Benchmark Calculations: Submerged Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | CRM_A13 Submerged Sediment 0.017 | | | | | | CRM_A18 Submerged Sediment 0.021 | | | | | | |
|---|--|----------|---|---|-------------------------------------|-------|-------------------------------------|---------------------------|---|---|-------------------------------------|------------|-----|
| | Polycyclic Aromatic Hydrocarbons | | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | ESBTU | C _{OC,PAHi,FCVi} | C _{OC,PAHi,MAXi} | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | ESBTU | |
| | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) | | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) |
| Naphthalene | 385 | 61700 | 0.0053 | 0.3118 | 0.0008 | 3.0% | 385 | 61700 | 0.0073 | 0.3476 | 0.0009 | 2.4% | |
| C1-Naphthalenes | 444 | - | 0.013 | 0.7647 | 0.0017 | 6.3% | 444 | - | 0.018 | 0.8571 | 0.0019 | 5.1% | |
| Acenaphthylene | 452 | 24000 | 0.001 | 0.0588 | 0.0001 | 0.5% | 452 | 24000 | 0.0028 | 0.1333 | 0.0003 | 0.8% | |
| Acenaphthene | 491 | 33400 | 0.001 | 0.0588 | 0.0001 | 0.4% | 491 | 33400 | 0.0028 | 0.1333 | 0.0003 | 0.7% | |
| #N/A | 510 | - | 0.029 | 1.7059 | 0.0033 | 12.2% | 510 | - | 0.042 | 2.0000 | 0.0039 | 10.3% | |
| Fluorene | 538 | 26000 | 0.0011 | 0.0647 | 0.0001 | 0.4% | 538 | 26000 | 0.0028 | 0.1333 | 0.0002 | 0.7% | |
| C3-Naphthalenes | 581 | - | 0.022 | 1.2941 | 0.0022 | 8.1% | 581 | - | 0.032 | 1.5238 | 0.0026 | 6.9% | |
| Anthracene | 594 | 1300 | 0.0015 | 0.0882 | 0.0001 | 0.5% | 594 | 1300 | 0.0028 | 0.1333 | 0.0002 | 0.6% | |
| Phenanthrene | 596 | 34300 | 0.012 | 0.7059 | 0.0012 | 4.3% | 596 | 34300 | 0.017 | 0.8095 | 0.0014 | 3.6% | |
| C1-Fluorenes | 611 | - | 0.0016 | 0.0941 | 0.0002 | 0.6% | 611 | - | 0.0028 | 0.1333 | 0.0002 | 0.6% | |
| C4-Naphthalenes | 657 | - | 0.015 | 0.8824 | 0.0013 | 4.9% | 657 | - | 0.02 | 0.9524 | 0.0014 | 3.8% | |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.013 | 0.7647 | 0.0011 | 4.2% | 670 | - | 0.02 | 0.9524 | 0.0014 | 3.7% | |
| C2-Fluorenes | 686 | - | 0.0036 | 0.2118 | 0.0003 | 1.1% | 686 | - | 0.0054 | 0.2571 | 0.0004 | 1.0% | |
| Pyrene | 697 | 9090 | 0.02 | 1.1765 | 0.0017 | 6.2% | 697 | 9090 | 0.034 | 1.6190 | 0.0023 | 6.1% | |
| Fluoranthene | 707 | 23870 | 0.026 | 1.5294 | 0.0022 | 7.9% | 707 | 23870 | 0.042 | 2.0000 | 0.0028 | 7.4% | |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.0084 | 0.4941 | 0.0007 | 2.4% | 746 | - | 0.013 | 0.6190 | 0.0008 | 2.2% | |
| C3-Fluorenes | 769 | - | 0.0029 | 0.1706 | 0.0002 | 0.8% | 769 | - | 0.0038 | 0.1810 | 0.0002 | 0.6% | |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.016 | 0.9412 | 0.0012 | 4.5% | 770 | - | 0.026 | 1.2381 | 0.0016 | 4.2% | |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.0048 | 0.2824 | 0.0003 | 1.2% | 829 | - | 0.0089 | 0.4238 | 0.0005 | 1.3% | |
| Benzo(a)anthracene | 841 | 4153 | 0.011 | 0.6471 | 0.0008 | 2.8% | 841 | 4153 | 0.018 | 0.8571 | 0.0010 | 2.7% | |
| Chrysene | 844 | 826 | 0.015 | 0.8824 | 0.0010 | 3.8% | 844 | 826 | 0.025 | 1.1905 | 0.0014 | 3.7% | |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.0018 | 0.1059 | 0.0001 | 0.4% | 913 | - | 0.003 | 0.1429 | 0.0002 | 0.4% | |
| C1-Chrysenes | 929 | - | 0.014 | 0.8235 | 0.0009 | 3.2% | 929 | - | 0.019 | 0.9048 | 0.0010 | 2.6% | |
| Benzo(a)Pyrene | 965 | 3840 | 0.011 | 0.6471 | 0.0007 | 2.4% | 965 | 3840 | 0.021 | 1.0000 | 0.0010 | 2.7% | |
| Perylene | 967 | 431 | 0.018 | 1.0588 | 0.0011 | 4.0% | 967 | 431 | 0.083 | 3.9524 | 0.0041 | 10.8% | |
| Benzo(e)pyrene | 967 | 4300 | 0.01 | 0.5882 | 0.0006 | 2.2% | 967 | 4300 | 0.019 | 0.9048 | 0.0009 | 2.5% | |
| Benzo(b)fluoranthene | 979 | 2169 | 0.015 | 0.8824 | 0.0009 | 3.3% | 979 | 2169 | 0.029 | 1.3810 | 0.0014 | 3.7% | |
| Benzo(k)fluoranthene | 981 | 1220 | 0.013 | 0.7647 | 0.0008 | 2.8% | 981 | 1220 | 0.022 | 1.0476 | 0.0011 | 2.8% | |
| C2-Chrysenes | 1008 | - | 0.0062 | 0.3647 | 0.0004 | 1.3% | 1008 | - | 0.01 | 0.4762 | 0.0005 | 1.2% | |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.0082 | 0.4824 | 0.0004 | 1.6% | 1095 | 648 | 0.017 | 0.8095 | 0.0007 | 1.9% | |
| C3-Chrysenes | 1112 | - | 0.0022 | 0.1294 | 0.0001 | 0.4% | 1112 | - | 0.0043 | 0.2048 | 0.0002 | 0.5% | |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.007 | 0.4118 | 0.0004 | 1.3% | 1115 | - | 0.014 | 0.6667 | 0.0006 | 1.6% | |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0027 | 0.1588 | 0.0001 | 0.5% | 1123 | 2389 | 0.0052 | 0.2476 | 0.0002 | 0.6% | |
| C4-Chrysenes | 1214 | - | 0.0014 | 0.0824 | 0.0001 | 0.2% | 1214 | - | 0.0028 | 0.1333 | 0.0001 | 0.3% | |
| Sum ESBTU_{FCVi} | | | | 0.0274 | 100.0% | | | | | 0.0380 | 100.0% | | |
| Sum ESBTU_{FCVi} (2 or 3 Ring PAHs) | | | | 0.0141 | 51.4% | | | | | 0.0170 | 44.7% | | |
| Sum ESBTU_{FCVi} (4 Ring PAHs) | | | | 0.0083 | 30.3% | | | | | 0.0109 | 28.8% | | |
| Sum ESBTU_{FCVi} (5 or 6 Ring PAHs) | | | | 0.0050 | 18.3% | | | | | 0.0101 | 26.6% | | |



Table S-4. Equilibrium Partitioning Sediment Benchmark Calculations: Submerged Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | CRM_A22 Submerged Sediment 0.021 | | | | | | CRM_B06 Submerged Sediment 0.021 | | | | | | |
|---|-------------------------------------|----------|-----------------------------------|---|-------------------------------|-------|--|----------|-----------------------------------|---|-------------------------------|---------------|-------|
| | Polycyclic Aromatic Hydrocarbons | | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | ESBTU | C _{OC,PAHi,FCVi} C _{OC,PAHi,MAX} | | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | ESBTU | |
| | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) | | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) |
| Naphthalene | 385 | 61700 | 0.0093 | 0.4429 | 0.0012 | 2.2% | | 385 | 61700 | 0.0031 | 0.1476 | 0.0004 | 2.9% |
| C1-Naphthalenes | 444 | - | 0.024 | 1.1429 | 0.0026 | 4.8% | | 444 | - | 0.0072 | 0.3429 | 0.0008 | 5.9% |
| Acenaphthylene | 452 | 24000 | 0.0043 | 0.2048 | 0.0005 | 0.9% | | 452 | 24000 | 0.001 | 0.0476 | 0.0001 | 0.8% |
| Acenaphthene | 491 | 33400 | 0.0043 | 0.2048 | 0.0004 | 0.8% | | 491 | 33400 | 0.001 | 0.0476 | 0.0001 | 0.7% |
| #N/A | 510 | - | 0.055 | 2.6190 | 0.0051 | 9.7% | | 510 | - | 0.017 | 0.8095 | 0.0016 | 12.0% |
| Fluorene | 538 | 26000 | 0.0043 | 0.2048 | 0.0004 | 0.7% | | 538 | 26000 | 0.001 | 0.0476 | 0.0001 | 0.7% |
| C3-Naphthalenes | 581 | - | 0.042 | 2.0000 | 0.0034 | 6.5% | | 581 | - | 0.013 | 0.6190 | 0.0011 | 8.1% |
| Anthracene | 594 | 1300 | 0.0043 | 0.2048 | 0.0003 | 0.6% | | 594 | 1300 | 0.001 | 0.0476 | 0.0001 | 0.6% |
| Phenanthrene | 596 | 34300 | 0.023 | 1.0952 | 0.0018 | 3.5% | | 596 | 34300 | 0.007 | 0.3333 | 0.0006 | 4.2% |
| C1-Fluorenes | 611 | - | 0.0048 | 0.2286 | 0.0004 | 0.7% | | 611 | - | 0.001 | 0.0476 | 0.0001 | 0.6% |
| C4-Naphthalenes | 657 | - | 0.026 | 1.2381 | 0.0019 | 3.5% | | 657 | - | 0.0069 | 0.3286 | 0.0005 | 3.8% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.026 | 1.2381 | 0.0018 | 3.5% | | 670 | - | 0.0073 | 0.3476 | 0.0005 | 3.9% |
| C2-Fluorenes | 686 | - | 0.0075 | 0.3571 | 0.0005 | 1.0% | | 686 | - | 0.0017 | 0.0810 | 0.0001 | 0.9% |
| Pyrene | 697 | 9090 | 0.046 | 2.1905 | 0.0031 | 5.9% | | 697 | 9090 | 0.011 | 0.5238 | 0.0008 | 5.7% |
| Fluoranthene | 707 | 23870 | 0.058 | 2.7619 | 0.0039 | 7.4% | | 707 | 23870 | 0.015 | 0.7143 | 0.0010 | 7.7% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.018 | 0.8571 | 0.0011 | 2.2% | | 746 | - | 0.0047 | 0.2238 | 0.0003 | 2.3% |
| C3-Fluorenes | 769 | - | 0.0058 | 0.2762 | 0.0004 | 0.7% | | 769 | - | 0.0014 | 0.0667 | 0.0001 | 0.7% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.036 | 1.7143 | 0.0022 | 4.2% | | 770 | - | 0.012 | 0.5714 | 0.0007 | 5.6% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.018 | 0.8571 | 0.0010 | 1.9% | | 829 | - | 0.0022 | 0.1048 | 0.0001 | 1.0% |
| Benz(a)anthracene | 841 | 4153 | 0.025 | 1.1905 | 0.0014 | 2.7% | | 841 | 4153 | 0.0063 | 0.3000 | 0.0004 | 2.7% |
| Chrysene | 844 | 826 | 0.033 | 1.5714 | 0.0019 | 3.5% | | 844 | 826 | 0.0089 | 0.4238 | 0.0005 | 3.8% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.0043 | 0.2048 | 0.0002 | 0.4% | | 913 | - | 0.001 | 0.0476 | 0.0001 | 0.4% |
| C1-Chrysenes | 929 | - | 0.025 | 1.1905 | 0.0013 | 2.4% | | 929 | - | 0.011 | 0.5238 | 0.0006 | 4.3% |
| Benzo(a)Pyrene | 965 | 3840 | 0.029 | 1.3810 | 0.0014 | 2.7% | | 965 | 3840 | 0.0063 | 0.3000 | 0.0003 | 2.4% |
| Perylene | 967 | 431 | 0.14 | 6.6667 | 0.0069 | 13.0% | | 967 | 431 | 0.012 | 0.5714 | 0.0006 | 4.5% |
| Benzo(e)pyrene | 967 | 4300 | 0.025 | 1.1905 | 0.0012 | 2.3% | | 967 | 4300 | 0.0061 | 0.2905 | 0.0003 | 2.3% |
| Benzo(b)fluoranthene | 979 | 2169 | 0.04 | 1.9048 | 0.0019 | 3.7% | | 979 | 2169 | 0.01 | 0.4762 | 0.0005 | 3.7% |
| Benzo(k)fluoranthene | 981 | 1220 | 0.032 | 1.5238 | 0.0016 | 2.9% | | 981 | 1220 | 0.0066 | 0.3143 | 0.0003 | 2.4% |
| C2-Chrysenes | 1008 | - | 0.012 | 0.5714 | 0.0006 | 1.1% | | 1008 | - | 0.0033 | 0.1571 | 0.0002 | 1.2% |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.023 | 1.0952 | 0.0010 | 1.9% | | 1095 | 648 | 0.0051 | 0.2429 | 0.0002 | 1.7% |
| C3-Chrysenes | 1112 | - | 0.0043 | 0.2048 | 0.0002 | 0.3% | | 1112 | - | 0.001 | 0.0476 | 0.0000 | 0.3% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.02 | 0.9524 | 0.0009 | 1.6% | | 1115 | - | 0.0048 | 0.2286 | 0.0002 | 1.6% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0071 | 0.3381 | 0.0003 | 0.6% | | 1123 | 2389 | 0.0016 | 0.0762 | 0.0001 | 0.5% |
| C4-Chrysenes | 1214 | - | 0.0043 | 0.2048 | 0.0002 | 0.3% | | 1214 | - | 0.001 | 0.0476 | 0.0000 | 0.3% |
| Sum ESBTU_{FCVi} | | | | 0.0531 | 100.0% | | | | | | 0.0132 | 100.0% | |
| Sum ESBTU_{FCVi} (2 or 3 Ring PAHs) | | | | 0.0231 | 43.6% | | | | | | 0.0065 | 49.4% | |
| Sum ESBTU_{FCVi} (4 Ring PAHs) | | | | 0.0148 | 27.8% | | | | | | 0.0042 | 31.6% | |
| Sum ESBTU_{FCVi} (5 or 6 Ring PAHs) | | | | 0.0152 | 28.6% | | | | | | 0.0025 | 19.0% | |



Table S-4. Equilibrium Partitioning Sediment Benchmark Calculations: Submerged Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | CRM_B08 Submerged Sediment 0.02 | | | | | | CRM_B38 Submerged Sediment 0.018 | | | | | | | |
|---|---------------------------------------|--------------------------------------|-----------------------------------|---|-------------------------------|-------|-------------------------------------|-------|--------------------------|-----------------------------------|---|-------------------------------|------------|-----|
| | Polycyclic Aromatic Hydrocarbons | | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | ESBTU | C _{OC,PAHi,FCVI} | | C _{OC,PAHi,MAX} | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | | |
| | C _{OC,PAHi,FCVI} (ug/goc) | C _{OC,PAHi,MAX} (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) | | | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) |
| Naphthalene | 385 | 61700 | 0.0059 | 0.2950 | 0.0008 | 2.4% | 385 | 61700 | 0.0087 | 0.4833 | 0.0013 | 2.7% | | |
| C1-Naphthalenes | 444 | - | 0.015 | 0.7500 | 0.0017 | 5.3% | 444 | - | 0.021 | 1.1667 | 0.0026 | 5.6% | | |
| Acenaphthylene | 452 | 24000 | 0.0011 | 0.0550 | 0.0001 | 0.4% | 452 | 24000 | 0.0012 | 0.0667 | 0.0001 | 0.3% | | |
| Acenaphthene | 491 | 33400 | 0.0011 | 0.0550 | 0.0001 | 0.4% | 491 | 33400 | 0.001 | 0.0556 | 0.0001 | 0.2% | | |
| #N/A | 510 | - | 0.035 | 1.7500 | 0.0034 | 10.8% | 510 | - | 0.048 | 2.6667 | 0.0052 | 11.0% | | |
| Fluorene | 538 | 26000 | 0.0017 | 0.0850 | 0.0002 | 0.5% | 538 | 26000 | 0.0023 | 0.1278 | 0.0002 | 0.5% | | |
| C3-Naphthalenes | 581 | - | 0.024 | 1.2000 | 0.0021 | 6.5% | 581 | - | 0.036 | 2.0000 | 0.0034 | 7.3% | | |
| Anthracene | 594 | 1300 | 0.0024 | 0.1200 | 0.0002 | 0.6% | 594 | 1300 | 0.0027 | 0.1500 | 0.0003 | 0.5% | | |
| Phenanthrene | 596 | 34300 | 0.016 | 0.8000 | 0.0013 | 4.2% | 596 | 34300 | 0.02 | 1.1111 | 0.0019 | 3.9% | | |
| C1-Fluorenes | 611 | - | 0.0017 | 0.0850 | 0.0001 | 0.4% | 611 | - | 0.0024 | 0.1333 | 0.0002 | 0.5% | | |
| C4-Naphthalenes | 657 | - | 0.014 | 0.7000 | 0.0011 | 3.3% | 657 | - | 0.019 | 1.0556 | 0.0016 | 3.4% | | |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.016 | 0.8000 | 0.0012 | 3.8% | 670 | - | 0.02 | 1.1111 | 0.0017 | 3.5% | | |
| C2-Fluorenes | 686 | - | 0.0035 | 0.1750 | 0.0003 | 0.8% | 686 | - | 0.0052 | 0.2889 | 0.0004 | 0.9% | | |
| Pyrene | 697 | 9090 | 0.027 | 1.3500 | 0.0019 | 6.1% | 697 | 9090 | 0.032 | 1.7778 | 0.0026 | 5.4% | | |
| Fluoranthene | 707 | 23870 | 0.037 | 1.8500 | 0.0026 | 8.2% | 707 | 23870 | 0.047 | 2.6111 | 0.0037 | 7.8% | | |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.011 | 0.5500 | 0.0007 | 2.3% | 746 | - | 0.014 | 0.7778 | 0.0010 | 2.2% | | |
| C3-Fluorenes | 769 | - | 0.0027 | 0.1350 | 0.0002 | 0.6% | 769 | - | 0.004 | 0.2222 | 0.0003 | 0.6% | | |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.027 | 1.3500 | 0.0018 | 5.5% | 770 | - | 0.027 | 1.5000 | 0.0019 | 4.1% | | |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.0071 | 0.3550 | 0.0004 | 1.3% | 829 | - | 0.01 | 0.5556 | 0.0007 | 1.4% | | |
| Benz(a)anthracene | 841 | 4153 | 0.015 | 0.7500 | 0.0009 | 2.8% | 841 | 4153 | 0.018 | 1.0000 | 0.0012 | 2.5% | | |
| Chrysene | 844 | 826 | 0.019 | 0.9500 | 0.0011 | 3.5% | 844 | 826 | 0.025 | 1.3889 | 0.0016 | 3.5% | | |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.002 | 0.1000 | 0.0001 | 0.3% | 913 | - | 0.0031 | 0.1722 | 0.0002 | 0.4% | | |
| C1-Chrysenes | 929 | - | 0.013 | 0.6500 | 0.0007 | 2.2% | 929 | - | 0.017 | 0.9444 | 0.0010 | 2.1% | | |
| Benzo(a)Pyrene | 965 | 3840 | 0.016 | 0.8000 | 0.0008 | 2.6% | 965 | 3840 | 0.021 | 1.1667 | 0.0012 | 2.6% | | |
| Perylene | 967 | 431 | 0.061 | 3.0500 | 0.0032 | 9.9% | 967 | 431 | 0.11 | 6.1111 | 0.0063 | 13.4% | | |
| Benzo(e)pyrene | 967 | 4300 | 0.016 | 0.8000 | 0.0008 | 2.6% | 967 | 4300 | 0.019 | 1.0556 | 0.0011 | 2.3% | | |
| Benzo(b)fluoranthene | 979 | 2169 | 0.025 | 1.2500 | 0.0013 | 4.0% | 979 | 2169 | 0.027 | 1.5000 | 0.0015 | 3.2% | | |
| Benzo(k)fluoranthene | 981 | 1220 | 0.017 | 0.8500 | 0.0009 | 2.7% | 981 | 1220 | 0.025 | 1.3889 | 0.0014 | 3.0% | | |
| C2-Chrysenes | 1008 | - | 0.007 | 0.3500 | 0.0003 | 1.1% | 1008 | - | 0.011 | 0.6111 | 0.0006 | 1.3% | | |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.013 | 0.6500 | 0.0006 | 1.9% | 1095 | 648 | 0.013 | 0.7222 | 0.0007 | 1.4% | | |
| C3-Chrysenes | 1112 | - | 0.0031 | 0.1550 | 0.0001 | 0.4% | 1112 | - | 0.0054 | 0.3000 | 0.0003 | 0.6% | | |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.012 | 0.6000 | 0.0005 | 1.7% | 1115 | - | 0.012 | 0.6667 | 0.0006 | 1.3% | | |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0042 | 0.2100 | 0.0002 | 0.6% | 1123 | 2389 | 0.0042 | 0.2333 | 0.0002 | 0.4% | | |
| C4-Chrysenes | 1214 | - | 0.0011 | 0.0550 | 0.0000 | 0.1% | 1214 | - | 0.0023 | 0.1278 | 0.0001 | 0.2% | | |
| Sum ESBTU_{FCVI} | | | | 0.0318 | 100.0% | | | | | 0.0473 | 100.0% | | | |
| Sum ESBTU_{FCVI} (2 or 3 Ring PAHs) | | | | 0.0140 | 44.0% | | | | | 0.0213 | 44.9% | | | |
| Sum ESBTU_{FCVI} (4 Ring PAHs) | | | | 0.0096 | 30.0% | | | | | 0.0130 | 27.5% | | | |
| Sum ESBTU_{FCVI} (5 or 6 Ring PAHs) | | | | 0.0083 | 26.0% | | | | | 0.0130 | 27.5% | | | |



Table S-4. Equilibrium Partitioning Sediment Benchmark Calculations: Submerged Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | CRM_RR02 Submerged Sediment 0.012 | | | | | | TRM_A10 Submerged Sediment 0.028 | | | | | | |
|---|--------------------------------------|----------|-----------------------------------|---|-------------------------------|-------|--|----------|-----------------------------------|---|-------------------------------|------------|-----|
| | Polycyclic Aromatic Hydrocarbons | | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | ESBTU | C _{OC,PAHi,FCVi} C _{OC,PAHi,MAX} | | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | ESBTU | |
| | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) | | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) |
| Naphthalene | 385 | 61700 | 0.0054 | 0.4500 | 0.0012 | 3.0% | 385 | 61700 | 0.012 | 0.4286 | 0.0011 | 2.3% | |
| C1-Naphthalenes | 444 | - | 0.014 | 1.1667 | 0.0026 | 6.6% | 444 | - | 0.013 | 0.4643 | 0.0010 | 2.2% | |
| Acenaphthylene | 452 | 24000 | 0.00085 | 0.0708 | 0.0002 | 0.4% | 452 | 24000 | 0.012 | 0.4286 | 0.0009 | 2.0% | |
| Acenaphthene | 491 | 33400 | 0.00085 | 0.0708 | 0.0001 | 0.4% | 491 | 33400 | 0.012 | 0.4286 | 0.0009 | 1.8% | |
| #N/A | 510 | - | 0.033 | 2.7500 | 0.0054 | 13.6% | 510 | - | 0.031 | 1.1071 | 0.0022 | 4.5% | |
| Fluorene | 538 | 26000 | 0.0013 | 0.1083 | 0.0002 | 0.5% | 538 | 26000 | 0.012 | 0.4286 | 0.0008 | 1.6% | |
| C3-Naphthalenes | 581 | - | 0.023 | 1.9167 | 0.0033 | 8.3% | 581 | - | 0.027 | 0.9643 | 0.0017 | 3.4% | |
| Anthracene | 594 | 1300 | 0.0013 | 0.1083 | 0.0002 | 0.5% | 594 | 1300 | 0.012 | 0.4286 | 0.0007 | 1.5% | |
| Phenanthrene | 596 | 34300 | 0.012 | 1.0000 | 0.0017 | 4.2% | 596 | 34300 | 0.016 | 0.5714 | 0.0010 | 2.0% | |
| C1-Fluorenes | 611 | - | 0.0038 | 0.3167 | 0.0005 | 1.3% | 611 | - | 0.012 | 0.4286 | 0.0007 | 1.4% | |
| C4-Naphthalenes | 657 | - | 0.013 | 1.0833 | 0.0016 | 4.2% | 657 | - | 0.015 | 0.5357 | 0.0008 | 1.7% | |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.014 | 1.1667 | 0.0017 | 4.4% | 670 | - | 0.02 | 0.7143 | 0.0011 | 2.2% | |
| C2-Fluorenes | 686 | - | 0.0029 | 0.2417 | 0.0004 | 0.9% | 686 | - | 0.012 | 0.4286 | 0.0006 | 1.3% | |
| Pyrene | 697 | 9090 | 0.016 | 1.3333 | 0.0019 | 4.8% | 697 | 9090 | 0.052 | 1.8571 | 0.0027 | 5.5% | |
| Fluoranthene | 707 | 23870 | 0.022 | 1.8333 | 0.0026 | 6.6% | 707 | 23870 | 0.044 | 1.5714 | 0.0022 | 4.6% | |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.0096 | 0.8000 | 0.0011 | 2.7% | 746 | - | 0.015 | 0.5357 | 0.0007 | 1.5% | |
| C3-Fluorenes | 769 | - | 0.0024 | 0.2000 | 0.0003 | 0.7% | 769 | - | 0.012 | 0.4286 | 0.0006 | 1.2% | |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.019 | 1.5833 | 0.0021 | 5.2% | 770 | - | 0.037 | 1.3214 | 0.0017 | 3.5% | |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.0051 | 0.4250 | 0.0005 | 1.3% | 829 | - | 0.012 | 0.4286 | 0.0005 | 1.1% | |
| Benzo(a)anthracene | 841 | 4153 | 0.0091 | 0.7583 | 0.0009 | 2.3% | 841 | 4153 | 0.02 | 0.7143 | 0.0008 | 1.8% | |
| Chrysene | 844 | 826 | 0.012 | 1.0000 | 0.0012 | 3.0% | 844 | 826 | 0.026 | 0.9286 | 0.0011 | 2.3% | |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.0014 | 0.1167 | 0.0001 | 0.3% | 913 | - | 0.012 | 0.4286 | 0.0005 | 1.0% | |
| C1-Chrysenes | 929 | - | 0.0096 | 0.8000 | 0.0009 | 2.2% | 929 | - | 0.014 | 0.5000 | 0.0005 | 1.1% | |
| Benzo(a)Pyrene | 965 | 3840 | 0.01 | 0.8333 | 0.0009 | 2.2% | 965 | 3840 | 0.026 | 0.9286 | 0.0010 | 2.0% | |
| Perylene | 967 | 431 | 0.033 | 2.7500 | 0.0028 | 7.2% | 967 | 431 | 0.43 | 15.3571 | 0.0159 | 32.8% | |
| Benzo(e)pyrene | 967 | 4300 | 0.01 | 0.8333 | 0.0009 | 2.2% | 967 | 4300 | 0.025 | 0.8929 | 0.0009 | 1.9% | |
| Benzo(b)fluoranthene | 979 | 2169 | 0.016 | 1.3333 | 0.0014 | 3.4% | 979 | 2169 | 0.034 | 1.2143 | 0.0012 | 2.6% | |
| Benzo(k)fluoranthene | 981 | 1220 | 0.011 | 0.9167 | 0.0009 | 2.4% | 981 | 1220 | 0.03 | 1.0714 | 0.0011 | 2.3% | |
| C2-Chrysenes | 1008 | - | 0.0047 | 0.3917 | 0.0004 | 1.0% | 1008 | - | 0.012 | 0.4286 | 0.0004 | 0.9% | |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.0085 | 0.7083 | 0.0006 | 1.6% | 1095 | 648 | 0.033 | 1.1786 | 0.0011 | 2.2% | |
| C3-Chrysenes | 1112 | - | 0.0021 | 0.1750 | 0.0002 | 0.4% | 1112 | - | 0.012 | 0.4286 | 0.0004 | 0.8% | |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.0082 | 0.6833 | 0.0006 | 1.6% | 1115 | - | 0.026 | 0.9286 | 0.0008 | 1.7% | |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0028 | 0.2333 | 0.0002 | 0.5% | 1123 | 2389 | 0.012 | 0.4286 | 0.0004 | 0.8% | |
| C4-Chrysenes | 1214 | - | 0.00085 | 0.0708 | 0.0001 | 0.1% | 1214 | - | 0.012 | 0.4286 | 0.0004 | 0.7% | |
| Sum ESBTU_{FCVi} | | | | 0.0395 | 100.0% | | | | | 0.0484 | 100.0% | | |
| Sum ESBTU_{FCVi} (2 or 3 Ring PAHs) | | | | 0.0211 | 53.3% | | | | | 0.0158 | 32.6% | | |
| Sum ESBTU_{FCVi} (4 Ring PAHs) | | | | 0.0101 | 25.6% | | | | | 0.0103 | 21.2% | | |
| Sum ESBTU_{FCVi} (5 or 6 Ring PAHs) | | | | 0.0083 | 21.1% | | | | | 0.0224 | 46.3% | | |



Table S-4. Equilibrium Partitioning Sediment Benchmark Calculations: Submerged Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | TRM_B07 Submerged Sediment 0.02 | | | | | | TRM_RR03 Submerged Sediment 0.0076 | | | | | |
|---|------------------------------------|----------|-----------------------------------|---|-------------------------------|-------|---------------------------------------|----------|-------------------------------------|-----------------------------------|--------------------------|-------|
| | Polycyclic Aromatic Hydrocarbons | | Dry Weight Sediment Concentration | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | ESBTU | C _{OC,PAH_i,FCVI} | | C _{OC,PAH_i,MAX} | Dry Weight Sediment Concentration | Normalized Concentration | ESBTU |
| | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) | (ug/goc) | (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) |
| Naphthalene | 385 | 61700 | 0.011 | 0.5500 | 0.0014 | 3.0% | 385 | 61700 | 0.00086 | 0.1132 | 0.0003 | 0.9% |
| C1-Naphthalenes | 444 | - | 0.027 | 1.3500 | 0.0030 | 6.4% | 444 | - | 0.00086 | 0.1132 | 0.0003 | 0.7% |
| Acenaphthylene | 452 | 24000 | 0.001 | 0.0500 | 0.0001 | 0.2% | 452 | 24000 | 0.00086 | 0.1132 | 0.0003 | 0.7% |
| Acenaphthene | 491 | 33400 | 0.001 | 0.0500 | 0.0001 | 0.2% | 491 | 33400 | 0.00086 | 0.1132 | 0.0002 | 0.7% |
| #N/A | 510 | - | 0.057 | 2.8500 | 0.0056 | 11.7% | 510 | - | 0.0019 | 0.2500 | 0.0005 | 1.4% |
| Fluorene | 538 | 26000 | 0.0024 | 0.1200 | 0.0002 | 0.5% | 538 | 26000 | 0.00086 | 0.1132 | 0.0002 | 0.6% |
| C3-Naphthalenes | 581 | - | 0.039 | 1.9500 | 0.0034 | 7.0% | 581 | - | 0.0014 | 0.1842 | 0.0003 | 0.9% |
| Anthracene | 594 | 1300 | 0.0027 | 0.1350 | 0.0002 | 0.5% | 594 | 1300 | 0.0019 | 0.2500 | 0.0004 | 1.2% |
| Phenanthrene | 596 | 34300 | 0.023 | 1.1500 | 0.0019 | 4.0% | 596 | 34300 | 0.0086 | 1.1316 | 0.0019 | 5.5% |
| C1-Fluorenes | 611 | - | 0.0027 | 0.1350 | 0.0002 | 0.5% | 611 | - | 0.00086 | 0.1132 | 0.0002 | 0.5% |
| C4-Naphthalenes | 657 | - | 0.023 | 1.1500 | 0.0018 | 3.7% | 657 | - | 0.0012 | 0.1579 | 0.0002 | 0.7% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.023 | 1.1500 | 0.0017 | 3.6% | 670 | - | 0.005 | 0.6579 | 0.0010 | 2.9% |
| C2-Fluorenes | 686 | - | 0.005 | 0.2500 | 0.0004 | 0.8% | 686 | - | 0.00086 | 0.1132 | 0.0002 | 0.5% |
| Pyrene | 697 | 9090 | 0.056 | 2.8000 | 0.0040 | 8.4% | 697 | 9090 | 0.022 | 2.8947 | 0.0042 | 12.1% |
| Fluoranthene | 707 | 23870 | 0.046 | 2.3000 | 0.0033 | 6.8% | 707 | 23870 | 0.018 | 2.3684 | 0.0033 | 9.8% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.016 | 0.8000 | 0.0011 | 2.2% | 746 | - | 0.0034 | 0.4474 | 0.0006 | 1.8% |
| C3-Fluorenes | 769 | - | 0.001 | 0.0500 | 0.0001 | 0.1% | 769 | - | 0.00086 | 0.1132 | 0.0001 | 0.4% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.035 | 1.7500 | 0.0023 | 4.7% | 770 | - | 0.012 | 1.5789 | 0.0021 | 6.0% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.0062 | 0.3100 | 0.0004 | 0.8% | 829 | - | 0.0013 | 0.1711 | 0.0002 | 0.6% |
| Benzo(a)anthracene | 841 | 4153 | 0.024 | 1.2000 | 0.0014 | 3.0% | 841 | 4153 | 0.011 | 1.4474 | 0.0017 | 5.0% |
| Chrysene | 844 | 826 | 0.033 | 1.6500 | 0.0020 | 4.1% | 844 | 826 | 0.011 | 1.4474 | 0.0017 | 5.0% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.008 | 0.4000 | 0.0004 | 0.9% | 913 | - | 0.00086 | 0.1132 | 0.0001 | 0.4% |
| C1-Chrysenes | 929 | - | 0.017 | 0.8500 | 0.0009 | 1.9% | 929 | - | 0.006 | 0.7895 | 0.0008 | 2.5% |
| Benzo(a)Pyrene | 965 | 3840 | 0.026 | 1.3000 | 0.0013 | 2.8% | 965 | 3840 | 0.01 | 1.3158 | 0.0014 | 4.0% |
| Perylene | 967 | 431 | 0.062 | 3.1000 | 0.0032 | 6.7% | 967 | 431 | 0.04 | 5.2632 | 0.0054 | 15.9% |
| Benzo(e)pyrene | 967 | 4300 | 0.024 | 1.2000 | 0.0012 | 2.6% | 967 | 4300 | 0.0079 | 1.0395 | 0.0011 | 3.1% |
| Benzo(b)fluoranthene | 979 | 2169 | 0.037 | 1.8500 | 0.0019 | 3.9% | 979 | 2169 | 0.011 | 1.4474 | 0.0015 | 4.3% |
| Benzo(k)fluoranthene | 981 | 1220 | 0.024 | 1.2000 | 0.0012 | 2.6% | 981 | 1220 | 0.0099 | 1.3026 | 0.0013 | 3.9% |
| C2-Chrysenes | 1008 | - | 0.0083 | 0.4150 | 0.0004 | 0.9% | 1008 | - | 0.0027 | 0.3553 | 0.0004 | 1.0% |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.026 | 1.3000 | 0.0012 | 2.5% | 1095 | 648 | 0.0081 | 1.0658 | 0.0010 | 2.8% |
| C3-Chrysenes | 1112 | - | 0.0033 | 0.1650 | 0.0001 | 0.3% | 1112 | - | 0.0015 | 0.1974 | 0.0002 | 0.5% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.022 | 1.1000 | 0.0010 | 2.1% | 1115 | - | 0.0072 | 0.9474 | 0.0008 | 2.5% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0078 | 0.3900 | 0.0003 | 0.7% | 1123 | 2389 | 0.002 | 0.2632 | 0.0002 | 0.7% |
| C4-Chrysenes | 1214 | - | 0.001 | 0.0500 | 0.0000 | 0.1% | 1214 | - | 0.00086 | 0.1132 | 0.0001 | 0.3% |
| Sum ESBTU_{FCVI} | | | | 0.0479 | 100.0% | | | | | 0.0342 | 100.0% | |
| Sum ESBTU_{FCVI} (2 or 3 Ring PAHs) | | | | 0.0220 | 46.0% | | | | | 0.0070 | 20.5% | |
| Sum ESBTU_{FCVI} (4 Ring PAHs) | | | | 0.0144 | 30.2% | | | | | 0.0145 | 42.3% | |
| Sum ESBTU_{FCVI} (5 or 6 Ring PAHs) | | | | 0.0114 | 23.9% | | | | | 0.0127 | 37.2% | |

Notes:

PAH = Polycyclic aromatic hydrocarbons.

ug/goc = Micrograms per grams organic carbon.

ug/g = Micrograms per gram sediment.

% = Percent.

C_{OC,PAH_i,FCVI} = Critical concentration of a PAH in sediment related to the final chronic value (FCV).C_{OC,PAH_i,MAX} = Aqueous solubility of a given PAH.ESBTU = Ratio of the organic carbon-normalized sediment concentration to the critical concentration (C_{OC,PAH_i,FCVI}) of each PAH.Sum ESBTU_{FCVI} = Sum total of ESBTU_{FCVI} for 34 PAHs. ESBTU_{FCVI} for each PAH represents the organic-carbon normalized sediment concentration divided by the critical concentration of each PAH in sediment (C_{OC,PAH_i,FCVI}). ESBTU_{FCVI} were also calculated specifically for 2 or 3 ring PAHs, 4 ring PAHs and 5 or 6 ring PAHs.



Table S-5. Equilibrium Partitioning Sediment Benchmark Calculations: Bulk Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | ERM0.5 Submerged Sediment 0.017 | | | | | | ERM0.8 Submerged Sediment 0.02 | | | | | |
|---|--|---|---|---|---|---------------------|--|---|---|---|---|---------------------|
| | Polycyclic Aromatic Hydrocarbons | C _{OC,PAH_i,FCV} (ug/goc) | C _{OC,PAH_i,MAX} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | ESBTU (unitless) | Percent Contribution to ESBTU (%) | C _{OC,PAH_i,FCV_i} (ug/goc) | C _{OC,PAH_i,MAX} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | ESBTU (unitless) |
| Naphthalene | 385 | 61700 | 0.0098 | 0.5765 | 0.0015 | 3.3% | 385 | 61700 | 0.0066 | 0.3300 | 0.0009 | 3.0% |
| C1-Naphthalenes | 444 | - | 0.025 | 1.4706 | 0.0033 | 7.3% | 444 | - | 0.016 | 0.8000 | 0.0018 | 6.3% |
| Acenaphthylene | 452 | 24000 | 0.0013 | 0.0765 | 0.0002 | 0.4% | 452 | 24000 | 0.001 | 0.0500 | 0.0001 | 0.4% |
| Acenaphthene | 491 | 33400 | 0.0012 | 0.0706 | 0.0001 | 0.3% | 491 | 33400 | 0.001 | 0.0500 | 0.0001 | 0.4% |
| C2-naphthalenes | 510 | - | 0.061 | 3.5882 | 0.0070 | 15.6% | 510 | - | 0.036 | 1.8000 | 0.0035 | 12.4% |
| Fluorene | 538 | 26000 | 0.0026 | 0.1529 | 0.0003 | 0.6% | 538 | 26000 | 0.0017 | 0.0850 | 0.0002 | 0.6% |
| C3-Naphthalenes | 581 | - | 0.048 | 2.8235 | 0.0049 | 10.7% | 581 | - | 0.03 | 1.5000 | 0.0026 | 9.1% |
| Anthracene | 594 | 1300 | 0.0019 | 0.1118 | 0.0002 | 0.4% | 594 | 1300 | 0.0016 | 0.0800 | 0.0001 | 0.5% |
| Phenanthrene | 596 | 34300 | 0.021 | 1.2353 | 0.0021 | 4.6% | 596 | 34300 | 0.015 | 0.7500 | 0.0013 | 4.4% |
| C1-Fluorennes | 611 | - | 0.0036 | 0.2118 | 0.0003 | 0.8% | 611 | - | 0.0024 | 0.1200 | 0.0002 | 0.7% |
| C4-Naphthalenes | 657 | - | 0.029 | 1.7059 | 0.0026 | 5.7% | 657 | - | 0.019 | 0.9500 | 0.0014 | 5.1% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.035 | 2.0588 | 0.0031 | 6.8% | 670 | - | 0.023 | 1.1500 | 0.0017 | 6.0% |
| C2-Fluorennes | 686 | - | 0.0068 | 0.4000 | 0.0006 | 1.3% | 686 | - | 0.0034 | 0.1700 | 0.0002 | 0.9% |
| Pyrene | 697 | 9090 | 0.028 | 1.6471 | 0.0024 | 5.2% | 697 | 9090 | 0.025 | 1.2500 | 0.0018 | 6.3% |
| Fluoranthene | 707 | 23870 | 0.033 | 1.9412 | 0.0027 | 6.1% | 707 | 23870 | 0.029 | 1.4500 | 0.0021 | 7.2% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.019 | 1.1176 | 0.0015 | 3.3% | 746 | - | 0.011 | 0.5500 | 0.0007 | 2.6% |
| C3-Fluorennes | 769 | - | 0.0071 | 0.4176 | 0.0005 | 1.2% | 769 | - | 0.001 | 0.0500 | 0.0001 | 0.2% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.024 | 1.4118 | 0.0018 | 4.1% | 770 | - | 0.017 | 0.8500 | 0.0011 | 3.9% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.0095 | 0.5588 | 0.0007 | 1.5% | 829 | - | 0.0061 | 0.3050 | 0.0004 | 1.3% |
| Benzo(a)anthracene | 841 | 4153 | 0.012 | 0.7059 | 0.0008 | 1.9% | 841 | 4153 | 0.012 | 0.6000 | 0.0007 | 2.5% |
| Chrysene | 844 | 826 | 0.017 | 1.0000 | 0.0012 | 2.6% | 844 | 826 | 0.017 | 0.8500 | 0.0010 | 3.5% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.02 | 1.1765 | 0.0013 | 2.8% | 913 | - | 0.0085 | 0.4250 | 0.0005 | 1.6% |
| C1-Chrysenes | 929 | - | 0.0093 | 0.5471 | 0.0006 | 1.3% | 929 | - | 0.012 | 0.6000 | 0.0006 | 2.3% |
| Benzo(a)Pyrene | 965 | 3840 | 0.0089 | 0.5235 | 0.0005 | 1.2% | 965 | 3840 | 0.013 | 0.6500 | 0.0007 | 2.4% |
| Perylene | 967 | 431 | 0.021 | 1.2353 | 0.0013 | 2.8% | 967 | 431 | 0.015 | 0.7500 | 0.0008 | 2.7% |
| Benzo(e)pyrene | 967 | 4300 | 0.015 | 0.8824 | 0.0009 | 2.0% | 967 | 4300 | 0.017 | 0.8500 | 0.0009 | 3.1% |
| Benzo(b)fluoranthene | 979 | 2169 | 0.017 | 1.0000 | 0.0010 | 2.3% | 979 | 2169 | 0.022 | 1.1000 | 0.0011 | 3.9% |
| Benzo(k)fluoranthene | 981 | 1220 | 0.0099 | 0.5824 | 0.0006 | 1.3% | 981 | 1220 | 0.012 | 0.6000 | 0.0006 | 2.1% |
| C2-Chrysenes | 1008 | - | 0.0075 | 0.4412 | 0.0004 | 1.0% | 1008 | - | 0.0071 | 0.3550 | 0.0004 | 1.2% |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.0064 | 0.3765 | 0.0003 | 0.8% | 1095 | 648 | 0.0097 | 0.4850 | 0.0004 | 1.6% |
| C3-Chrysenes | 1112 | - | 0.0099 | 0.0582 | 0.0001 | 0.1% | 1112 | - | 0.001 | 0.0500 | 0.0000 | 0.2% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.0043 | 0.2529 | 0.0002 | 0.5% | 1115 | - | 0.0077 | 0.3850 | 0.0003 | 1.2% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0012 | 0.0706 | 0.0001 | 0.1% | 1123 | 2389 | 0.0024 | 0.1200 | 0.0001 | 0.4% |
| C4-Chrysenes | 1214 | - | 0.00099 | 0.0582 | 0.0000 | 0.1% | 1214 | - | 0.001 | 0.0500 | 0.0000 | 0.1% |
| Sum ESBTU _{FCVI} | | | | 0.0452 | 100.0% | | | | | 0.0285 | 100.0% | |
| Sum ESBTU _{FCVI} (2 or 3 Ring PAHs) | | | | 0.0302 | 66.7% | | | | | 0.0158 | 55.4% | |
| Sum ESBTU _{FCVI} (4 Ring PAHs) | | | | 0.0101 | 22.3% | | | | | 0.0078 | 27.2% | |
| Sum ESBTU _{FCVI} (5 or 6 Ring PAHs) | | | | 0.0050 | 11.0% | | | | | 0.0050 | 17.4% | |



Table S-5. Equilibrium Partitioning Sediment Benchmark Calculations: Bulk Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | ERM1.0 Submerged Sediment 0.022 | | | | | | ERM2.5 Submerged Sediment 0.005 | | | | | |
|---|--|---|---|-------------------------|----------|------------|---|---|-------------------------|----------|------------|-------|
| | Polycyclic Aromatic Hydrocarbons | Dry Weight Sediment | Organic Carbon Normalized Concentration | Percent Contribution | ESBTU | to ESBTU | Dry Weight Sediment | Organic Carbon Normalized Concentration | Percent Contribution | ESBTU | to ESBTU | |
| | | C _{OC,PAH_i,FCV_i} (ug/goc) | C _{OC,PAH_i,MAX} (ug/goc) | (ug/g) | (ug/goc) | (unitless) | C _{OC,PAH_i,FCV_i} (ug/goc) | C _{OC,PAH_i,MAX} (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) |
| Naphthalene | 385 | 61700 | 0.011 | 0.5000 | 0.0013 | 3.1% | 385 | 61700 | 0.0047 | 0.9400 | 0.0024 | 6.0% |
| C1-Naphthalenes | 444 | - | 0.027 | 1.2273 | 0.0028 | 6.7% | 444 | - | 0.0098 | 1.9600 | 0.0044 | 10.8% |
| Acenaphthylene | 452 | 24000 | 0.0012 | 0.0545 | 0.0001 | 0.3% | 452 | 24000 | R | R | R | 0.0% |
| Acenaphthene | 491 | 33400 | 0.002 | 0.0909 | 0.0002 | 0.4% | 491 | 33400 | R | R | R | 0.0% |
| #N/A | 510 | - | 0.066 | 3.0000 | 0.0059 | 14.3% | 510 | - | 0.026 | 5.2000 | 0.0102 | 25.0% |
| Fluorene | 538 | 26000 | 0.003 | 0.1364 | 0.0003 | 0.6% | 538 | 26000 | 0.00085 | 0.1700 | 0.0003 | 0.8% |
| C3-Naphthalenes | 581 | - | 0.053 | 2.4091 | 0.0041 | 10.1% | 581 | - | 0.024 | 4.8000 | 0.0083 | 20.2% |
| Anthracene | 594 | 1300 | 0.0026 | 0.1182 | 0.0002 | 0.5% | 594 | 1300 | R | R | R | 0.0% |
| Phenanthrene | 596 | 34300 | 0.027 | 1.2273 | 0.0021 | 5.0% | 596 | 34300 | 0.0037 | 0.7400 | 0.0012 | 3.0% |
| C1-Fluorennes | 611 | - | 0.004 | 0.1818 | 0.0003 | 0.7% | 611 | - | 0.0014 | 0.2800 | 0.0005 | 1.1% |
| C4-Naphthalenes | 657 | - | 0.031 | 1.4091 | 0.0021 | 5.2% | 657 | - | 0.015 | 3.0000 | 0.0046 | 11.2% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.043 | 1.9545 | 0.0029 | 7.1% | 670 | - | 0.0069 | 1.3800 | 0.0021 | 5.0% |
| C2-Fluorennes | 686 | - | 0.0069 | 0.3136 | 0.0005 | 1.1% | 686 | - | 0.0027 | 0.5400 | 0.0008 | 1.9% |
| Pyrene | 697 | 9090 | 0.036 | 1.6364 | 0.0023 | 5.7% | 697 | 9090 | 0.0026 | 0.5200 | 0.0007 | 1.8% |
| Fluoranthene | 707 | 23870 | 0.04 | 1.8182 | 0.0026 | 6.2% | 707 | 23870 | 0.0026 | 0.5200 | 0.0007 | 1.8% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.02 | 0.9091 | 0.0012 | 3.0% | 746 | - | 0.0051 | 1.0200 | 0.0014 | 3.3% |
| C3-Fluorennes | 769 | - | 0.011 | 0.5000 | 0.0007 | 1.6% | 769 | - | 0.003 | 0.6000 | 0.0008 | 1.9% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.026 | 1.1818 | 0.0015 | 3.7% | 770 | - | 0.0028 | 0.5600 | 0.0007 | 1.8% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.01 | 0.4545 | 0.0005 | 1.3% | 829 | - | 0.0032 | 0.6400 | 0.0008 | 1.9% |
| Benzo(a)anthracene | 841 | 4153 | 0.014 | 0.6364 | 0.0008 | 1.8% | 841 | 4153 | R | R | R | 0.0% |
| Chrysene | 844 | 826 | 0.023 | 1.0455 | 0.0012 | 3.0% | 844 | 826 | 0.00088 | 0.1760 | 0.0002 | 0.5% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.024 | 1.0909 | 0.0012 | 2.9% | 913 | - | 0.0027 | 0.5400 | 0.0006 | 1.4% |
| C1-Chrysenes | 929 | - | 0.01 | 0.4545 | 0.0005 | 1.2% | 929 | - | R | R | R | 0.0% |
| Benzo(a)Pyrene | 965 | 3840 | 0.014 | 0.6364 | 0.0007 | 1.6% | 965 | 3840 | R | R | R | 0.0% |
| Perylene | 967 | 431 | 0.021 | 0.9545 | 0.0010 | 2.4% | 967 | 431 | R | R | R | 0.0% |
| Benzo(e)pyrene | 967 | 4300 | 0.022 | 1.0000 | 0.0010 | 2.5% | 967 | 4300 | 0.00084 | 0.1680 | 0.0002 | 0.4% |
| Benzo(b)fluoranthene | 979 | 2169 | 0.026 | 1.1818 | 0.0012 | 2.9% | 979 | 2169 | R | R | R | 0.0% |
| Benzo(k)fluoranthene | 981 | 1220 | 0.015 | 0.6818 | 0.0007 | 1.7% | 981 | 1220 | R | R | R | 0.0% |
| C2-Chrysenes | 1008 | - | 0.0078 | 0.3545 | 0.0004 | 0.9% | 1008 | - | R | R | R | 0.0% |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.013 | 0.5909 | 0.0005 | 1.3% | 1095 | 648 | R | R | R | 0.0% |
| C3-Chrysenes | 1112 | - | 0.00096 | 0.0436 | 0.0000 | 0.1% | 1112 | - | R | R | R | 0.0% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.0087 | 0.3955 | 0.0004 | 0.9% | 1115 | - | R | R | R | 0.0% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0019 | 0.0864 | 0.0001 | 0.2% | 1123 | 2389 | R | R | R | 0.0% |
| C4-Chrysenes | 1214 | - | 0.00096 | 0.0436 | 0.0000 | 0.1% | 1214 | - | R | R | R | 0.0% |
| Sum ESBTU _{FCVI} | | | | 0.0413 | 100.0% | | | | | 0.0408 | 100.0% | |
| Sum ESBTU _{FCVI} (2 or 3 Ring PAHs) | | | | 0.0263 | 63.8% | | | | | 0.0383 | 93.7% | |
| Sum ESBTU _{FCVI} (4 Ring PAHs) | | | | 0.0094 | 22.7% | | | | | 0.0024 | 5.9% | |
| Sum ESBTU _{FCVI} (5 or 6 Ring PAHs) | | | | 0.0056 | 13.5% | | | | | 0.0002 | 0.4% | |



Table S-5. Equilibrium Partitioning Sediment Benchmark Calculations: Bulk Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | ERM3.0 Submerged Sediment 0.013 | | | | | | ERM3.5 Submerged Sediment 0.007 | | | | | |
|---|--|---|---|-------------------------|----------|------------|---|---|-------------------------|----------|------------|-------|
| | Polycyclic Aromatic Hydrocarbons | Dry Weight Sediment | Organic Carbon Normalized Concentration | Percent Contribution | ESBTU | to ESBTU | Dry Weight Sediment | Organic Carbon Normalized Concentration | Percent Contribution | ESBTU | to ESBTU | |
| | | C _{OC,PAH_i,FCV_i} (ug/goc) | C _{OC,PAH_i,MAX} (ug/goc) | Concentration (ug/g) | (ug/goc) | (unitless) | C _{OC,PAH_i,FCV_i} (ug/goc) | C _{OC,PAH_i,MAX} (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) |
| Naphthalene | 385 | 61700 | 0.0077 | 0.5923 | 0.0015 | 3.8% | 385 | 61700 | 0.0091 | 1.3000 | 0.0034 | 0.8% |
| C1-Naphthalenes | 444 | - | 0.019 | 1.4615 | 0.0033 | 8.2% | 444 | - | 0.023 | 3.2857 | 0.0074 | 1.8% |
| Acenaphthylene | 452 | 24000 | 0.00067 | 0.0515 | 0.0001 | 0.3% | 452 | 24000 | 0.0055 | 0.7857 | 0.0017 | 0.4% |
| Acenaphthene | 491 | 33400 | 0.00088 | 0.0677 | 0.0001 | 0.3% | 491 | 33400 | 0.0022 | 0.3143 | 0.0006 | 0.2% |
| #N/A | 510 | - | 0.047 | 3.6154 | 0.0071 | 17.6% | 510 | - | 0.056 | 8.0000 | 0.0157 | 3.8% |
| Fluorene | 538 | 26000 | 0.002 | 0.1538 | 0.0003 | 0.7% | 538 | 26000 | 0.0042 | 0.6000 | 0.0011 | 0.3% |
| C3-Naphthalenes | 581 | - | 0.036 | 2.7692 | 0.0048 | 11.8% | 581 | - | 0.048 | 6.8571 | 0.0118 | 2.9% |
| Anthracene | 594 | 1300 | 0.0012 | 0.0923 | 0.0002 | 0.4% | 594 | 1300 | 0.0064 | 0.9143 | 0.0015 | 0.4% |
| Phenanthrene | 596 | 34300 | 0.015 | 1.1538 | 0.0019 | 4.8% | 596 | 34300 | 0.046 | 6.5714 | 0.0110 | 2.7% |
| C1-Fluorennes | 611 | - | 0.0028 | 0.2154 | 0.0004 | 0.9% | 611 | - | 0.0069 | 0.9857 | 0.0016 | 0.4% |
| C4-Naphthalenes | 657 | - | 0.022 | 1.6923 | 0.0026 | 6.4% | 657 | - | 0.04 | 5.7143 | 0.0087 | 2.1% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.026 | 2.0000 | 0.0030 | 7.4% | 670 | - | 0.15 | 21.4286 | 0.0320 | 7.8% |
| C2-Fluorennes | 686 | - | 0.0048 | 0.3692 | 0.0005 | 1.3% | 686 | - | 0.02 | 2.8571 | 0.0042 | 1.0% |
| Pyrene | 697 | 9090 | 0.015 | 1.1538 | 0.0017 | 4.1% | 697 | 9090 | 0.31 | 44.2857 | 0.0635 | 15.4% |
| Fluoranthene | 707 | 23870 | 0.017 | 1.3077 | 0.0018 | 4.6% | 707 | 23870 | 0.27 | 38.5714 | 0.0546 | 13.3% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.012 | 0.9231 | 0.0012 | 3.1% | 746 | - | 0.1 | 14.2857 | 0.0191 | 4.7% |
| C3-Fluorennes | 769 | - | 0.0059 | 0.4538 | 0.0006 | 1.5% | 769 | - | 0.028 | 4.0000 | 0.0052 | 1.3% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.013 | 1.0000 | 0.0013 | 3.2% | 770 | - | 0.26 | 37.1429 | 0.0482 | 11.7% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.0056 | 0.4308 | 0.0005 | 1.3% | 829 | - | 0.042 | 6.0000 | 0.0072 | 1.8% |
| Benzo(a)anthracene | 841 | 4153 | 0.0057 | 0.4385 | 0.0005 | 1.3% | 841 | 4153 | 0.14 | 20.0000 | 0.0238 | 5.8% |
| Chrysene | 844 | 826 | 0.0092 | 0.7077 | 0.0008 | 2.1% | 844 | 826 | 0.12 | 17.1429 | 0.0203 | 4.9% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.0073 | 0.5615 | 0.0006 | 1.5% | 913 | - | 0.014 | 2.0000 | 0.0022 | 0.5% |
| C1-Chrysenes | 929 | - | 0.0049 | 0.3769 | 0.0004 | 1.0% | 929 | - | 0.068 | 9.7143 | 0.0105 | 2.5% |
| Benzo(a)Pyrene | 965 | 3840 | 0.0062 | 0.4769 | 0.0005 | 1.2% | 965 | 3840 | 0.094 | 13.4286 | 0.0139 | 3.4% |
| Perylene | 967 | 431 | 0.015 | 1.1538 | 0.0012 | 3.0% | 967 | 431 | 0.032 | 4.5714 | 0.0047 | 1.1% |
| Benzo(e)pyrene | 967 | 4300 | 0.0096 | 0.7385 | 0.0008 | 1.9% | 967 | 4300 | 0.062 | 8.8571 | 0.0092 | 2.2% |
| Benzo(b)fluoranthene | 979 | 2169 | 0.011 | 0.8462 | 0.0009 | 2.1% | 979 | 2169 | 0.055 | 7.8571 | 0.0080 | 2.0% |
| Benzo(k)fluoranthene | 981 | 1220 | 0.0058 | 0.4462 | 0.0005 | 1.1% | 981 | 1220 | 0.065 | 9.2857 | 0.0095 | 2.3% |
| C2-Chrysenes | 1008 | - | 0.0048 | 0.3692 | 0.0004 | 0.9% | 1008 | - | 0.016 | 2.2857 | 0.0023 | 0.6% |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.0064 | 0.4923 | 0.0004 | 1.1% | 1095 | 648 | 0.027 | 3.8571 | 0.0035 | 0.9% |
| C3-Chrysenes | 1112 | - | 0.00067 | 0.0515 | 0.0000 | 0.1% | 1112 | - | 0.006 | 0.8571 | 0.0008 | 0.2% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.0043 | 0.3308 | 0.0003 | 0.7% | 1115 | - | 0.022 | 3.1429 | 0.0028 | 0.7% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0015 | 0.1154 | 0.0001 | 0.3% | 1123 | 2389 | 0.0081 | 1.1571 | 0.0010 | 0.3% |
| C4-Chrysenes | 1214 | - | 0.00067 | 0.0515 | 0.0000 | 0.1% | 1214 | - | 0.0018 | 0.2571 | 0.0002 | 0.1% |
| Sum ESBTU _{FCVI} | | | | 0.0404 | 100.0% | | | | | 0.4114 | 100.0% | |
| Sum ESBTU _{FCVI} (2 or 3 Ring PAHs) | | | | 0.0287 | 71.2% | | | | | 0.1346 | 32.7% | |
| Sum ESBTU _{FCVI} (4 Ring PAHs) | | | | 0.0070 | 17.4% | | | | | 0.2241 | 54.5% | |
| Sum ESBTU _{FCVI} (5 or 6 Ring PAHs) | | | | 0.0046 | 11.4% | | | | | 0.0527 | 12.8% | |



Table S-5. Equilibrium Partitioning Sediment Benchmark Calculations: Bulk Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | ERM4.0 Submerged Sediment 0.032 | | | | | | ERM5.5 Submerged Sediment 0.021 | | | | | |
|---|--|---|---|-------------------------|----------|------------|---|---|-------------------------|----------|------------|-------|
| | Polycyclic Aromatic Hydrocarbons | Dry Weight Sediment | Organic Carbon Normalized Concentration | Percent Contribution | ESBTU | to ESBTU | Dry Weight Sediment | Organic Carbon Normalized Concentration | Percent Contribution | ESBTU | to ESBTU | |
| | | C _{OC,PAH_i,FCV_i} (ug/goc) | C _{OC,PAH_i,MAX} (ug/goc) | Concentration (ug/g) | (ug/goc) | (unitless) | C _{OC,PAH_i,FCV_i} (ug/goc) | C _{OC,PAH_i,MAX} (ug/goc) | (ug/g) | (ug/goc) | (unitless) | (%) |
| Naphthalene | 385 | 61700 | 0.01 | 0.3125 | 0.0008 | 1.6% | 385 | 61700 | 0.026 | 1.2381 | 0.0032 | 4.2% |
| C1-Naphthalenes | 444 | - | 0.029 | 0.9063 | 0.0020 | 4.0% | 444 | - | 0.06 | 2.8571 | 0.0064 | 8.5% |
| Acenaphthylene | 452 | 24000 | 0.0021 | 0.0656 | 0.0001 | 0.3% | 452 | 24000 | 0.00091 | 0.0433 | 0.0001 | 0.1% |
| Acenaphthene | 491 | 33400 | 0.0013 | 0.0406 | 0.0001 | 0.2% | 491 | 33400 | 0.0042 | 0.2000 | 0.0004 | 0.5% |
| #N/A | 510 | - | 0.068 | 2.1250 | 0.0042 | 8.1% | 510 | - | 0.13 | 6.1905 | 0.0121 | 16.0% |
| Fluorene | 538 | 26000 | 0.0043 | 0.1344 | 0.0002 | 0.5% | 538 | 26000 | 0.0088 | 0.4190 | 0.0008 | 1.0% |
| C3-Naphthalenes | 581 | - | 0.052 | 1.6250 | 0.0028 | 5.4% | 581 | - | 0.11 | 5.2381 | 0.0090 | 11.9% |
| Anthracene | 594 | 1300 | 0.0034 | 0.1063 | 0.0002 | 0.3% | 594 | 1300 | 0.0052 | 0.2476 | 0.0004 | 0.5% |
| Phenanthrene | 596 | 34300 | 0.026 | 0.8125 | 0.0014 | 2.6% | 596 | 34300 | 0.045 | 2.1429 | 0.0036 | 4.7% |
| C1-Fluorennes | 611 | - | 0.0052 | 0.1625 | 0.0003 | 0.5% | 611 | - | 0.0065 | 0.3095 | 0.0005 | 0.7% |
| C4-Naphthalenes | 657 | - | 0.03 | 0.9375 | 0.0014 | 2.8% | 657 | - | 0.052 | 2.4762 | 0.0038 | 5.0% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.041 | 1.2813 | 0.0019 | 3.7% | 670 | - | 0.051 | 2.4286 | 0.0036 | 4.8% |
| C2-Fluorennes | 686 | - | 0.0074 | 0.2313 | 0.0003 | 0.7% | 686 | - | 0.009 | 0.4286 | 0.0006 | 0.8% |
| Pyrene | 697 | 9090 | 0.051 | 1.5938 | 0.0023 | 4.4% | 697 | 9090 | 0.029 | 1.3810 | 0.0020 | 2.6% |
| Fluoranthene | 707 | 23870 | 0.056 | 1.7500 | 0.0025 | 4.8% | 707 | 23870 | 0.038 | 1.8095 | 0.0026 | 3.4% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.023 | 0.7188 | 0.0010 | 1.9% | 746 | - | 0.029 | 1.3810 | 0.0019 | 2.4% |
| C3-Fluorennes | 769 | - | 0.01 | 0.3125 | 0.0004 | 0.8% | 769 | - | 0.0096 | 0.4571 | 0.0006 | 0.8% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.038 | 1.1875 | 0.0015 | 3.0% | 770 | - | 0.027 | 1.2857 | 0.0017 | 2.2% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.011 | 0.3438 | 0.0004 | 0.8% | 829 | - | 0.013 | 0.6190 | 0.0007 | 1.0% |
| Benzo(a)anthracene | 841 | 4153 | 0.026 | 0.8125 | 0.0010 | 1.9% | 841 | 4153 | 0.012 | 0.5714 | 0.0007 | 0.9% |
| Chrysene | 844 | 826 | 0.037 | 1.1563 | 0.0014 | 2.7% | 844 | 826 | 0.021 | 1.0000 | 0.0012 | 1.6% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.012 | 0.3750 | 0.0004 | 0.8% | 913 | - | 0.015 | 0.7143 | 0.0008 | 1.0% |
| C1-Chrysenes | 929 | - | 0.016 | 0.5000 | 0.0005 | 1.0% | 929 | - | 0.011 | 0.5238 | 0.0006 | 0.7% |
| Benzo(a)Pyrene | 965 | 3840 | 0.031 | 0.9688 | 0.0010 | 1.9% | 965 | 3840 | 0.014 | 0.6667 | 0.0007 | 0.9% |
| Perylene | 967 | 431 | 0.54 | 16.8750 | 0.0175 | 33.8% | 967 | 431 | 0.26 | 12.3810 | 0.0128 | 16.9% |
| Benzo(e)pyrene | 967 | 4300 | 0.039 | 1.2188 | 0.0013 | 2.4% | 967 | 4300 | 0.02 | 0.9524 | 0.0010 | 1.3% |
| Benzo(b)fluoranthene | 979 | 2169 | 0.049 | 1.5313 | 0.0016 | 3.0% | 979 | 2169 | 0.024 | 1.1429 | 0.0012 | 1.5% |
| Benzo(k)fluoranthene | 981 | 1220 | 0.033 | 1.0313 | 0.0011 | 2.0% | 981 | 1220 | 0.014 | 0.6667 | 0.0007 | 0.9% |
| C2-Chrysenes | 1008 | - | 0.012 | 0.3750 | 0.0004 | 0.7% | 1008 | - | 0.013 | 0.6190 | 0.0006 | 0.8% |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.029 | 0.9063 | 0.0008 | 1.6% | 1095 | 648 | 0.014 | 0.6667 | 0.0006 | 0.8% |
| C3-Chrysenes | 1112 | - | 0.0013 | 0.0406 | 0.0000 | 0.1% | 1112 | - | 0.0081 | 0.3857 | 0.0003 | 0.5% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.023 | 0.7188 | 0.0006 | 1.2% | 1115 | - | 0.01 | 0.4762 | 0.0004 | 0.6% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0069 | 0.2156 | 0.0002 | 0.4% | 1123 | 2389 | 0.0032 | 0.1524 | 0.0001 | 0.2% |
| C4-Chrysenes | 1214 | - | 0.0013 | 0.0406 | 0.0000 | 0.1% | 1214 | - | 0.0036 | 0.1714 | 0.0001 | 0.2% |
| Sum ESBTU _{FCV_i} | | | 0.0516 | 100.0% | | | | | | 0.0758 | 100.0% | |
| Sum ESBTU _{FCV_i} (2 or 3 Ring PAHs) | | | 0.0180 | 34.8% | | | | | | 0.0486 | 64.1% | |
| Sum ESBTU _{FCV_i} (4 Ring PAHs) | | | 0.0096 | 18.6% | | | | | | 0.0097 | 12.8% | |
| Sum ESBTU _{FCV_i} (5 or 6 Ring PAHs) | | | 0.0240 | 46.5% | | | | | | 0.0175 | 23.1% | |



Table S-5. Equilibrium Partitioning Sediment Benchmark Calculations: Bulk Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | ERM_REF Submerged Sediment 0.038 | | | | | | CRM0.0 Submerged Sediment 0.025 | | | | | | |
|---|--|--|---|-------------------------------------|--|------------------------|---|-------------------------------------|--|------------------------|---|-------------------------------------|---------------------|
| | Polycyclic Aromatic Hydrocarbons | Dry Weight Sediment | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | C _{OC,PAH_i,FCVI} (ug/goc) | Dry Weight Sediment | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | C _{OC,PAH_i,FCVI} (ug/goc) | Dry Weight Sediment | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU | |
| | | C _{OC,PAH_i,FCVI} (ug/goc) | C _{OC,PAH_i,MAX} (ug/goc) | Concentration (ug/g) | ESBTU (unitless) | (%) | C _{OC,PAH_i,MAX} (ug/goc) | Concentration (ug/g) | ESBTU (unitless) | (%) | C _{OC,PAH_i,MAX} (ug/goc) | Concentration (ug/g) | ESBTU (unitless) |
| Naphthalene | 385 | 61700 | 0.013 | 0.3421 | 0.0009 | 2.0% | 385 | 61700 | 0.0089 | 0.3560 | 0.0009 | 2.7% | |
| C1-Naphthalenes | 444 | - | 0.035 | 0.9211 | 0.0021 | 4.6% | 444 | - | 0.022 | 0.8800 | 0.0020 | 5.7% | |
| Acenaphthylene | 452 | 24000 | 0.0025 | 0.0658 | 0.0001 | 0.3% | 452 | 24000 | 0.0014 | 0.0560 | 0.0001 | 0.4% | |
| Acenaphthene | 491 | 33400 | 0.002 | 0.0526 | 0.0001 | 0.2% | 491 | 33400 | 0.0014 | 0.0560 | 0.0001 | 0.3% | |
| #N/A | 510 | - | 0.077 | 2.0263 | 0.0040 | 8.7% | 510 | - | 0.05 | 2.0000 | 0.0039 | 11.3% | |
| Fluorene | 538 | 26000 | 0.0055 | 0.1447 | 0.0003 | 0.6% | 538 | 26000 | 0.003 | 0.1200 | 0.0002 | 0.6% | |
| C3-Naphthalenes | 581 | - | 0.051 | 1.3421 | 0.0023 | 5.1% | 581 | - | 0.038 | 1.5200 | 0.0026 | 7.5% | |
| Anthracene | 594 | 1300 | 0.0066 | 0.1737 | 0.0003 | 0.6% | 594 | 1300 | 0.0042 | 0.1680 | 0.0003 | 0.8% | |
| Phenanthrene | 596 | 34300 | 0.05 | 1.3158 | 0.0022 | 4.8% | 596 | 34300 | 0.023 | 0.9200 | 0.0015 | 4.5% | |
| C1-Fluorennes | 611 | - | 0.0044 | 0.1158 | 0.0002 | 0.4% | 611 | - | 0.0031 | 0.1240 | 0.0002 | 0.6% | |
| C4-Naphthalenes | 657 | - | 0.029 | 0.7632 | 0.0012 | 2.6% | 657 | - | 0.023 | 0.9200 | 0.0014 | 4.0% | |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.047 | 1.2368 | 0.0018 | 4.1% | 670 | - | 0.025 | 1.0000 | 0.0015 | 4.3% | |
| C2-Fluorennes | 686 | - | 0.0067 | 0.1763 | 0.0003 | 0.6% | 686 | - | 0.0069 | 0.2760 | 0.0004 | 1.2% | |
| Pyrene | 697 | 9090 | 0.066 | 1.7368 | 0.0025 | 5.5% | 697 | 9090 | 0.044 | 1.7600 | 0.0025 | 7.3% | |
| Fluoranthene | 707 | 23870 | 0.1 | 2.6316 | 0.0037 | 8.2% | 707 | 23870 | 0.045 | 1.8000 | 0.0025 | 7.3% | |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.028 | 0.7368 | 0.0010 | 2.2% | 746 | - | 0.016 | 0.6400 | 0.0009 | 2.5% | |
| C3-Fluorennes | 769 | - | 0.0087 | 0.2289 | 0.0003 | 0.7% | 769 | - | 0.0047 | 0.1880 | 0.0002 | 0.7% | |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.048 | 1.2632 | 0.0016 | 3.6% | 770 | - | 0.03 | 1.2000 | 0.0016 | 4.5% | |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.016 | 0.4211 | 0.0005 | 1.1% | 829 | - | 0.0078 | 0.3120 | 0.0004 | 1.1% | |
| Benzo(a)anthracene | 841 | 4153 | 0.038 | 1.0000 | 0.0012 | 2.6% | 841 | 4153 | 0.021 | 0.8400 | 0.0010 | 2.9% | |
| Chrysene | 844 | 826 | 0.056 | 1.4737 | 0.0017 | 3.8% | 844 | 826 | 0.031 | 1.2400 | 0.0015 | 4.2% | |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.23 | 6.0526 | 0.0066 | 14.6% | 913 | - | 0.015 | 0.6000 | 0.0007 | 1.9% | |
| C1-Chrysenes | 929 | - | 0.019 | 0.5000 | 0.0005 | 1.2% | 929 | - | 0.01 | 0.4000 | 0.0004 | 1.2% | |
| Benzo(a)Pyrene | 965 | 3840 | 0.05 | 1.3158 | 0.0014 | 3.0% | 965 | 3840 | 0.025 | 1.0000 | 0.0010 | 3.0% | |
| Perylene | 967 | 431 | 0.075 | 1.9737 | 0.0020 | 4.5% | 967 | 431 | 0.037 | 1.4800 | 0.0015 | 4.4% | |
| Benzo(e)pyrene | 967 | 4300 | 0.057 | 1.5000 | 0.0016 | 3.4% | 967 | 4300 | 0.023 | 0.9200 | 0.0010 | 2.7% | |
| Benzo(b)fluoranthene | 979 | 2169 | 0.07 | 1.8421 | 0.0019 | 4.1% | 979 | 2169 | 0.041 | 1.6400 | 0.0017 | 4.8% | |
| Benzo(k)fluoranthene | 981 | 1220 | 0.047 | 1.2368 | 0.0013 | 2.8% | 981 | 1220 | 0.025 | 1.0000 | 0.0010 | 2.9% | |
| C2-Chrysenes | 1008 | - | 0.017 | 0.4474 | 0.0004 | 1.0% | 1008 | - | 0.01 | 0.4000 | 0.0004 | 1.1% | |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.029 | 0.7632 | 0.0007 | 1.5% | 1095 | 648 | 0.011 | 0.4400 | 0.0004 | 1.2% | |
| C3-Chrysenes | 1112 | - | 0.0014 | 0.0368 | 0.0000 | 0.1% | 1112 | - | 0.0048 | 0.1920 | 0.0002 | 0.5% | |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.025 | 0.6579 | 0.0006 | 1.3% | 1115 | - | 0.01 | 0.4000 | 0.0004 | 1.0% | |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0072 | 0.1895 | 0.0002 | 0.4% | 1123 | 2389 | 0.0039 | 0.1560 | 0.0001 | 0.4% | |
| C4-Chrysenes | 1214 | - | 0.0014 | 0.0368 | 0.0000 | 0.1% | 1214 | - | 0.0026 | 0.1040 | 0.0001 | 0.2% | |
| Sum ESBTU _{FCVI} | | | | 0.0455 | 100.0% | | | | | 0.0347 | 100.0% | | |
| Sum ESBTU _{FCVI} (2 or 3 Ring PAHs) | | | | 0.0241 | 53.0% | | | | | 0.0174 | 50.1% | | |
| Sum ESBTU _{FCVI} (4 Ring PAHs) | | | | 0.0118 | 26.0% | | | | | 0.0102 | 29.4% | | |
| Sum ESBTU _{FCVI} (5 or 6 Ring PAHs) | | | | 0.0096 | 21.0% | | | | | 0.0071 | 20.5% | | |



Table S-5. Equilibrium Partitioning Sediment Benchmark Calculations: Bulk Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | CRM1.5 Submerged Sediment 0.023 | | | | | | CRM2.0 Submerged Sediment 0.014 | | | | | |
|---|--|--|---|--|---------------------|--|------------------------------------|---|--|---------------------|--|-------|
| | Polycyclic Aromatic Hydrocarbons | Dry Weight Sediment | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU (%) | ESBTU (unitless) | C _{OC,PAH_i,FCVI} (ug/goc) | Dry Weight Sediment | Organic Carbon Normalized Concentration | Percent Contribution to ESBTU (%) | ESBTU (unitless) | C _{OC,PAH_i,FCVI} (ug/goc) | |
| | | C _{OC,PAH_i,FCVI} (ug/goc) | C _{OC,PAH_i,MAX} (ug/goc) | (ug/g) | (ug/goc) | (ug/g) | (ug/g) | (ug/goc) | (ug/g) | (ug/goc) | | |
| Naphthalene | 385 | 61700 | 0.013 | 0.5652 | 0.0015 | 2.1% | 385 | 61700 | 0.0079 | 0.5643 | 0.0015 | 3.1% |
| C1-Naphthalenes | 444 | - | 0.035 | 1.5217 | 0.0034 | 5.0% | 444 | - | 0.02 | 1.4286 | 0.0032 | 6.7% |
| Acenaphthylene | 452 | 24000 | 0.002 | 0.0870 | 0.0002 | 0.3% | 452 | 24000 | 0.001 | 0.0714 | 0.0002 | 0.3% |
| Acenaphthene | 491 | 33400 | 0.0015 | 0.0652 | 0.0001 | 0.2% | 491 | 33400 | 0.001 | 0.0714 | 0.0001 | 0.3% |
| #N/A | 510 | - | 0.08 | 3.4783 | 0.0068 | 10.0% | 510 | - | 0.044 | 3.1429 | 0.0062 | 12.9% |
| Fluorene | 538 | 26000 | 0.0041 | 0.1783 | 0.0003 | 0.5% | 538 | 26000 | 0.002 | 0.1429 | 0.0003 | 0.6% |
| C3-Naphthalenes | 581 | - | 0.061 | 2.6522 | 0.0046 | 6.7% | 581 | - | 0.035 | 2.5000 | 0.0043 | 9.0% |
| Anthracene | 594 | 1300 | 0.004 | 0.1739 | 0.0003 | 0.4% | 594 | 1300 | 0.0021 | 0.1500 | 0.0003 | 0.5% |
| Phenanthrene | 596 | 34300 | 0.03 | 1.3043 | 0.0022 | 3.2% | 596 | 34300 | 0.017 | 1.2143 | 0.0020 | 4.3% |
| C1-Fluorennes | 611 | - | 0.0048 | 0.2087 | 0.0003 | 0.5% | 611 | - | 0.0025 | 0.1786 | 0.0003 | 0.6% |
| C4-Naphthalenes | 657 | - | 0.038 | 1.6522 | 0.0025 | 3.7% | 657 | - | 0.021 | 1.5000 | 0.0023 | 4.8% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.036 | 1.5652 | 0.0023 | 3.4% | 670 | - | 0.019 | 1.3571 | 0.0020 | 4.2% |
| C2-Fluorennes | 686 | - | 0.01 | 0.4348 | 0.0006 | 0.9% | 686 | - | 0.0057 | 0.4071 | 0.0006 | 1.2% |
| Pyrene | 697 | 9090 | 0.06 | 2.6087 | 0.0037 | 5.5% | 697 | 9090 | 0.032 | 2.2857 | 0.0033 | 6.9% |
| Fluoranthene | 707 | 23870 | 0.06 | 2.6087 | 0.0037 | 5.4% | 707 | 23870 | 0.034 | 2.4286 | 0.0034 | 7.2% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.026 | 1.1304 | 0.0015 | 2.2% | 746 | - | 0.014 | 1.0000 | 0.0013 | 2.8% |
| C3-Fluorennes | 769 | - | 0.008 | 0.3478 | 0.0005 | 0.7% | 769 | - | 0.0042 | 0.3000 | 0.0004 | 0.8% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.041 | 1.7826 | 0.0023 | 3.4% | 770 | - | 0.021 | 1.5000 | 0.0019 | 4.1% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.014 | 0.6087 | 0.0007 | 1.1% | 829 | - | 0.0069 | 0.4929 | 0.0006 | 1.2% |
| Benzo(a)anthracene | 841 | 4153 | 0.031 | 1.3478 | 0.0016 | 2.3% | 841 | 4153 | 0.014 | 1.0000 | 0.0012 | 2.5% |
| Chrysene | 844 | 826 | 0.037 | 1.6087 | 0.0019 | 2.8% | 844 | 826 | 0.019 | 1.3571 | 0.0016 | 3.4% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.011 | 0.4783 | 0.0005 | 0.8% | 913 | - | 0.0077 | 0.5500 | 0.0006 | 1.3% |
| C1-Chrysenes | 929 | - | 0.024 | 1.0435 | 0.0011 | 1.6% | 929 | - | 0.0074 | 0.5286 | 0.0006 | 1.2% |
| Benzo(a)Pyrene | 965 | 3840 | 0.035 | 1.5217 | 0.0016 | 2.3% | 965 | 3840 | 0.015 | 1.0714 | 0.0011 | 2.3% |
| Perylene | 967 | 431 | 0.35 | 15.2174 | 0.0157 | 23.0% | 967 | 431 | 0.034 | 2.4286 | 0.0025 | 5.3% |
| Benzo(e)pyrene | 967 | 4300 | 0.032 | 1.3913 | 0.0014 | 2.1% | 967 | 4300 | 0.015 | 1.0714 | 0.0011 | 2.3% |
| Benzo(b)fluoranthene | 979 | 2169 | 0.052 | 2.2609 | 0.0023 | 3.4% | 979 | 2169 | 0.023 | 1.6429 | 0.0017 | 3.5% |
| Benzo(k)fluoranthene | 981 | 1220 | 0.037 | 1.6087 | 0.0016 | 2.4% | 981 | 1220 | 0.017 | 1.2143 | 0.0012 | 2.6% |
| C2-Chrysenes | 1008 | - | 0.017 | 0.7391 | 0.0007 | 1.1% | 1008 | - | 0.0075 | 0.5357 | 0.0005 | 1.1% |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.018 | 0.7826 | 0.0007 | 1.0% | 1095 | 648 | 0.0073 | 0.5214 | 0.0005 | 1.0% |
| C3-Chrysenes | 1112 | - | 0.0096 | 0.4174 | 0.0004 | 0.5% | 1112 | - | 0.004 | 0.2857 | 0.0003 | 0.5% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.017 | 0.7391 | 0.0007 | 1.0% | 1115 | - | 0.0066 | 0.4714 | 0.0004 | 0.9% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0059 | 0.2565 | 0.0002 | 0.3% | 1123 | 2389 | 0.0024 | 0.1714 | 0.0002 | 0.3% |
| C4-Chrysenes | 1214 | - | 0.0047 | 0.2043 | 0.0002 | 0.2% | 1214 | - | 0.0022 | 0.1571 | 0.0001 | 0.3% |
| Sum ESBTU _{FCVI} | | | | 0.0684 | 100.0% | | | | | 0.0478 | 100.0% | |
| Sum ESBTU _{FCVI} (2 or 3 Ring PAHs) | | | | 0.0285 | 41.6% | | | | | 0.0261 | 54.7% | |
| Sum ESBTU _{FCVI} (4 Ring PAHs) | | | | 0.0157 | 22.9% | | | | | 0.0129 | 27.1% | |
| Sum ESBTU _{FCVI} (5 or 6 Ring PAHs) | | | | 0.0243 | 35.5% | | | | | 0.0087 | 18.2% | |



Table S-5. Equilibrium Partitioning Sediment Benchmark Calculations: Bulk Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | CRM2.5 Submerged Sediment 0.016 | | | | | | CRM3.0 Submerged Sediment 0.025 | | | | | |
|---|--|---|---|--|--------------------------------------|--------------------------------------|---|---|--|---------------------|--------------------------------------|--------------------------------------|
| | Polycyclic Aromatic Hydrocarbons | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/g) | Percent Contribution to ESBTU (%) | ESBTU (unitless) | C _{OC,PAHI,FCV} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/g) | Percent Contribution to ESBTU (%) | ESBTU (unitless) | C _{OC,PAHI,FCV} (ug/goc) | C _{OC,PAHI,MAX} (ug/goc) |
| #N/A | | C _{OC,PAHI,FCV} (ug/goc) | C _{OC,PAHI,MAX} (ug/goc) | ESBTU (unitless) | C _{OC,PAHI,FCV} (ug/goc) | C _{OC,PAHI,MAX} (ug/goc) | | | | | | |
| Naphthalene | 385 | 61700 | 0.011 | 0.6875 | 0.0018 | 3.4% | 385 | 61700 | 0.0064 | 0.2560 | 0.0007 | 2.5% |
| C1-Naphthalenes | 444 | - | 0.028 | 1.7500 | 0.0039 | 7.5% | 444 | - | 0.016 | 0.6400 | 0.0014 | 5.5% |
| Acenaphthylene | 452 | 24000 | 0.00098 | 0.0613 | 0.0001 | 0.3% | 452 | 24000 | 0.0013 | 0.0520 | 0.0001 | 0.4% |
| Acenaphthene | 491 | 33400 | 0.0013 | 0.0813 | 0.0002 | 0.3% | 491 | 33400 | 0.0011 | 0.0440 | 0.0001 | 0.3% |
| #N/A | 510 | - | 0.06 | 3.7500 | 0.0074 | 14.0% | 510 | - | 0.037 | 1.4800 | 0.0029 | 11.1% |
| Fluorene | 538 | 26000 | 0.0026 | 0.1625 | 0.0003 | 0.6% | 538 | 26000 | 0.002 | 0.0800 | 0.0001 | 0.6% |
| C3-Naphthalenes | 581 | - | 0.044 | 2.7500 | 0.0047 | 9.0% | 581 | - | 0.029 | 1.1600 | 0.0020 | 7.6% |
| Anthracene | 594 | 1300 | 0.0028 | 0.1750 | 0.0003 | 0.6% | 594 | 1300 | 0.0022 | 0.0880 | 0.0001 | 0.6% |
| Phenanthrene | 596 | 34300 | 0.021 | 1.3125 | 0.0022 | 4.2% | 596 | 34300 | 0.018 | 0.7200 | 0.0012 | 4.6% |
| C1-Fluorennes | 611 | - | 0.003 | 0.1875 | 0.0003 | 0.6% | 611 | - | 0.0027 | 0.1080 | 0.0002 | 0.7% |
| C4-Naphthalenes | 657 | - | 0.026 | 1.6250 | 0.0025 | 4.7% | 657 | - | 0.018 | 0.7200 | 0.0011 | 4.2% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.025 | 1.5625 | 0.0023 | 4.4% | 670 | - | 0.018 | 0.7200 | 0.0011 | 4.1% |
| C2-Fluorennes | 686 | - | 0.0068 | 0.4250 | 0.0006 | 1.2% | 686 | - | 0.0057 | 0.2280 | 0.0003 | 1.3% |
| Pyrene | 697 | 9090 | 0.04 | 2.5000 | 0.0036 | 6.8% | 697 | 9090 | 0.035 | 1.4000 | 0.0020 | 7.7% |
| Fluoranthene | 707 | 23870 | 0.04 | 2.5000 | 0.0035 | 6.7% | 707 | 23870 | 0.04 | 1.6000 | 0.0023 | 8.7% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.017 | 1.0625 | 0.0014 | 2.7% | 746 | - | 0.013 | 0.5200 | 0.0007 | 2.7% |
| C3-Fluorennes | 769 | - | 0.0048 | 0.3000 | 0.0004 | 0.7% | 769 | - | 0.0048 | 0.1920 | 0.0002 | 1.0% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.027 | 1.6875 | 0.0022 | 4.2% | 770 | - | 0.021 | 0.8400 | 0.0011 | 4.2% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.0089 | 0.5563 | 0.0007 | 1.3% | 829 | - | 0.0068 | 0.2720 | 0.0003 | 1.3% |
| Benzo(a)anthracene | 841 | 4153 | 0.018 | 1.1250 | 0.0013 | 2.5% | 841 | 4153 | 0.015 | 0.6000 | 0.0007 | 2.7% |
| Chrysene | 844 | 826 | 0.021 | 1.3125 | 0.0016 | 3.0% | 844 | 826 | 0.022 | 0.8800 | 0.0010 | 4.0% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.0078 | 0.4875 | 0.0005 | 1.0% | 913 | - | 0.011 | 0.4400 | 0.0005 | 1.8% |
| C1-Chrysenes | 929 | - | 0.0082 | 0.5125 | 0.0006 | 1.1% | 929 | - | 0.008 | 0.3200 | 0.0003 | 1.3% |
| Benzo(a)Pyrene | 965 | 3840 | 0.017 | 1.0625 | 0.0011 | 2.1% | 965 | 3840 | 0.017 | 0.6800 | 0.0007 | 2.7% |
| Perylene | 967 | 431 | 0.051 | 3.1875 | 0.0033 | 6.3% | 967 | 431 | 0.026 | 1.0400 | 0.0011 | 4.1% |
| Benzo(e)pyrene | 967 | 4300 | 0.016 | 1.0000 | 0.0010 | 2.0% | 967 | 4300 | 0.017 | 0.6800 | 0.0007 | 2.7% |
| Benzo(b)fluoranthene | 979 | 2169 | 0.025 | 1.5625 | 0.0016 | 3.0% | 979 | 2169 | 0.028 | 1.1200 | 0.0011 | 4.4% |
| Benzo(k)fluoranthene | 981 | 1220 | 0.019 | 1.1875 | 0.0012 | 2.3% | 981 | 1220 | 0.021 | 0.8400 | 0.0009 | 3.3% |
| C2-Chrysenes | 1008 | - | 0.0081 | 0.5063 | 0.0005 | 1.0% | 1008 | - | 0.0093 | 0.3720 | 0.0004 | 1.4% |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.008 | 0.5000 | 0.0005 | 0.9% | 1095 | 648 | 0.0072 | 0.2880 | 0.0003 | 1.0% |
| C3-Chrysenes | 1112 | - | 0.0039 | 0.2438 | 0.0002 | 0.4% | 1112 | - | 0.0011 | 0.0440 | 0.0000 | 0.2% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.0071 | 0.4438 | 0.0004 | 0.8% | 1115 | - | 0.0069 | 0.2760 | 0.0002 | 0.9% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0029 | 0.1813 | 0.0002 | 0.3% | 1123 | 2389 | 0.002 | 0.0800 | 0.0001 | 0.3% |
| C4-Chrysenes | 1214 | - | 0.0022 | 0.1375 | 0.0001 | 0.2% | 1214 | - | 0.0011 | 0.0440 | 0.0000 | 0.1% |
| Sum ESBTU _{FCVI} | | | | 0.0525 | 100.0% | | | | | 0.0261 | 100.0% | |
| Sum ESBTU _{FCVI} (2 or 3 Ring PAHs) | | | | 0.0297 | 56.5% | | | | | 0.0132 | 50.3% | |
| Sum ESBTU _{FCVI} (4 Ring PAHs) | | | | 0.0136 | 25.9% | | | | | 0.0079 | 30.3% | |
| Sum ESBTU _{FCVI} (5 or 6 Ring PAHs) | | | | 0.0093 | 17.6% | | | | | 0.0051 | 19.4% | |



Table S-5. Equilibrium Partitioning Sediment Benchmark Calculations: Bulk Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | CRM3.5 Submerged Sediment 0.025 | | | | | | CRM4.0 Submerged Sediment 0.022 | | | | | |
|---|--|---|---|---------------------|--|---|---|---------------------|--|--------|--------|-------|
| | Polycyclic Aromatic Hydrocarbons | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/g) | ESBTU (unitless) | Percent Contribution to ESBTU (%) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/g) | ESBTU (unitless) | Percent Contribution to ESBTU (%) | | | |
| | | C _{OC,PAH_i,FCV_i} (ug/goc) | C _{OC,PAH_i,MAX} (ug/goc) | | | C _{OC,PAH_i,FCV_i} (ug/goc) | C _{OC,PAH_i,MAX} (ug/goc) | | | | | |
| Naphthalene | 385 | 61700 | 0.0069 | 0.2760 | 0.0007 | 2.6% | 385 | 61700 | 0.0087 | 0.3955 | 0.0010 | 3.0% |
| C1-Naphthalenes | 444 | - | 0.017 | 0.6800 | 0.0015 | 5.6% | 444 | - | 0.022 | 1.0000 | 0.0023 | 6.7% |
| Acenaphthylene | 452 | 24000 | 0.0012 | 0.0480 | 0.0001 | 0.4% | 452 | 24000 | 0.0013 | 0.0591 | 0.0001 | 0.4% |
| Acenaphthene | 491 | 33400 | 0.0012 | 0.0480 | 0.0001 | 0.4% | 491 | 33400 | 0.001 | 0.0455 | 0.0001 | 0.3% |
| #N/A | 510 | - | 0.04 | 1.6000 | 0.0031 | 11.5% | 510 | - | 0.047 | 2.1364 | 0.0042 | 12.4% |
| Fluorene | 538 | 26000 | 0.0023 | 0.0920 | 0.0002 | 0.6% | 538 | 26000 | 0.0023 | 0.1045 | 0.0002 | 0.6% |
| C3-Naphthalenes | 581 | - | 0.031 | 1.2400 | 0.0021 | 7.8% | 581 | - | 0.035 | 1.5909 | 0.0027 | 8.1% |
| Anthracene | 594 | 1300 | 0.0034 | 0.1360 | 0.0002 | 0.8% | 594 | 1300 | 0.0028 | 0.1273 | 0.0002 | 0.6% |
| Phenanthrene | 596 | 34300 | 0.019 | 0.7600 | 0.0013 | 4.7% | 596 | 34300 | 0.019 | 0.8636 | 0.0014 | 4.3% |
| C1-Fluorennes | 611 | - | 0.0025 | 0.1000 | 0.0002 | 0.6% | 611 | - | 0.0025 | 0.1136 | 0.0002 | 0.6% |
| C4-Naphthalenes | 657 | - | 0.019 | 0.7600 | 0.0012 | 4.2% | 657 | - | 0.021 | 0.9545 | 0.0015 | 4.3% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.019 | 0.7600 | 0.0011 | 4.2% | 670 | - | 0.02 | 0.9091 | 0.0014 | 4.0% |
| C2-Fluorennes | 686 | - | 0.0057 | 0.2280 | 0.0003 | 1.2% | 686 | - | 0.0051 | 0.2318 | 0.0003 | 1.0% |
| Pyrene | 697 | 9090 | 0.036 | 1.4400 | 0.0021 | 7.6% | 697 | 9090 | 0.038 | 1.7273 | 0.0025 | 7.3% |
| Fluoranthene | 707 | 23870 | 0.038 | 1.5200 | 0.0021 | 7.9% | 707 | 23870 | 0.037 | 1.6818 | 0.0024 | 7.0% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.013 | 0.5200 | 0.0007 | 2.6% | 746 | - | 0.014 | 0.6364 | 0.0009 | 2.5% |
| C3-Fluorennes | 769 | - | 0.0052 | 0.2080 | 0.0003 | 1.0% | 769 | - | 0.0039 | 0.1773 | 0.0002 | 0.7% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.022 | 0.8800 | 0.0011 | 4.2% | 770 | - | 0.025 | 1.1364 | 0.0015 | 4.4% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.0064 | 0.2560 | 0.0003 | 1.1% | 829 | - | 0.0064 | 0.2909 | 0.0004 | 1.0% |
| Benzo(a)anthracene | 841 | 4153 | 0.016 | 0.6400 | 0.0008 | 2.8% | 841 | 4153 | 0.018 | 0.8182 | 0.0010 | 2.9% |
| Chrysene | 844 | 826 | 0.022 | 0.8800 | 0.0010 | 3.8% | 844 | 826 | 0.023 | 1.0455 | 0.0012 | 3.7% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.0082 | 0.3280 | 0.0004 | 1.3% | 913 | - | 0.0092 | 0.4182 | 0.0005 | 1.4% |
| C1-Chrysenes | 929 | - | 0.0081 | 0.3240 | 0.0003 | 1.3% | 929 | - | 0.0075 | 0.3409 | 0.0004 | 1.1% |
| Benzo(a)Pyrene | 965 | 3840 | 0.018 | 0.7200 | 0.0007 | 2.7% | 965 | 3840 | 0.019 | 0.8636 | 0.0009 | 2.7% |
| Perylene | 967 | 431 | 0.032 | 1.2800 | 0.0013 | 4.9% | 967 | 431 | 0.046 | 2.0909 | 0.0022 | 6.4% |
| Benzo(e)pyrene | 967 | 4300 | 0.018 | 0.7200 | 0.0007 | 2.7% | 967 | 4300 | 0.016 | 0.7273 | 0.0008 | 2.2% |
| Benzo(b)fluoranthene | 979 | 2169 | 0.029 | 1.1600 | 0.0012 | 4.4% | 979 | 2169 | 0.029 | 1.3182 | 0.0013 | 4.0% |
| Benzo(k)fluoranthene | 981 | 1220 | 0.02 | 0.8000 | 0.0008 | 3.0% | 981 | 1220 | 0.018 | 0.8182 | 0.0008 | 2.5% |
| C2-Chrysenes | 1008 | - | 0.0092 | 0.3680 | 0.0004 | 1.3% | 1008 | - | 0.0075 | 0.3409 | 0.0003 | 1.0% |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.0077 | 0.3080 | 0.0003 | 1.0% | 1095 | 648 | 0.0084 | 0.3818 | 0.0003 | 1.0% |
| C3-Chrysenes | 1112 | - | 0.0012 | 0.0480 | 0.0000 | 0.2% | 1112 | - | 0.0036 | 0.1636 | 0.0001 | 0.4% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.0072 | 0.2880 | 0.0003 | 0.9% | 1115 | - | 0.0081 | 0.3682 | 0.0003 | 1.0% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0027 | 0.1080 | 0.0001 | 0.4% | 1123 | 2389 | 0.0025 | 0.1136 | 0.0001 | 0.3% |
| C4-Chrysenes | 1214 | - | 0.0012 | 0.0480 | 0.0000 | 0.1% | 1214 | - | 0.0022 | 0.1000 | 0.0001 | 0.2% |
| Sum ESBTU _{FCVI} | | | 0.0272 | 100.0% | | | | | | 0.0338 | 100.0% | |
| Sum ESBTU _{FCVI} (2 or 3 Ring PAHs) | | | 0.0138 | 50.8% | | | | | | 0.0175 | 51.9% | |
| Sum ESBTU _{FCVI} (4 Ring PAHs) | | | 0.0080 | 29.2% | | | | | | 0.0095 | 28.1% | |
| Sum ESBTU _{FCVI} (5 or 6 Ring PAHs) | | | 0.0055 | 20.0% | | | | | | 0.0068 | 20.1% | |



Table S-5. Equilibrium Partitioning Sediment Benchmark Calculations: Bulk Sediment
Tennessee Valley Authority Kingston, Tennessee

| Sample Location ID (River_Reach): Fraction Organic Carbon: | CRM4.5 Submerged Sediment 0.02 | | | | | | CRM_REF Submerged Sediment 0.018 | | | | | |
|---|--|-------------------------------------|-------------------------------------|---|---|---------------------|--|-------------------------------------|-------------------------------------|---|---|---------------------|
| | Polycyclic Aromatic Hydrocarbons | C _{OC,PAH,FCV} (ug/goc) | C _{OC,PAH,MAX} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | ESBTU (unitless) | Percent Contribution to ESBTU (%) | C _{OC,PAH,FCV} (ug/goc) | C _{OC,PAH,MAX} (ug/goc) | Dry Weight Sediment Concentration (ug/g) | Organic Carbon Normalized Concentration (ug/goc) | ESBTU (unitless) |
| Naphthalene | 385 | 61700 | 0.01 | 0.5000 | 0.0013 | 3.3% | 385 | 61700 | 0.018 | 1.0000 | 0.0026 | 3.7% |
| C1-Naphthalenes | 444 | - | 0.026 | 1.3000 | 0.0029 | 7.5% | 444 | - | 0.048 | 2.6667 | 0.0060 | 8.6% |
| Acenaphthylene | 452 | 24000 | 0.001 | 0.0500 | 0.0001 | 0.3% | 452 | 24000 | 0.0009 | 0.0500 | 0.0001 | 0.2% |
| Acenaphthene | 491 | 33400 | 0.0011 | 0.0550 | 0.0001 | 0.3% | 491 | 33400 | 0.0031 | 0.1722 | 0.0004 | 0.5% |
| #N/A | 510 | - | 0.058 | 2.9000 | 0.0057 | 14.5% | 510 | - | 0.11 | 6.1111 | 0.0120 | 17.2% |
| Fluorene | 538 | 26000 | 0.0024 | 0.1200 | 0.0002 | 0.6% | 538 | 26000 | 0.0044 | 0.2444 | 0.0005 | 0.7% |
| C3-Naphthalenes | 581 | - | 0.045 | 2.2500 | 0.0039 | 9.9% | 581 | - | 0.075 | 4.1667 | 0.0072 | 10.3% |
| Anthracene | 594 | 1300 | 0.0024 | 0.1200 | 0.0002 | 0.5% | 594 | 1300 | 0.0067 | 0.3722 | 0.0006 | 0.9% |
| Phenanthrene | 596 | 34300 | 0.019 | 0.9500 | 0.0016 | 4.1% | 596 | 34300 | 0.037 | 2.0556 | 0.0034 | 5.0% |
| C1-Fluorennes | 611 | - | 0.0031 | 0.1550 | 0.0003 | 0.6% | 611 | - | 0.0043 | 0.2389 | 0.0004 | 0.6% |
| C4-Naphthalenes | 657 | - | 0.027 | 1.3500 | 0.0021 | 5.3% | 657 | - | 0.045 | 2.5000 | 0.0038 | 5.5% |
| C1-Phenanthrenes/Anthracenes | 670 | - | 0.023 | 1.1500 | 0.0017 | 4.4% | 670 | - | 0.04 | 2.2222 | 0.0033 | 4.8% |
| C2-Fluorennes | 686 | - | 0.0067 | 0.3350 | 0.0005 | 1.2% | 686 | - | 0.0095 | 0.5278 | 0.0008 | 1.1% |
| Pyrene | 697 | 9090 | 0.031 | 1.5500 | 0.0022 | 5.7% | 697 | 9090 | 0.039 | 2.1667 | 0.0031 | 4.5% |
| Fluoranthene | 707 | 23870 | 0.032 | 1.6000 | 0.0023 | 5.8% | 707 | 23870 | 0.042 | 2.3333 | 0.0033 | 4.7% |
| C2-Phenanthrenes/Anthracenes | 746 | - | 0.017 | 0.8500 | 0.0011 | 2.9% | 746 | - | 0.027 | 1.5000 | 0.0020 | 2.9% |
| C3-Fluorennes | 769 | - | 0.0048 | 0.2400 | 0.0003 | 0.8% | 769 | - | 0.0066 | 0.3667 | 0.0005 | 0.7% |
| C1-Fluoranthenes/Pyrenes | 770 | - | 0.024 | 1.2000 | 0.0016 | 4.0% | 770 | - | 0.033 | 1.8333 | 0.0024 | 3.4% |
| C3-Phenanthrenes/Anthracenes | 829 | - | 0.0075 | 0.3750 | 0.0005 | 1.2% | 829 | - | 0.014 | 0.7778 | 0.0009 | 1.3% |
| Benzo(a)anthracene | 841 | 4153 | 0.015 | 0.7500 | 0.0009 | 2.3% | 841 | 4153 | 0.025 | 1.3889 | 0.0017 | 2.4% |
| Chrysene | 844 | 826 | 0.019 | 0.9500 | 0.0011 | 2.9% | 844 | 826 | 0.024 | 1.3333 | 0.0016 | 2.3% |
| C4-Phenanthrenes/Anthracenes | 913 | - | 0.021 | 1.0500 | 0.0012 | 2.9% | 913 | - | 0.0076 | 0.4222 | 0.0005 | 0.7% |
| C1-Chrysenes | 929 | - | 0.0081 | 0.4050 | 0.0004 | 1.1% | 929 | - | 0.018 | 1.0000 | 0.0011 | 1.5% |
| Benzo(a)Pyrene | 965 | 3840 | 0.015 | 0.7500 | 0.0008 | 2.0% | 965 | 3840 | 0.028 | 1.5556 | 0.0016 | 2.3% |
| Perylene | 967 | 431 | 0.038 | 1.9000 | 0.0020 | 5.0% | 967 | 431 | 0.053 | 2.9444 | 0.0030 | 4.4% |
| Benzo(e)pyrene | 967 | 4300 | 0.015 | 0.7500 | 0.0008 | 2.0% | 967 | 4300 | 0.021 | 1.1667 | 0.0012 | 1.7% |
| Benzo(b)fluoranthene | 979 | 2169 | 0.023 | 1.1500 | 0.0012 | 3.0% | 979 | 2169 | 0.031 | 1.7222 | 0.0018 | 2.5% |
| Benzo(k)fluoranthene | 981 | 1220 | 0.018 | 0.9000 | 0.0009 | 2.3% | 981 | 1220 | 0.024 | 1.3333 | 0.0014 | 2.0% |
| C2-Chrysenes | 1008 | - | 0.0086 | 0.4300 | 0.0004 | 1.1% | 1008 | - | 0.013 | 0.7222 | 0.0007 | 1.0% |
| Benzo(g,h,i)perylene | 1095 | 648 | 0.0068 | 0.3400 | 0.0003 | 0.8% | 1095 | 648 | 0.011 | 0.6111 | 0.0006 | 0.8% |
| C3-Chrysenes | 1112 | - | 0.0042 | 0.2100 | 0.0002 | 0.5% | 1112 | - | 0.0071 | 0.3944 | 0.0004 | 0.5% |
| Indeno(1,2,3-cd)pyrene | 1115 | - | 0.0061 | 0.3050 | 0.0003 | 0.7% | 1115 | - | 0.011 | 0.6111 | 0.0005 | 0.8% |
| Dibenz(a,h)anthracene | 1123 | 2389 | 0.0024 | 0.1200 | 0.0001 | 0.3% | 1123 | 2389 | 0.0045 | 0.2500 | 0.0002 | 0.3% |
| C4-Chrysenes | 1214 | - | 0.0025 | 0.1250 | 0.0001 | 0.3% | 1214 | - | 0.0036 | 0.2000 | 0.0002 | 0.2% |
| Sum ESBTU _{FCVI} | | | | 0.0391 | 100.0% | | | | | 0.0696 | 100.0% | |
| Sum ESBTU _{FCVI} (2 or 3 Ring PAHs) | | | | 0.0236 | 60.3% | | | | | 0.0449 | 64.6% | |
| Sum ESBTU _{FCVI} (4 Ring PAHs) | | | | 0.0092 | 23.6% | | | | | 0.0143 | 20.6% | |
| Sum ESBTU _{FCVI} (5 or 6 Ring PAHs) | | | | 0.0063 | 16.1% | | | | | 0.0103 | 14.8% | |

Notes:

PAH = Polycyclic aromatic hydrocarbons.

ug/goc = Micrograms per grams organic carbon.

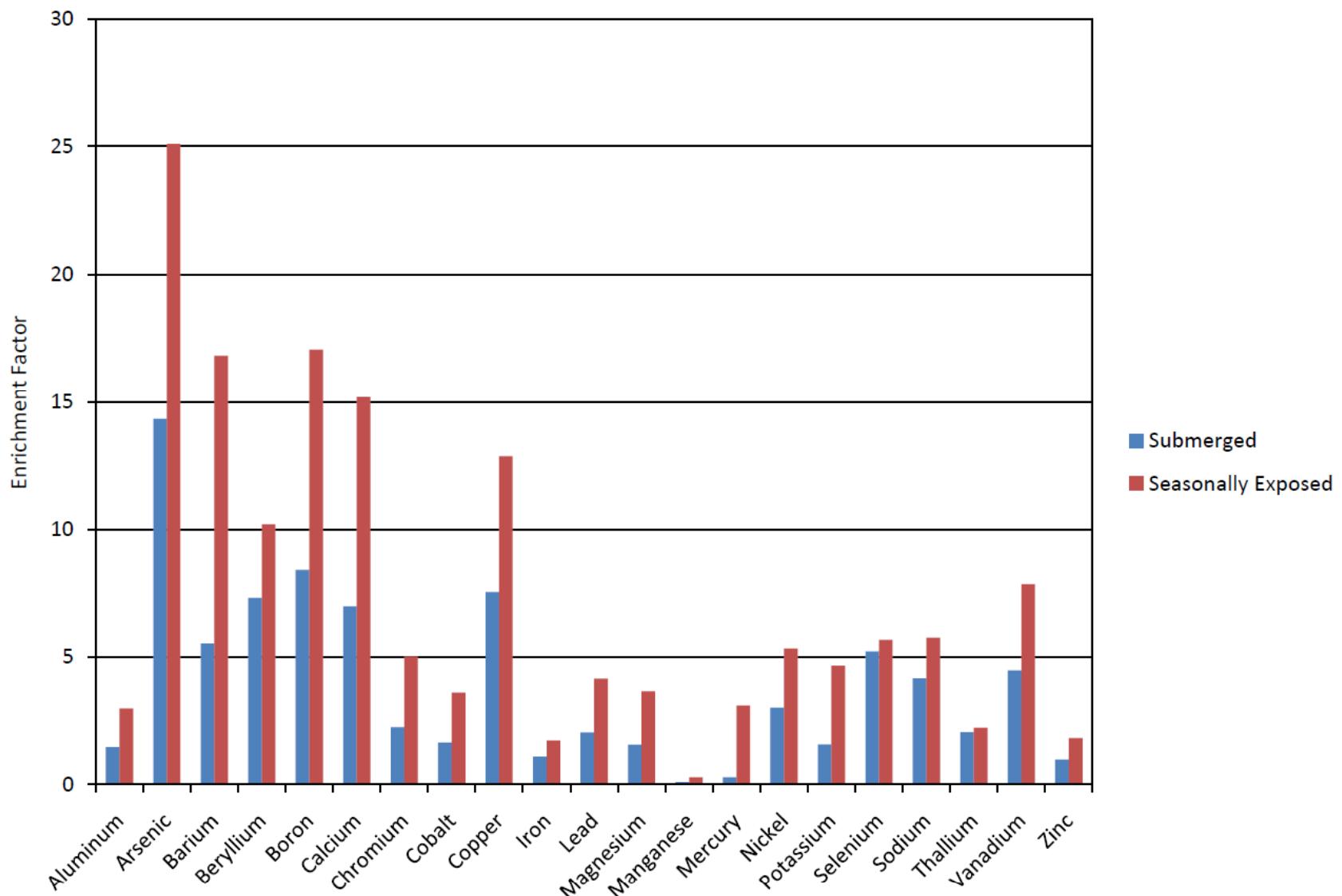
ug/g = Micrograms per gram sediment.

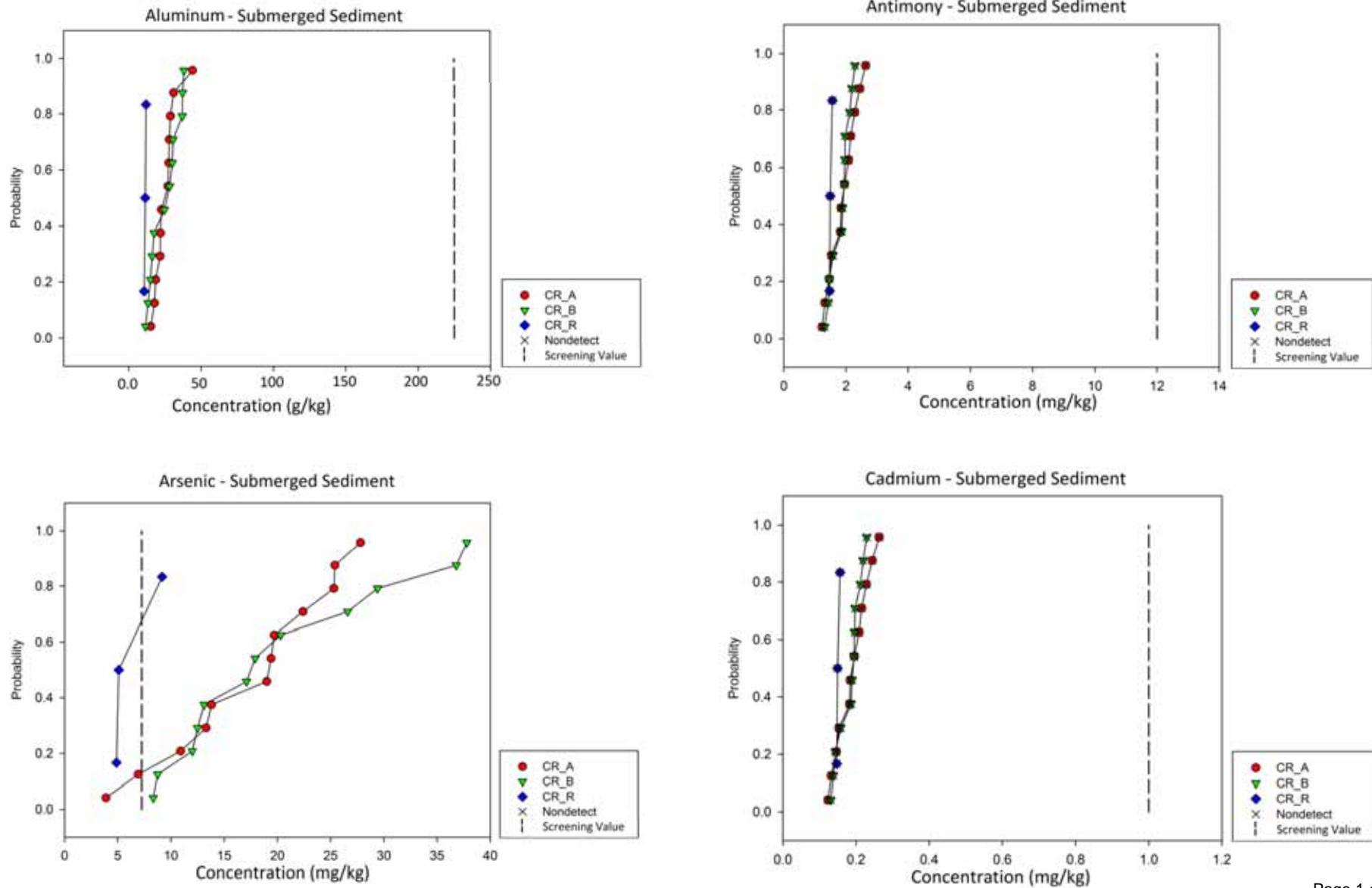
% = Percent.

C_{OC,PAH,FCV} = Critical concentration of a PAH in sediment related to the final chronic value (FCV).C_{OC,PAH,MAX} = Aqueous solubility of a given PAH.ESBTU = Ratio of the organic carbon-normalized sediment concentration to the critical concentration (C_{OC,PAH,FCV}) of each PAH.Sum ESBTU_{FCVI} = Sum total of ESBTU_{FCVI} for 34 PAHs. ESBTU_{FCVI} for each PAH represents the organic-carbon normalized sediment concentration divideddivided by the critical concentration of each PAH in sediment (C_{OC,PAH,FCV}). ESBTU_{FCVI} were also calculated specifically for 2 or 3 ring PAHs, 4 ring PAHs and

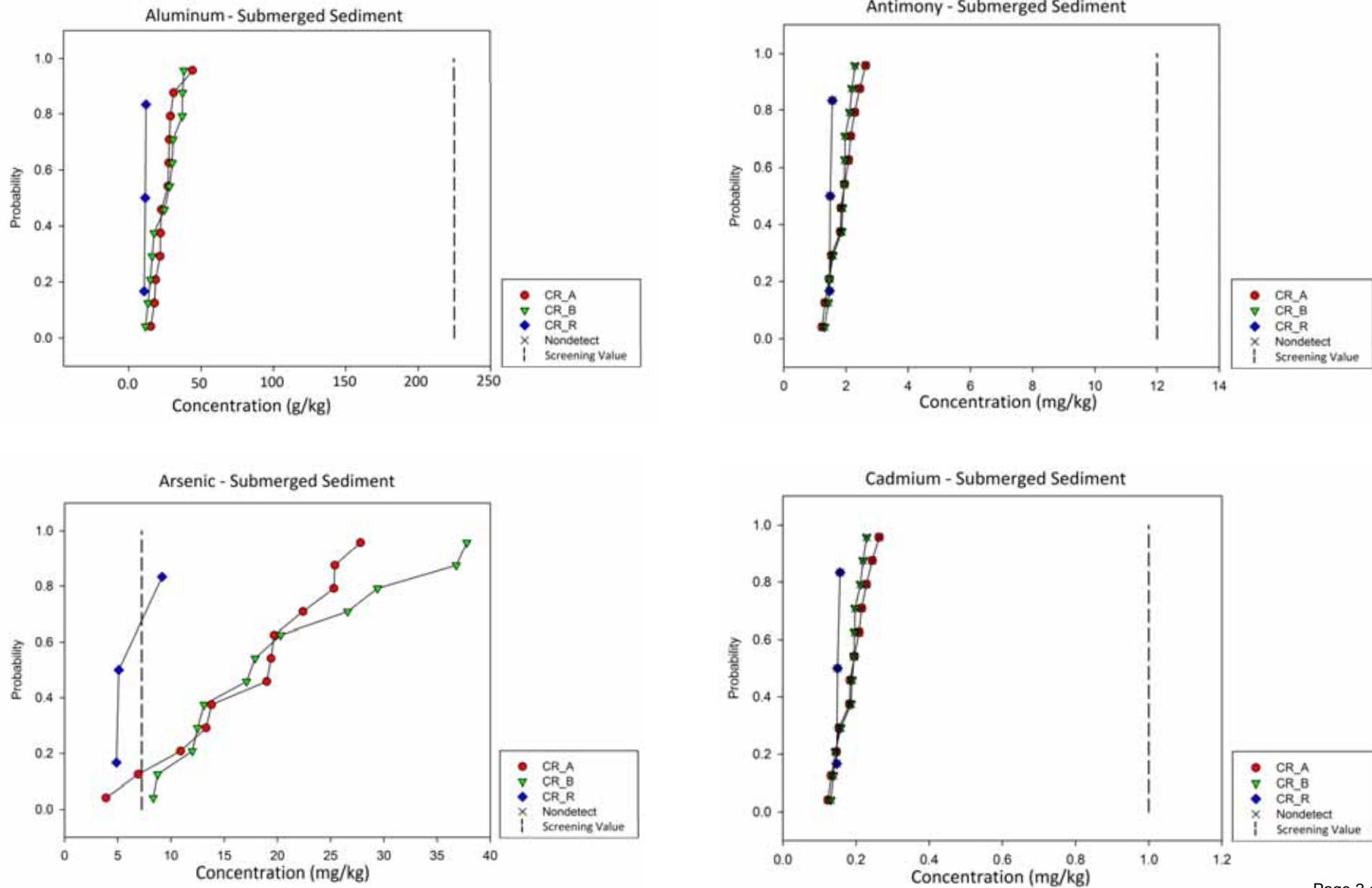
5 or 6 ring PAHs.

Enrichment Factors by Sediment Type

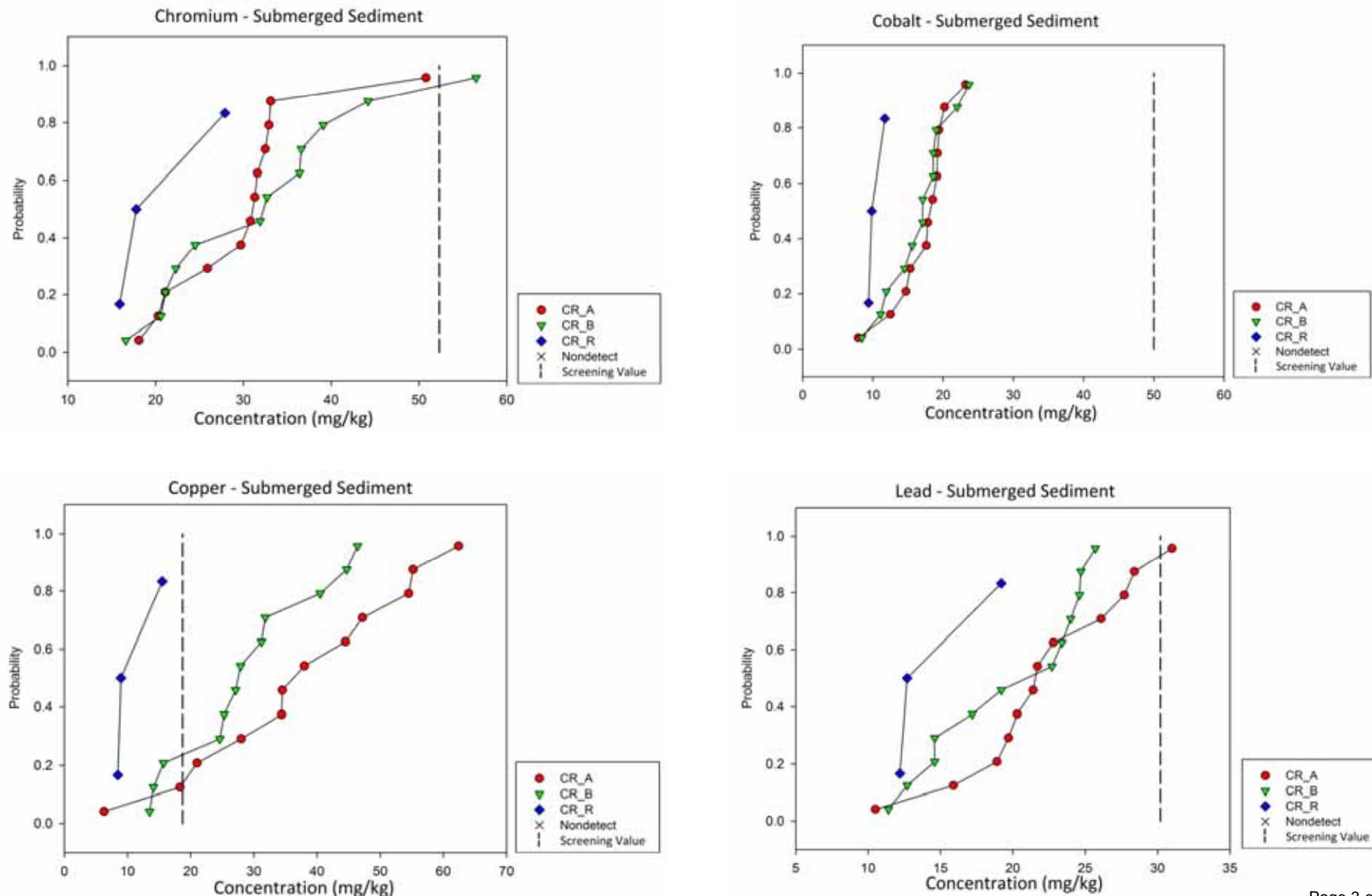




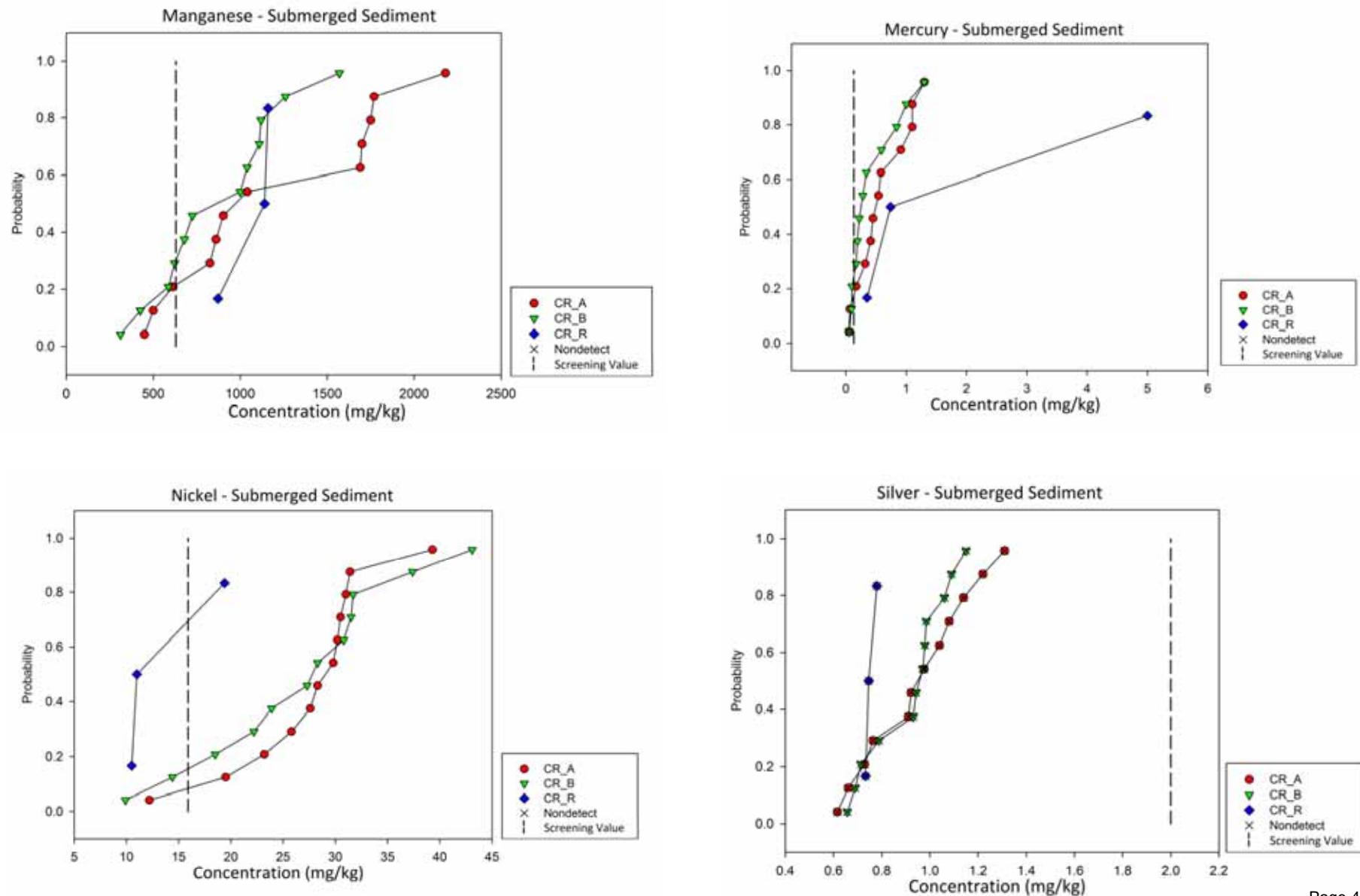
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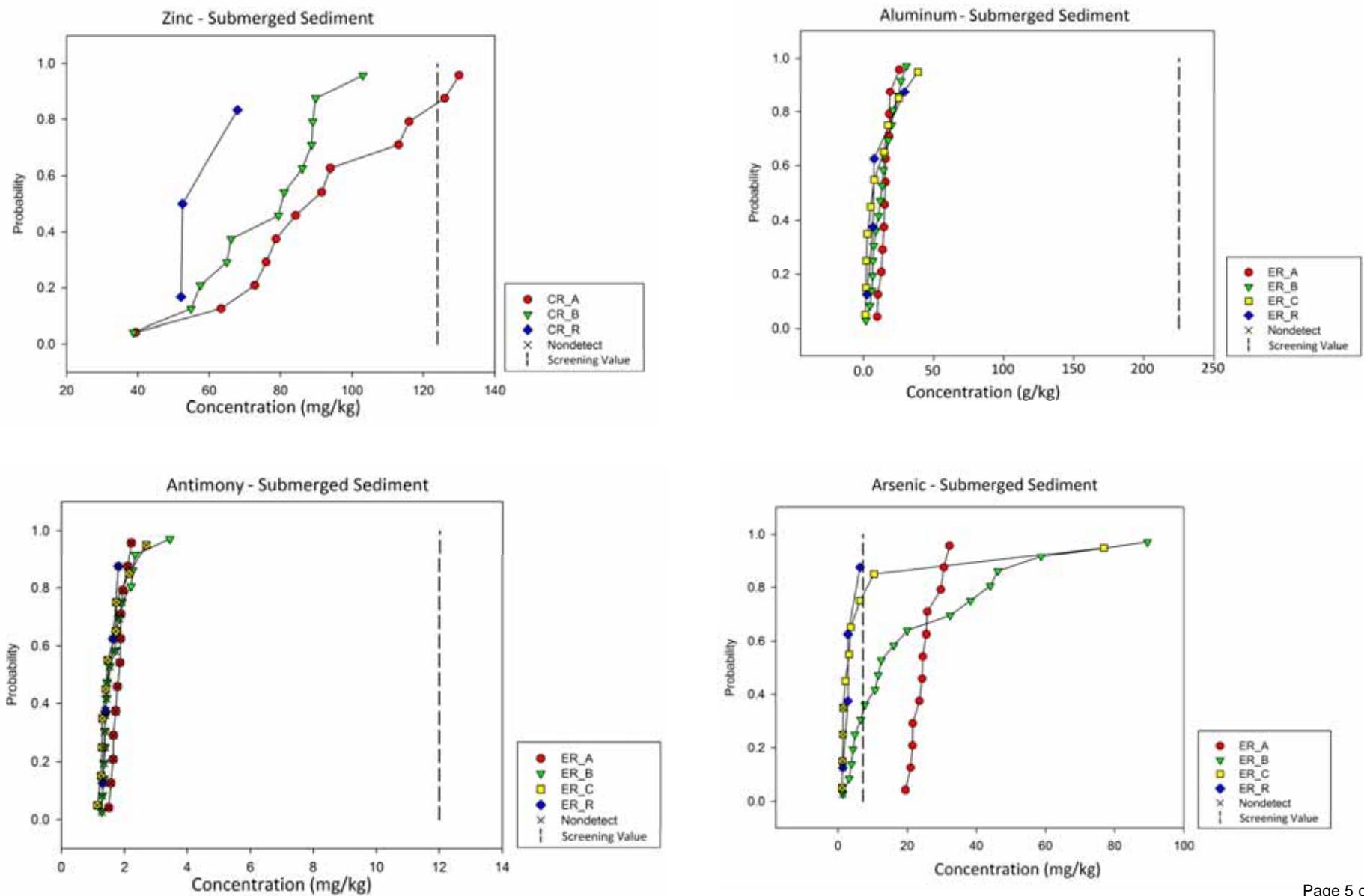
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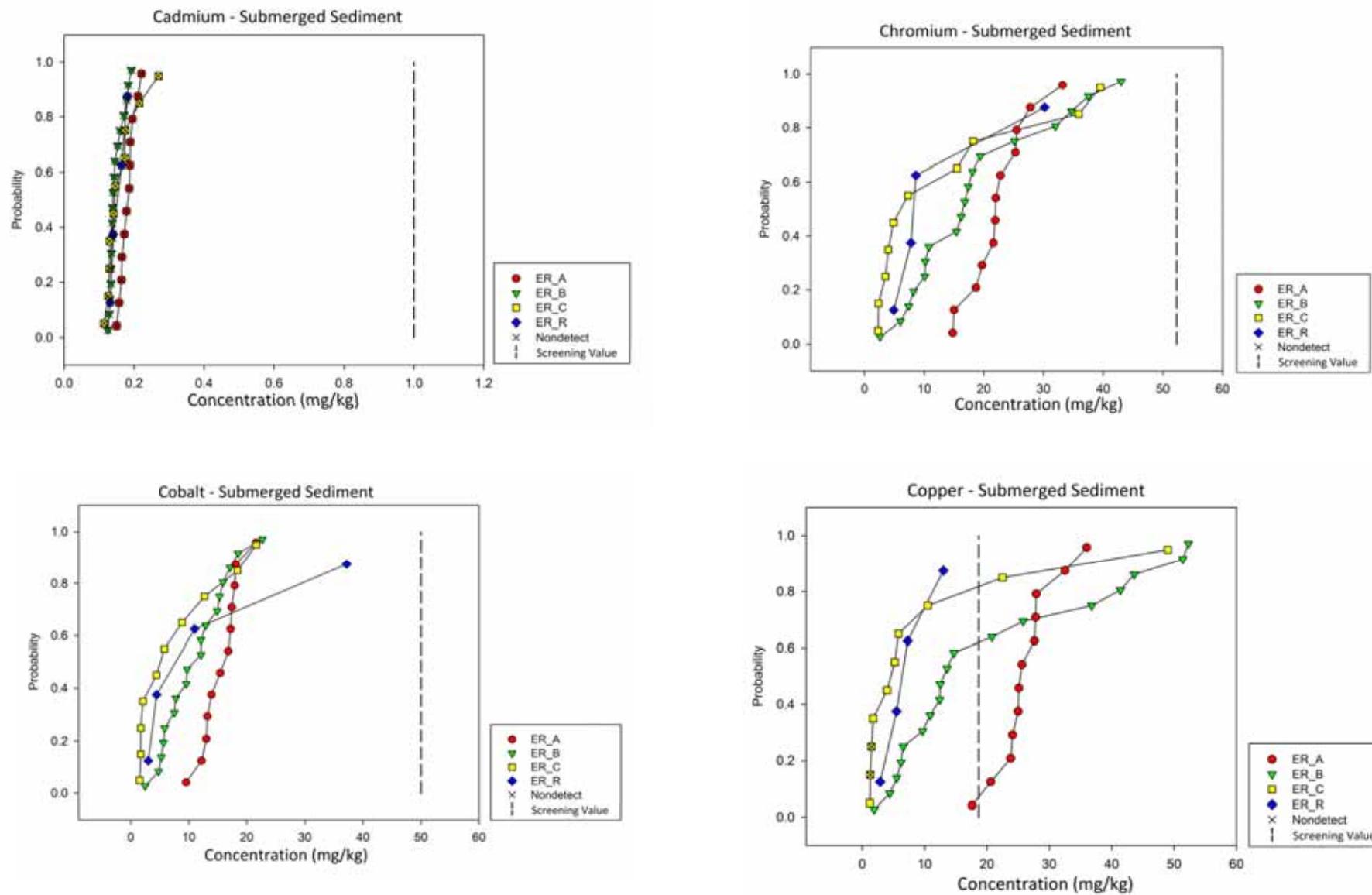


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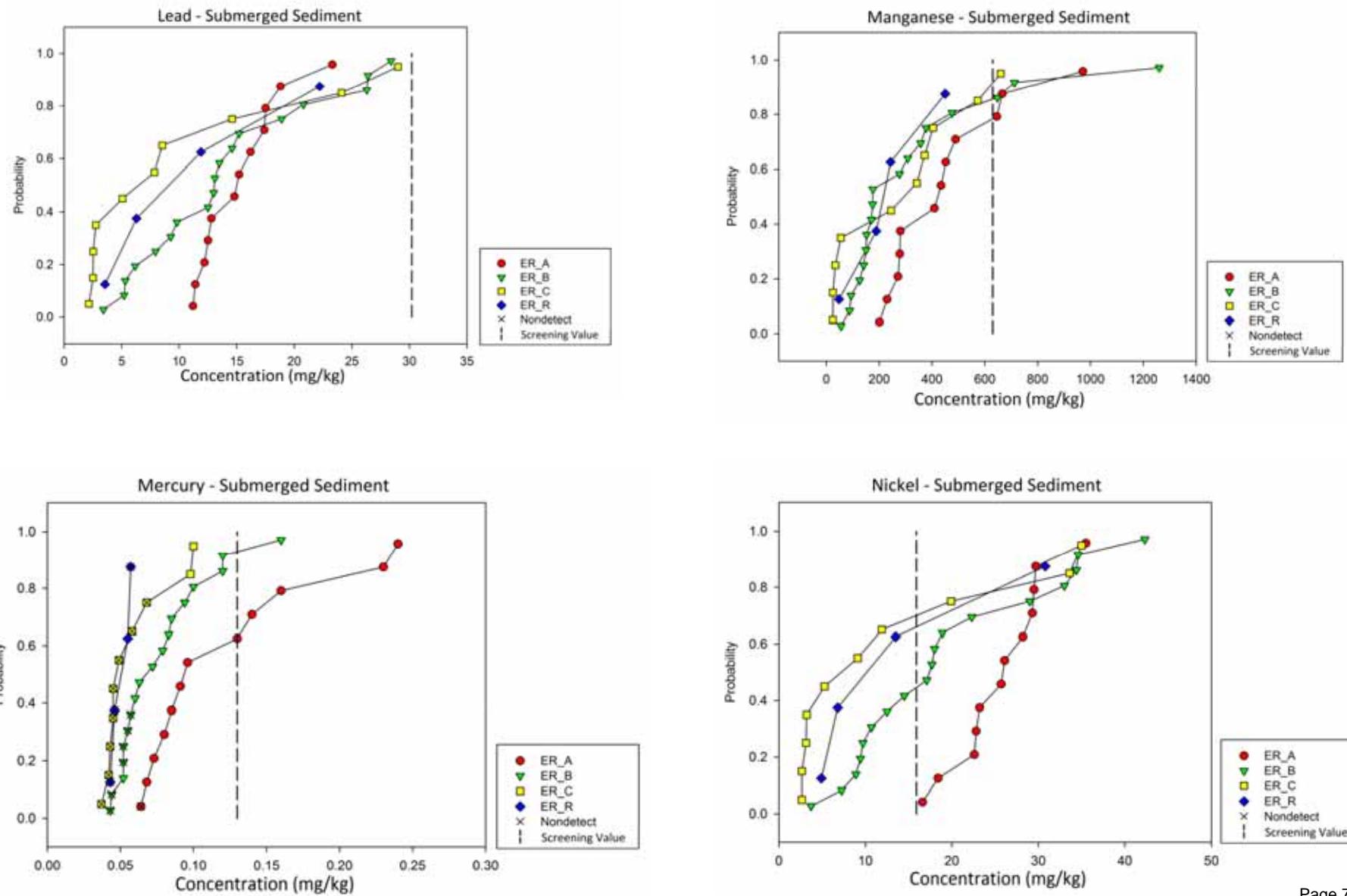


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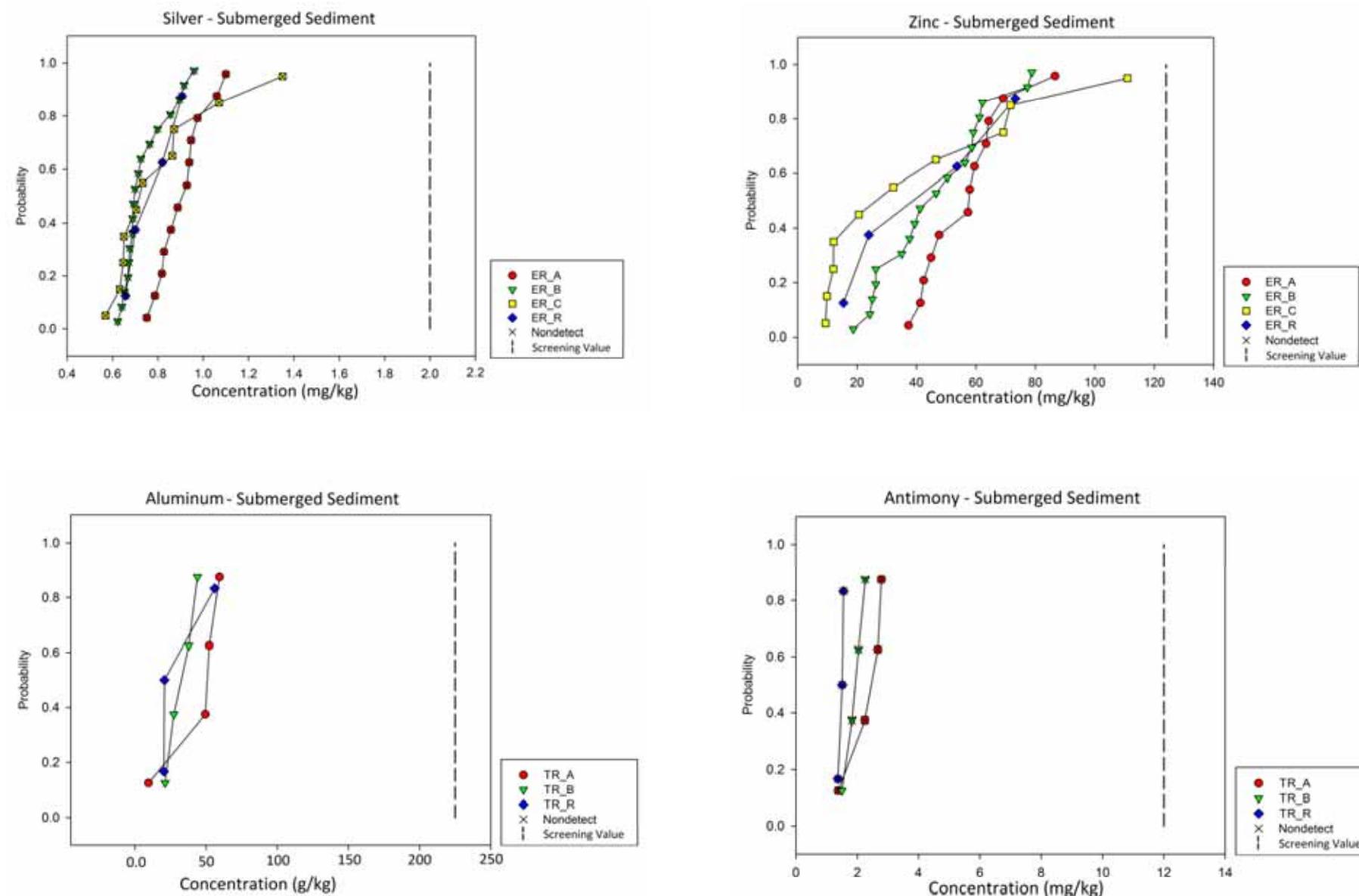




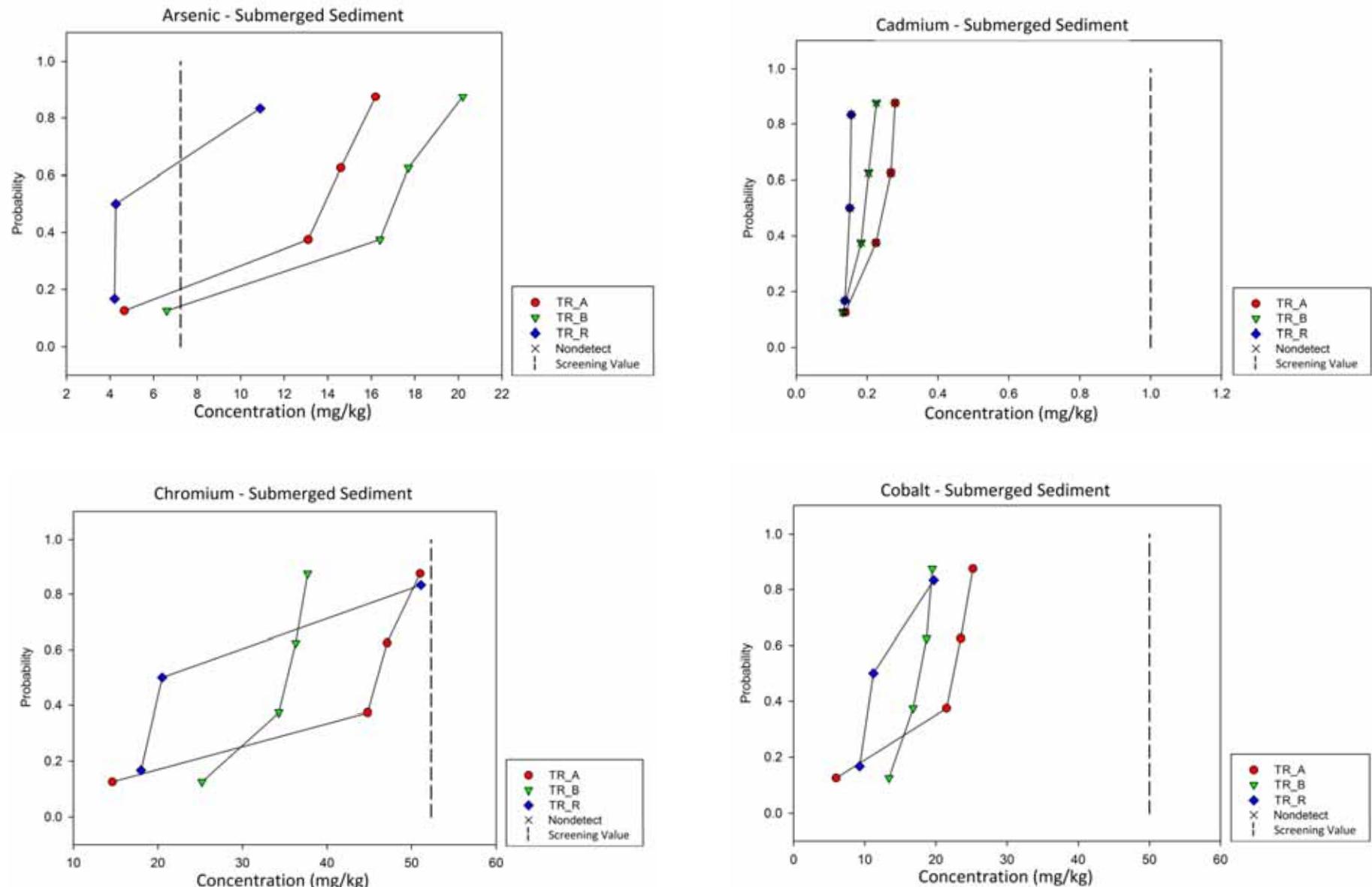
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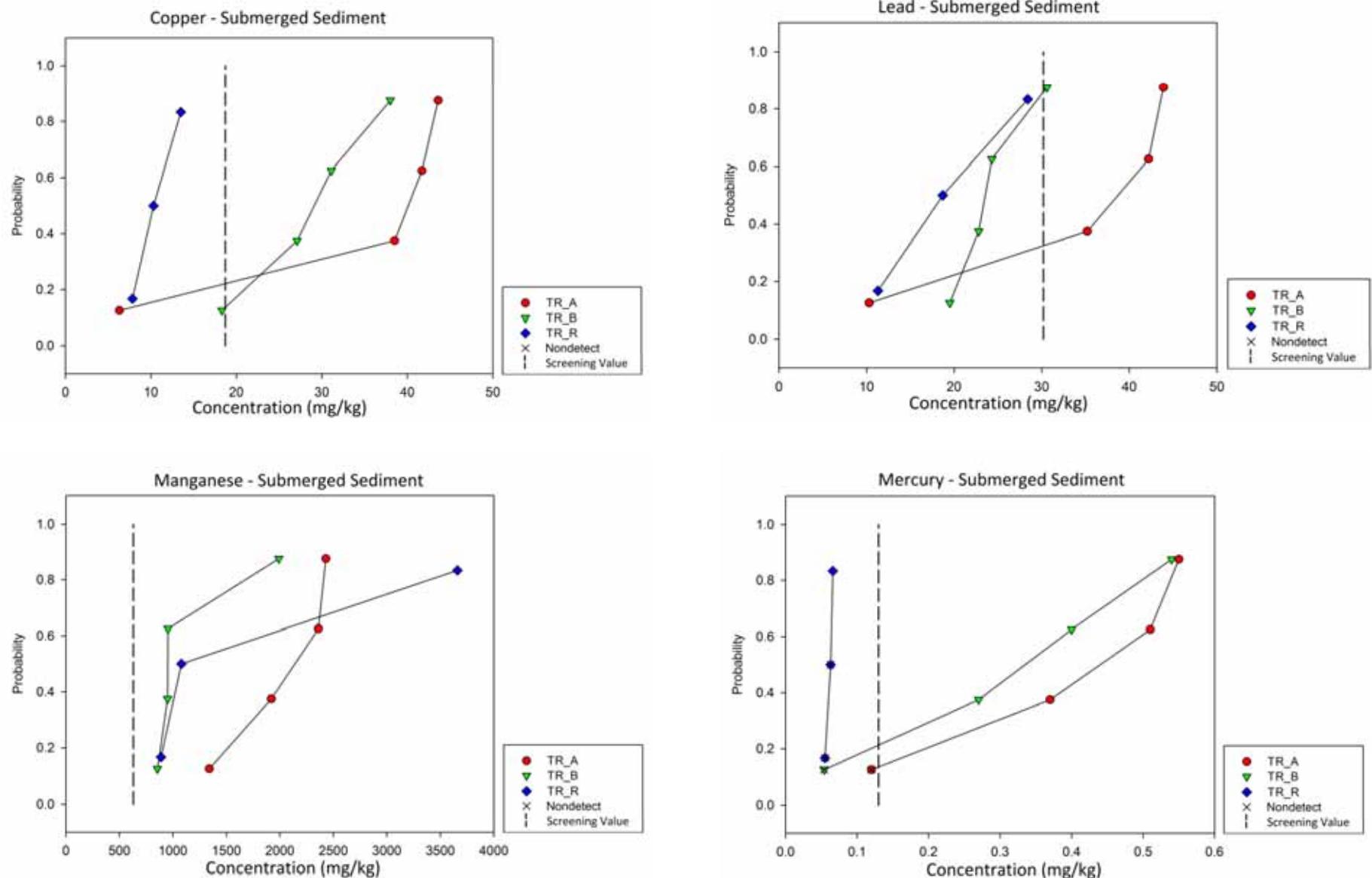


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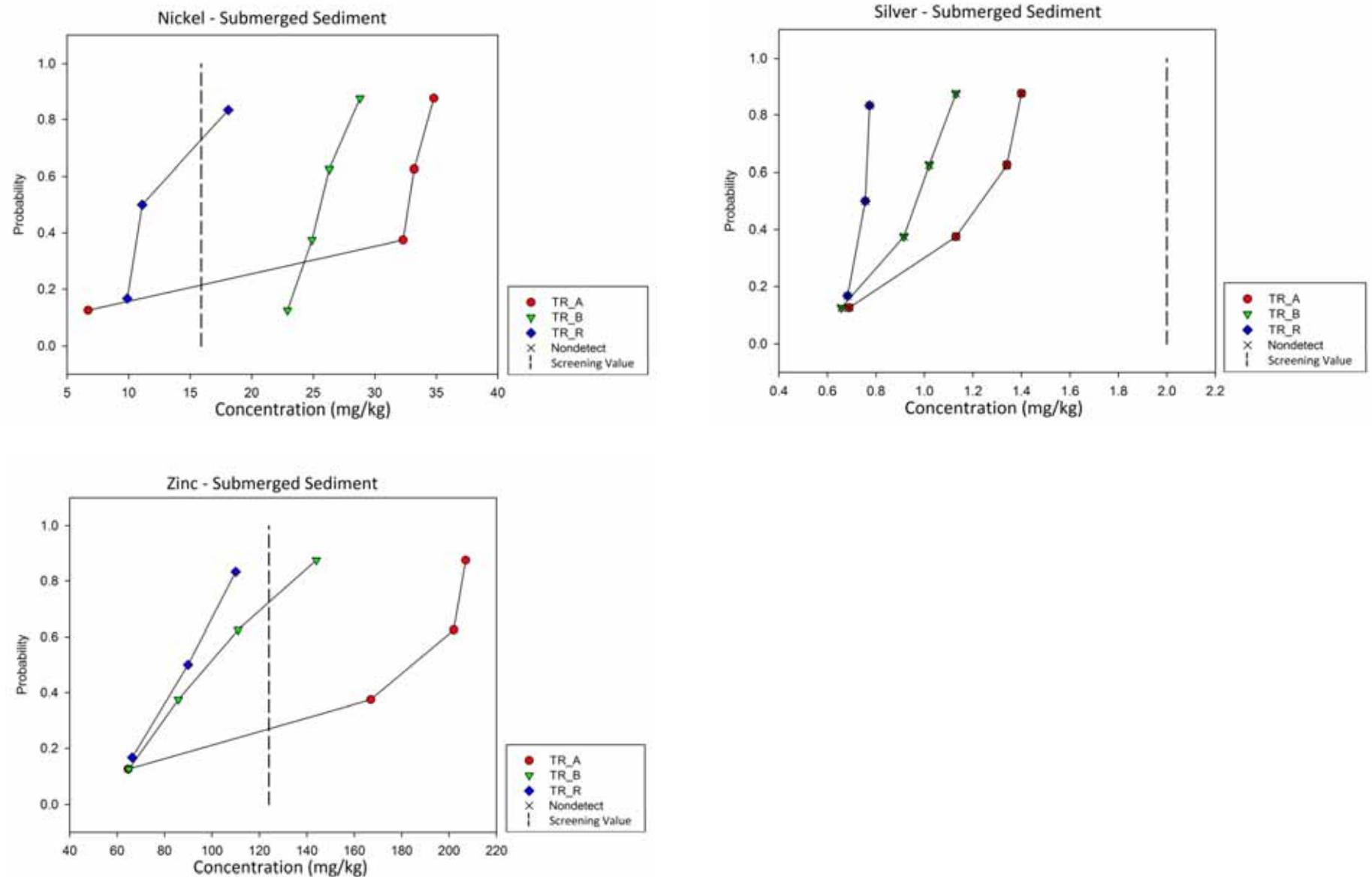
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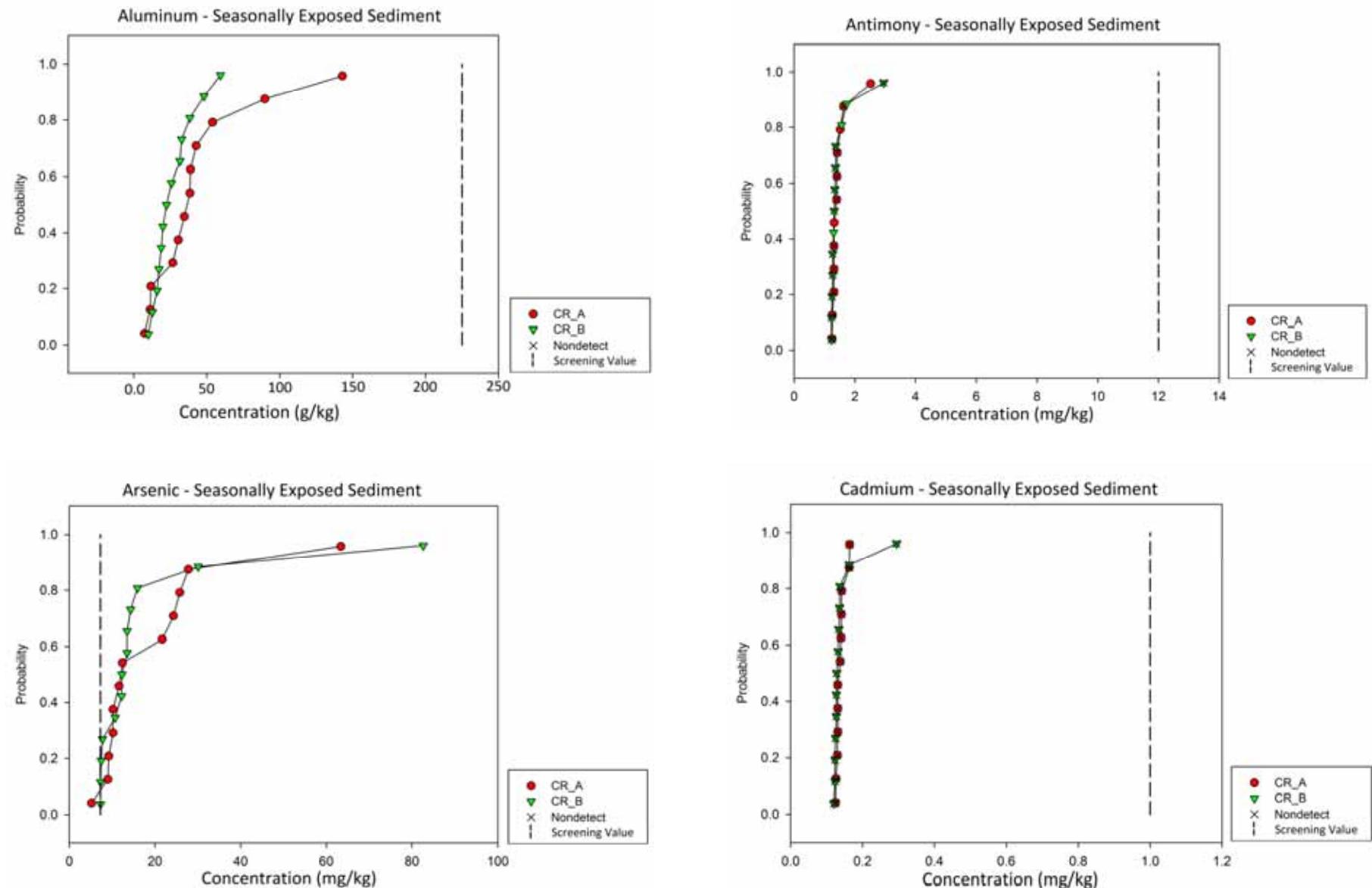




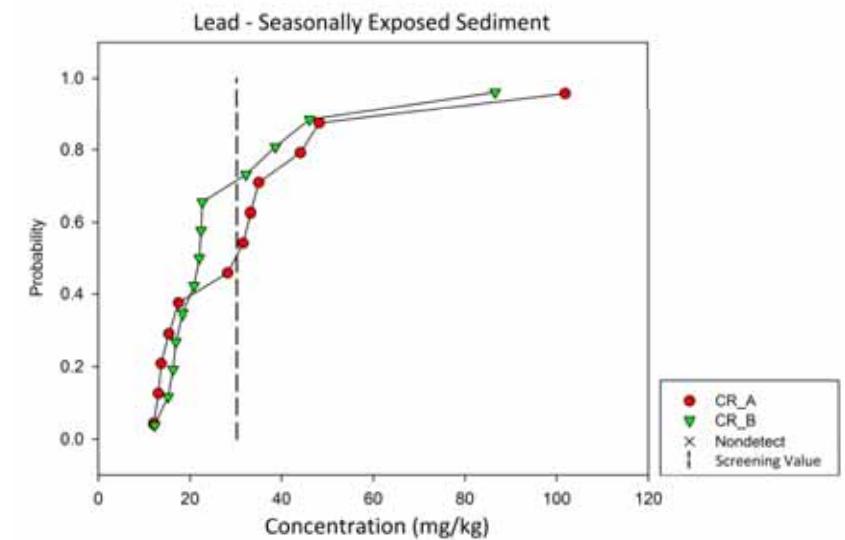
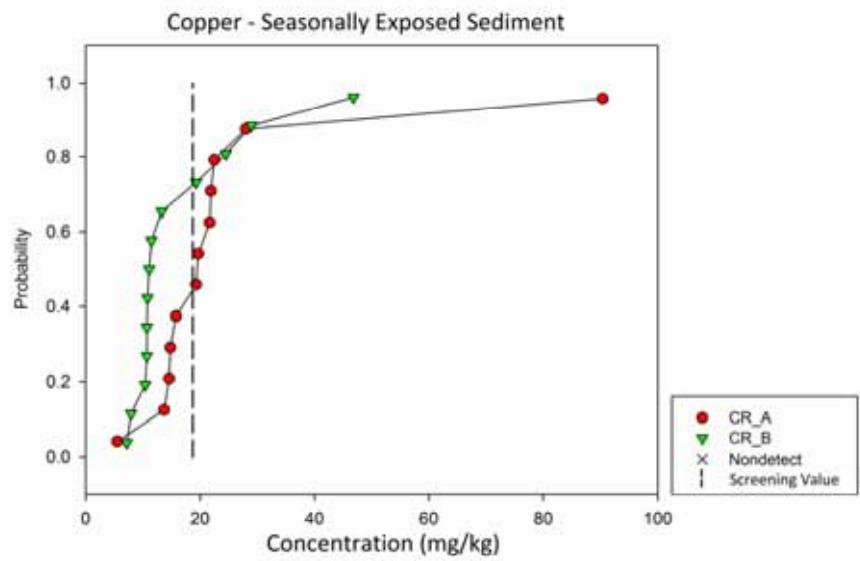
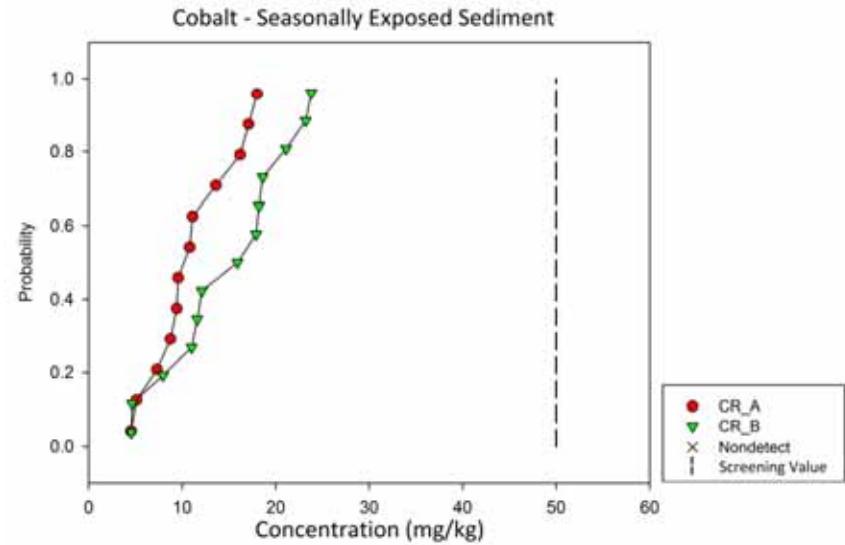
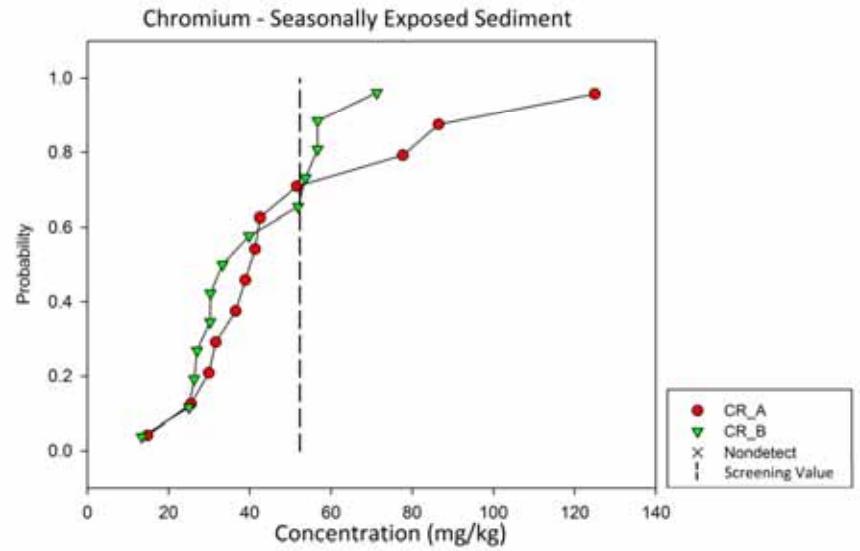
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Cumulative Frequency Distribution - Submerged Sediment
 Baseline Ecological Risk Assessment
 TENNESSEE VALLEY AUTHORITY
 KINGSTON, TENNESSEE

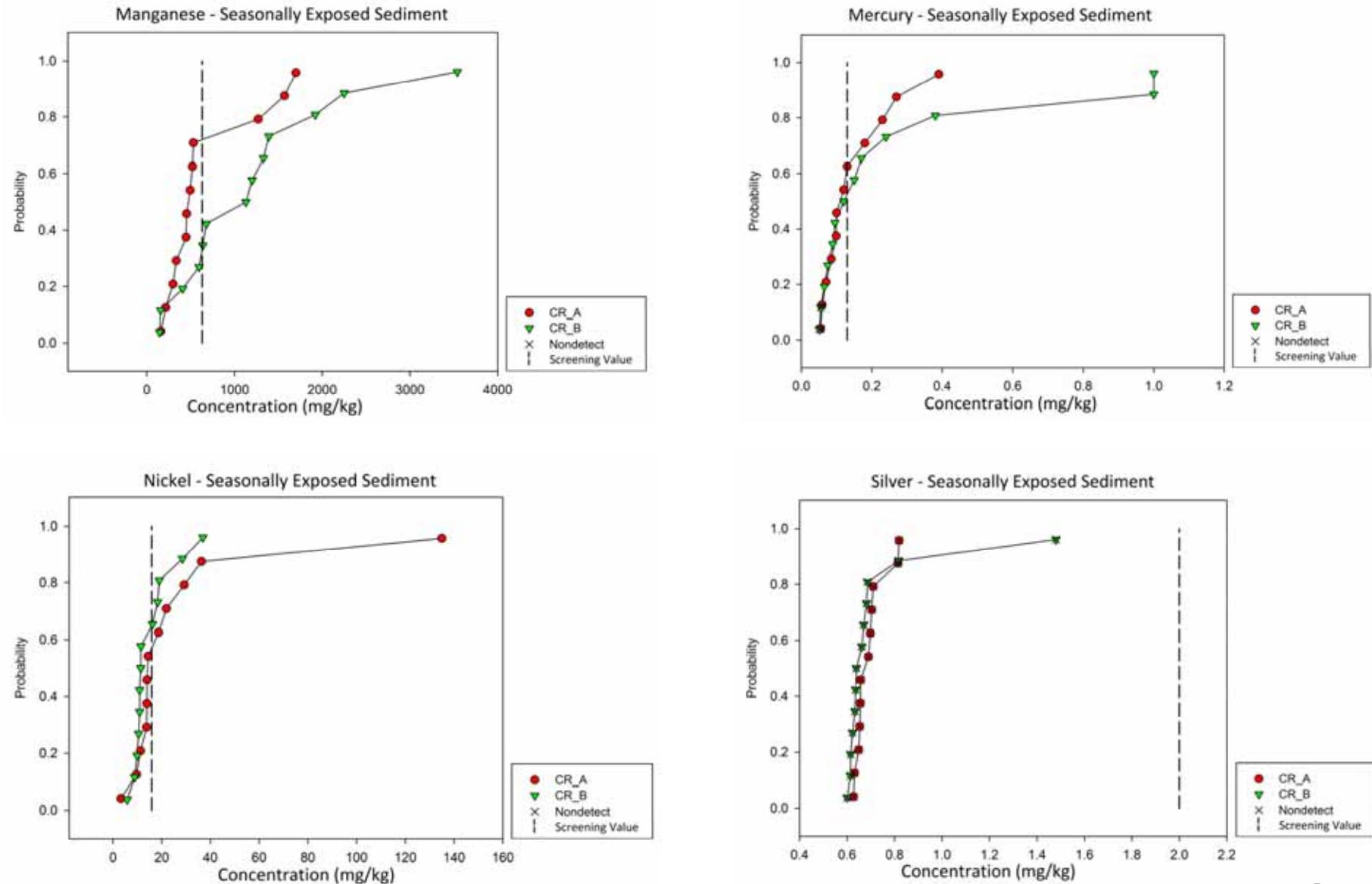




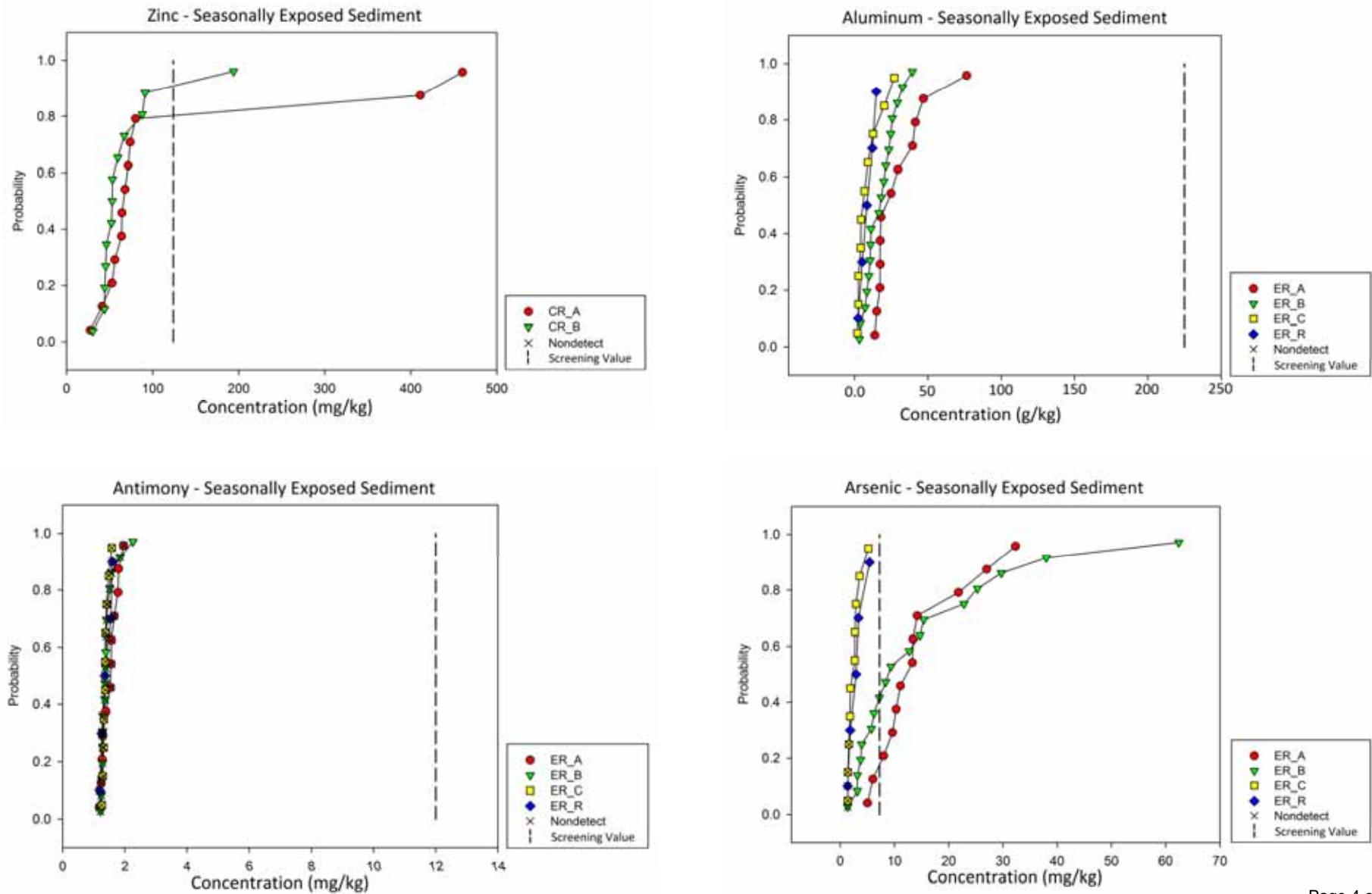
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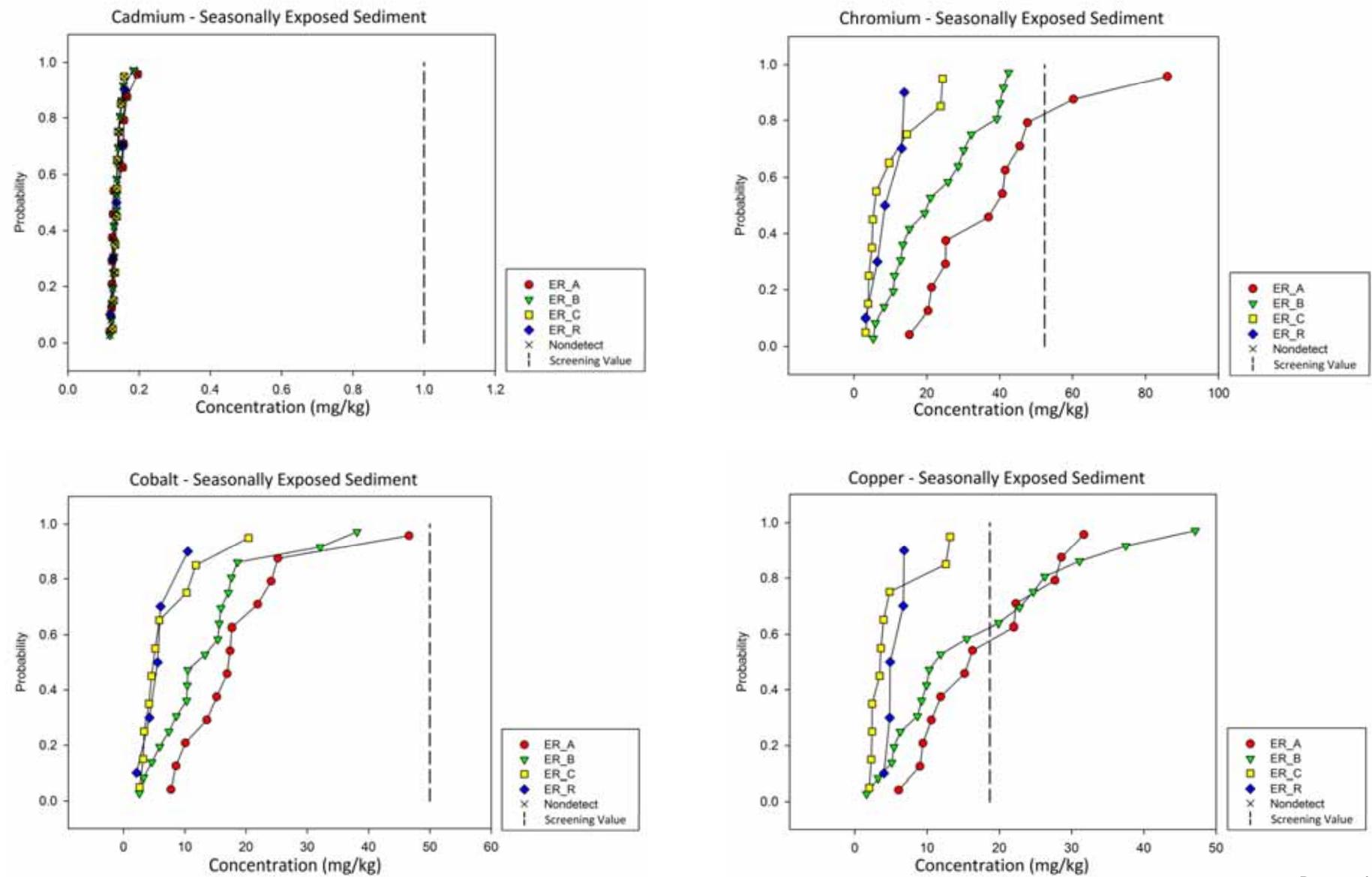
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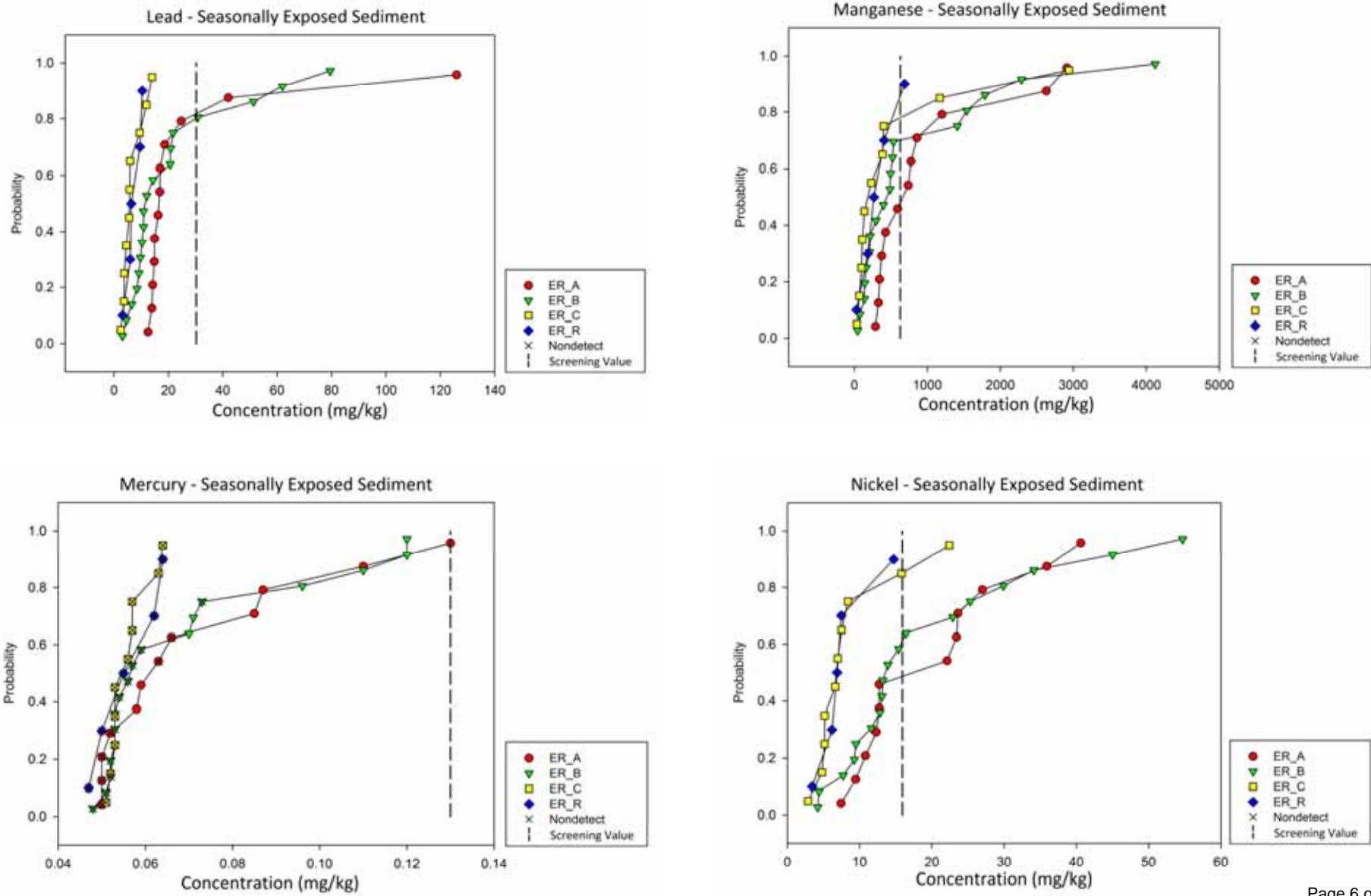
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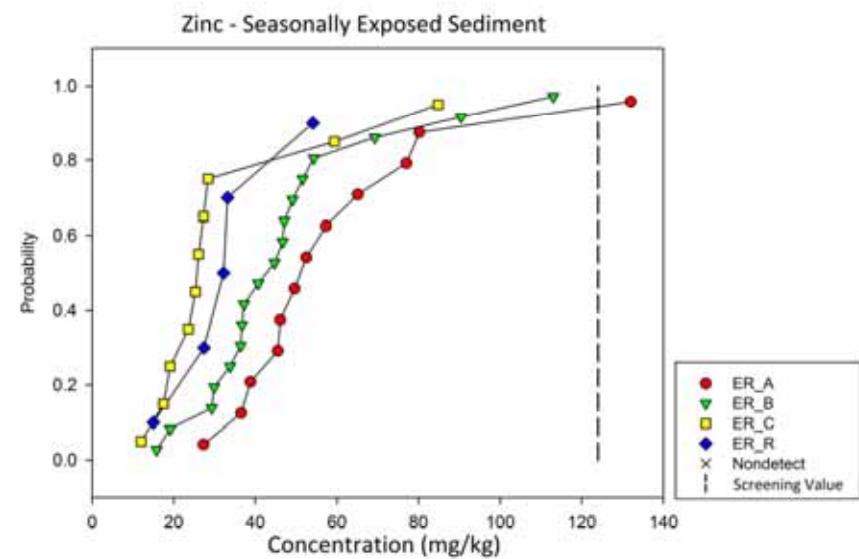
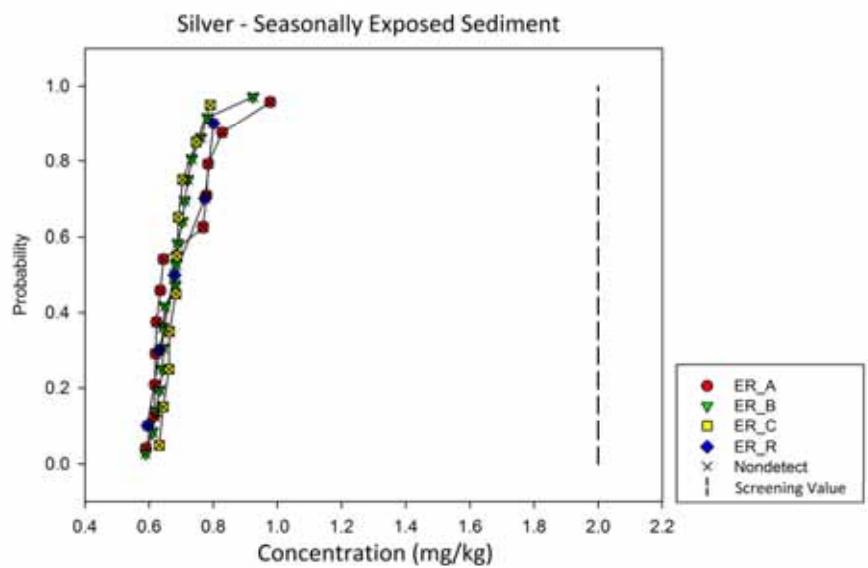
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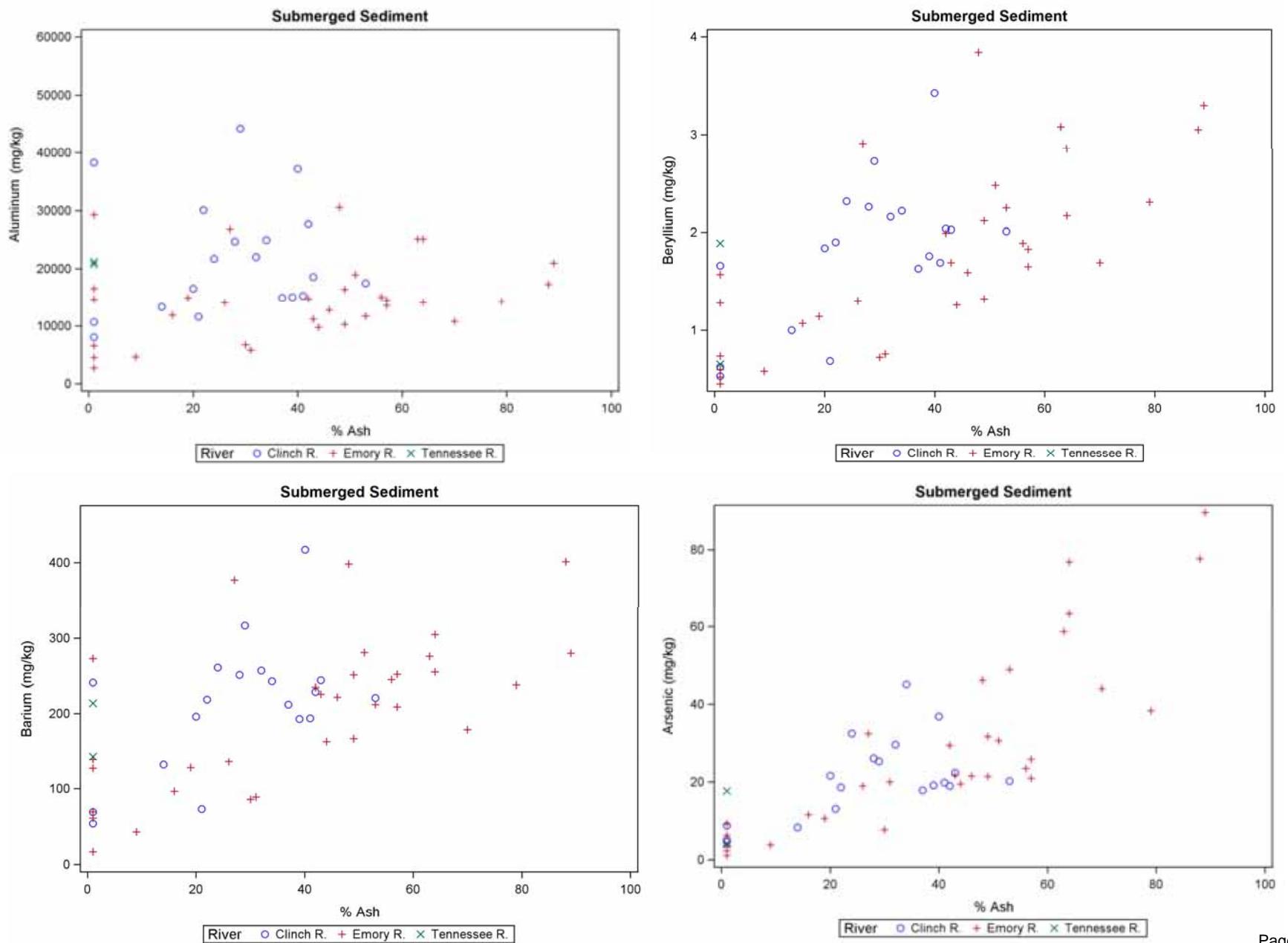


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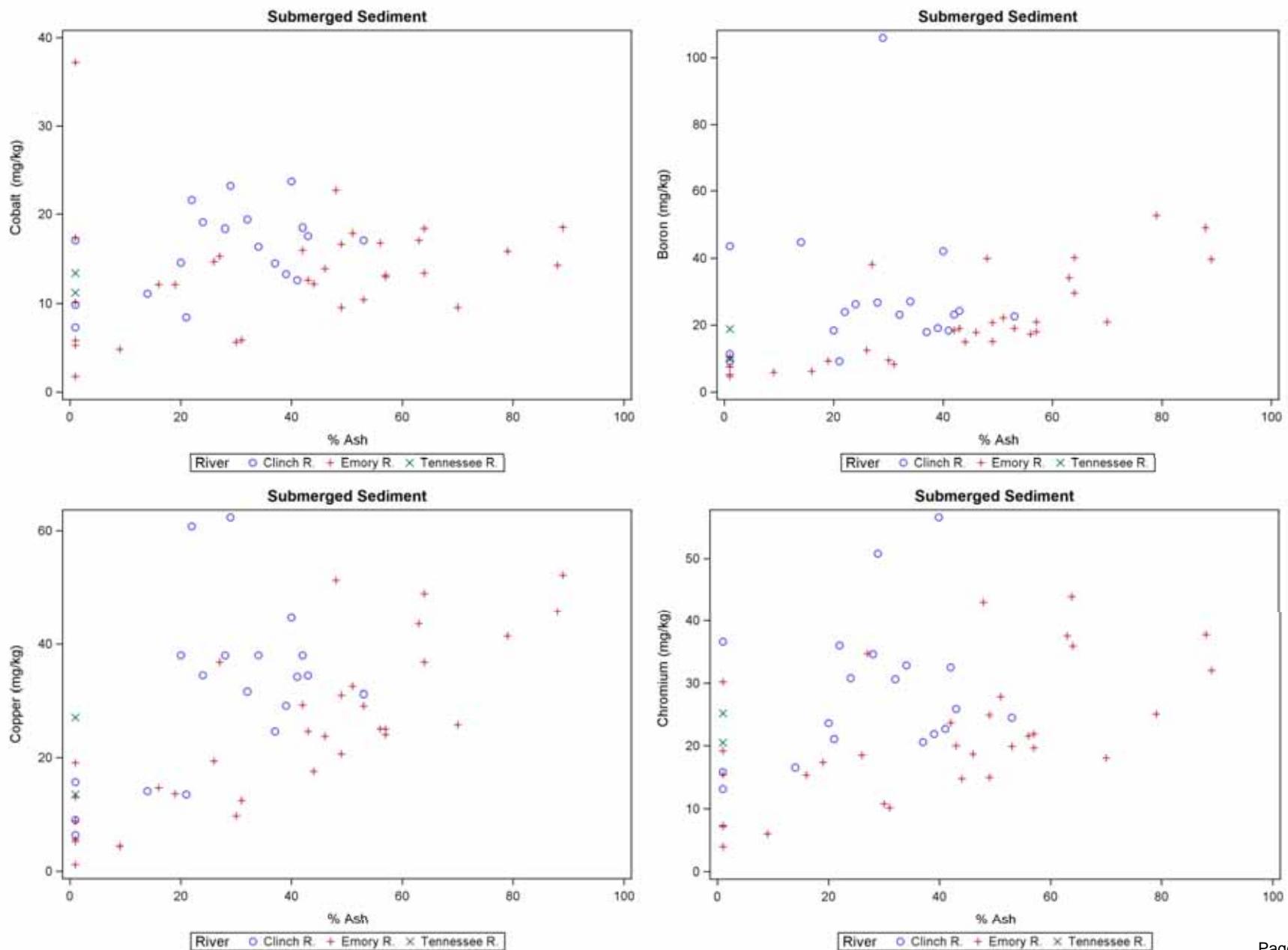


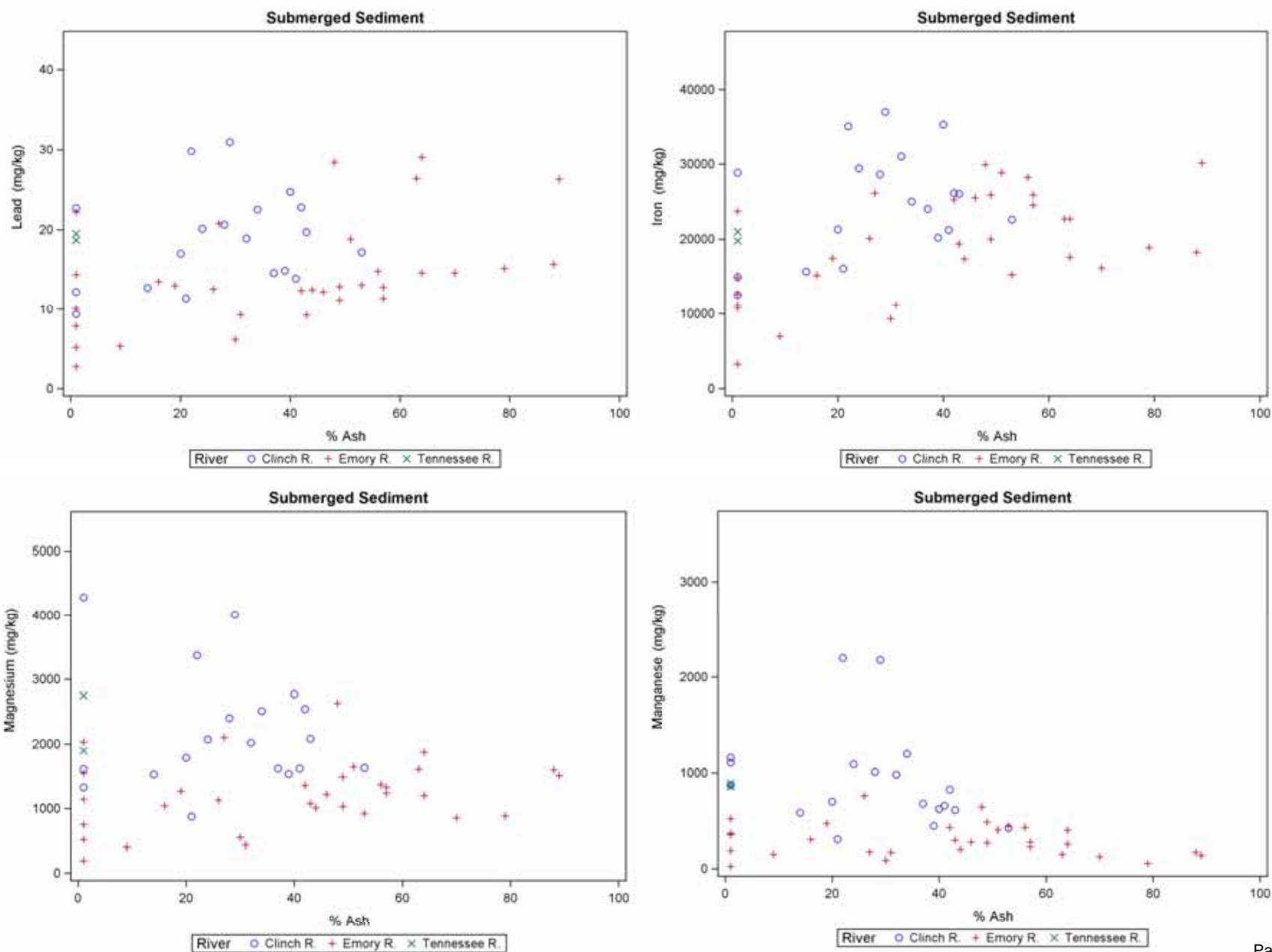
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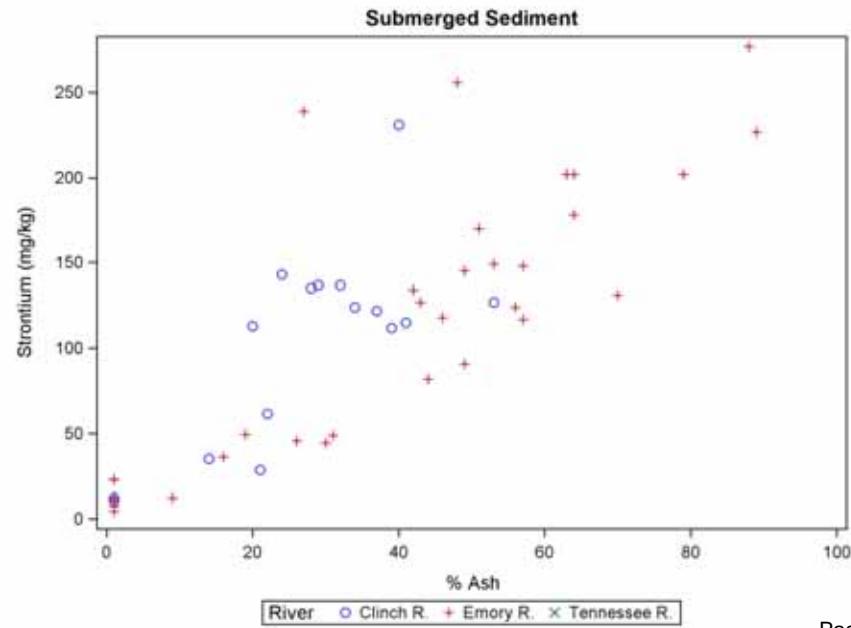
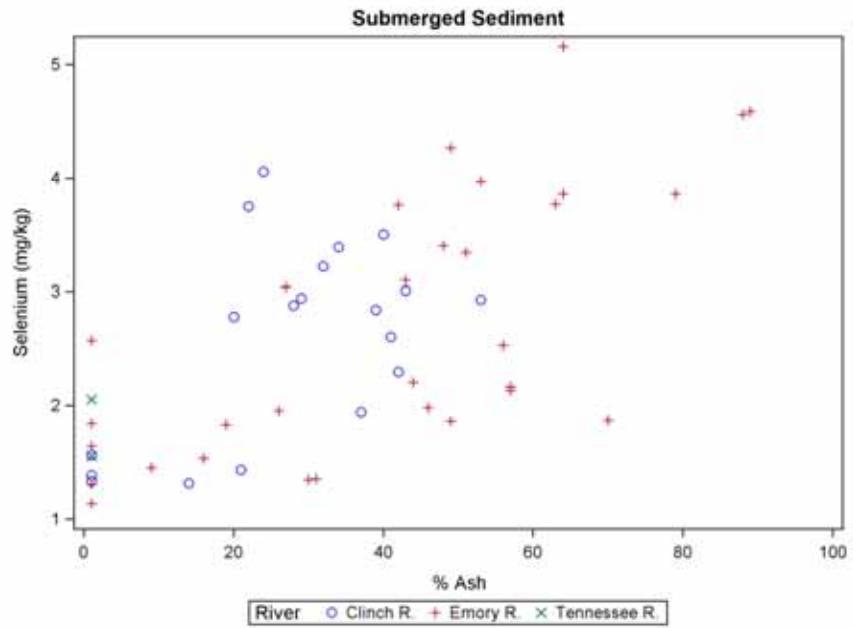
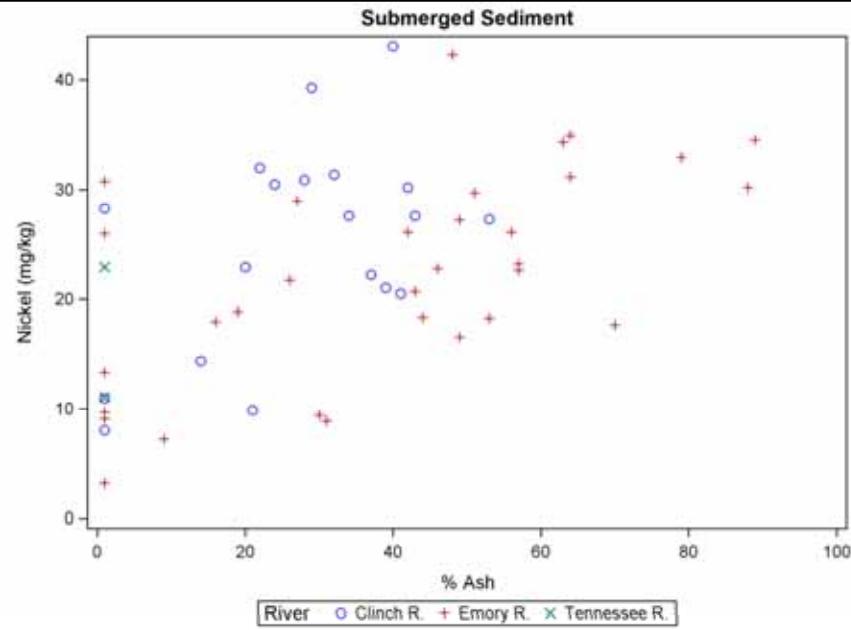
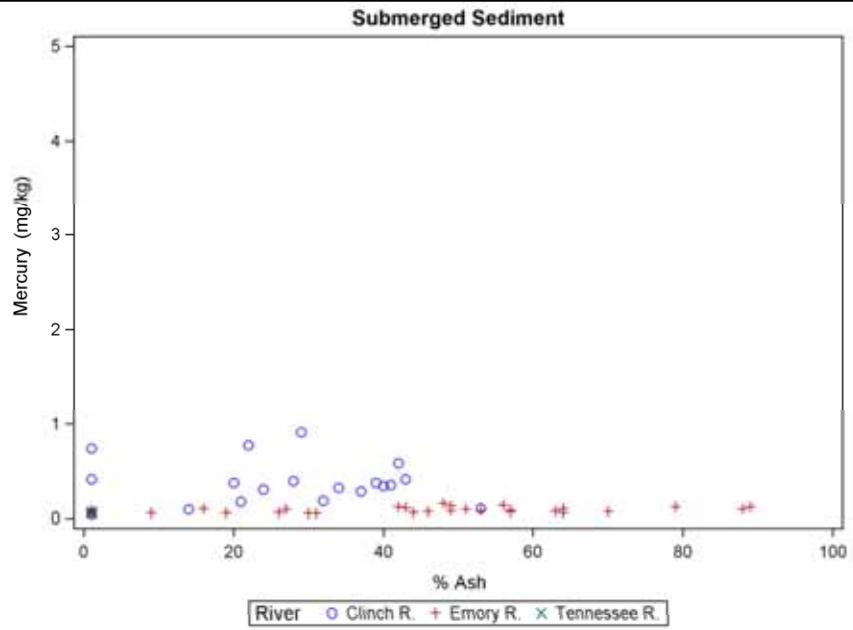


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