PORTLAND HARBOR RI

APPENDIX G
BASELINE ECOLOGICAL RISK ASSESSMENT

ATTACHMENT 5
SLERA AND REFINED SCREEN

DRAFT

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1.0 INTRODUCTION TO SCREENING PROCESS

The baseline ecological risk assessment (BERA) dataset was screened in two tiers as directed by the US Environmental Protection Agency (EPA) (2008d). The first tier was a screening-level ecological risk assessment (SLERA) in which surface sediment, tissue residue, dietary doses, surface water, and transition zone water (TZW) were compared to screening-level thresholds provided by EPA. The second tier was a refined screen of those chemicals that passed through the first tier that included additional screening criteria and evaluation steps. The outcome of the screening process was the identification of chemicals of potential concern (COPCs) that were further evaluated in the BERA.

The general processes of the SLERA and refined screen are presented in Sections 1.1 and 1.2, respectively. Screening of the surface sediment, tissue residue, dietary doses, surface water, and TZW are presented in Sections 2.0 through 6.0. A screening of background sediment and surface water concentrations is presented in Section 7.0.

1.1 SLERA

The SLERA begins by identifying chemicals of interest (COIs). Media-specific COIs were defined as all chemicals detected in each medium (i.e., surface sediment, benthic invertebrate tissue, fish tissue, surface water, and shallow TZW) from the BERA dataset. COIs for the wildlife dietary assessment were those chemicals detected in both surface sediment and fish or invertebrate tissue samples. Metals and polycyclic aromatic hydrocarbons (PAHs) detected in both surface sediment and tissue samples were identified as COIs for the fish dietary assessment.

The general SLERA process is presented in Figure 1-1. COIs were screened in each medium and for receptor-specific[1] dietary scenarios. For benthic invertebrate and fish tissue, COIs were screened on a receptor-specific basis. Maximum COI concentrations (i.e., maximum detected concentration or maximum detection limit) were compared to media-specific (or dietary) screening-level thresholds. COIs were not evaluated further if the maximum concentration did not exceed the screening-level threshold. COIs within a given media that exceeded screening-level thresholds were retained for further evaluation in the refined screen. COIs with no screening-level thresholds were not evaluated but were retained for discussion in the uncertainty section of the BERA.

[1] This generally equates to an individual species.

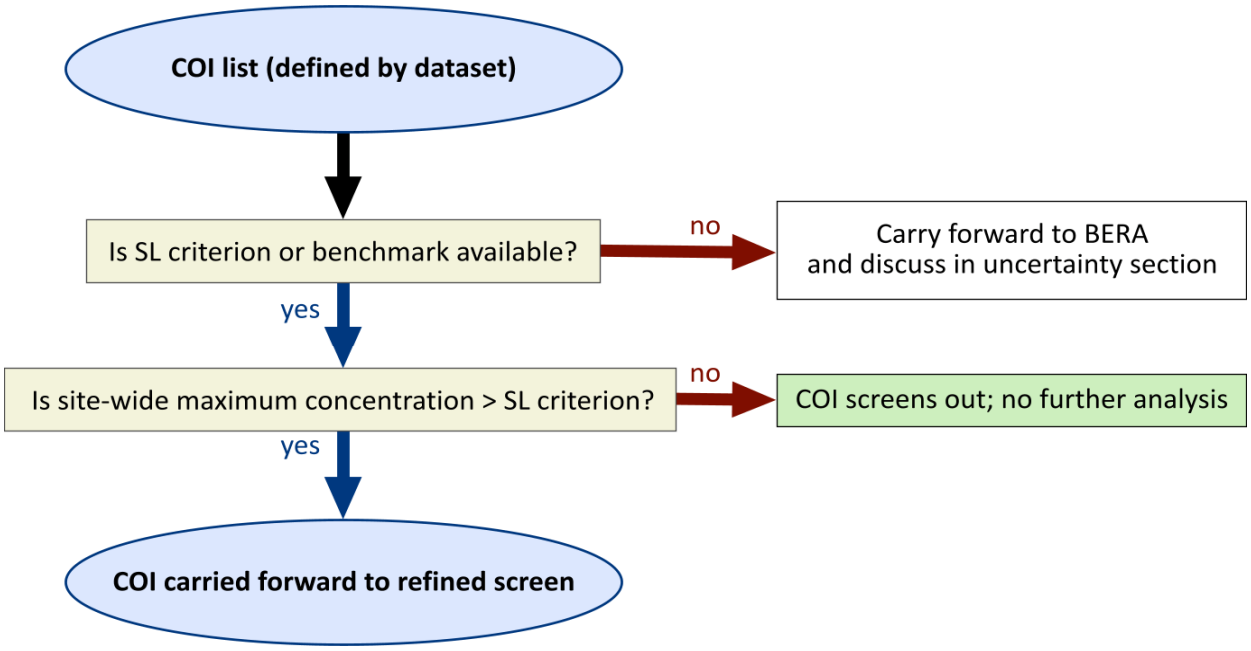

Figure 1-1. The SLERA Process

1.2 REFINED SCREEN

The COIs carried forward from the SLERA were evaluated in the refined screen as presented in Figure 1-2 and described below. COPCs were identified in the refined screen for each abiotic medium (i.e., surface sediment, surface water, and shallow TZW) receptor-specific benthic invertebrate and fish tissue, and receptor-specific dietary scenarios. In the refined screen, maximum detected concentrations were used and other considerations were made for determining COPCs (i.e., frequency of detection, nutritional role).

- For each medium and for the dietary assessment, the maximum detected concentrations for each COI were first compared to the respective screening-level thresholds (Figure 1-2, Step 2). If detected concentrations did not exceed screening-level thresholds, the COI was not evaluated further.
- For those COIs that were retained in the previous step, if the detection frequency was less than 5% and the maximum detection limit was less than the screening-level threshold, the COI was evaluated further based on three considerations: 1) medium, 2) magnitude of exceedance, and 3) bioaccumulation potential (Figure 1-2, Step 3). If the medium was surface water, shallow TZW, clam tissue, crayfish tissue, sculpin tissue, or smallmouth bass tissue, the COI was retained. The COI was also retained for further evaluation if the maximum detected concentration was 5 times or greater than screening threshold or the log K_{OW} (octanol-water partitioning coefficient) of an

organic COI was greater than or equal to 4.0; other infrequently detected COIs were dropped from further evaluation.

- COIs that were retained in previous steps based on the tissue and diet dose evaluations, and were also identified as nutritionally essential were compared to available information (Figure 1-2, Step 4). The COI was eliminated if the maximum detected concentration was less than the "nutritionally essential" concentration.[2]
- All COIs that did not screen out based on the steps of the refined screen were carried forward as COPCs for evaluation in the BERA.

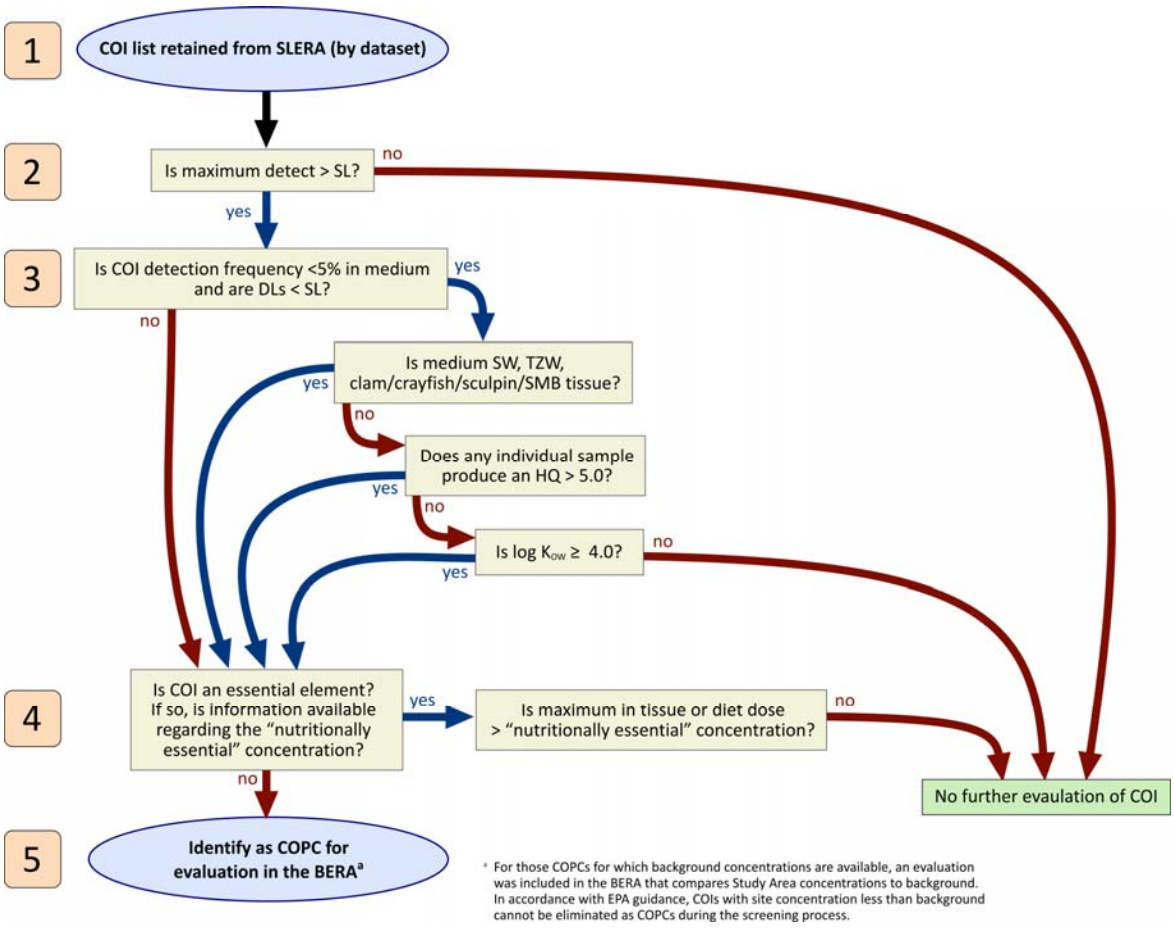

Figure 1-2. The Refined Screening Process

As part of the refined screen outlined in EPA's Problem Formulation (Attachment 2), EPA also included a final step to identify chemicals that have background concentrations greater

[2] Ultimately, the nutritional role of selected metals was not used to eliminate any COIs as COPCs; Step 4 was not implemented due to the lack of definitive information with high certainty, as required by EPA.

than screening thresholds. To satisfy this step, maximum background sediment and surface water concentrations were compared to screening thresholds. This evaluation is presented in Section 7.0.

2.0 SURFACE SEDIMENT

The surface sediment dataset was compared to sediment quality guidelines (SQGs) provided by EPA (2008d) in both the SLERA and the refined screen. The COPCs identified through this process were evaluated in the benthic risk assessment. The surface sediment screening-level benchmarks are presented in Section 2.1 and the results of the SLERA and refined screen are presented in Section 2.2 and 2.3, respectively. The surface sediment COPCs evaluated in the BERA are presented in Section 2.4.

2.1 SURFACE SEDIMENT SCREENING-LEVEL BENCHMARKS

The surface sediment SQGs provided by EPA included threshold effects levels (TELs) (Smith et al. 1996), threshold effects concentrations (TECs) (MacDonald et al. 2000), sediment quality standards (SQS) and cleanup screening levels (CSLs) (Ecology 1995), and criteria from the Joint Source Control Strategy (JSCS) (ODEQ and EPA 2005). The total petroleum hydrocarbon (TPH) SQGs were derived by EPA and its partners using the Alaska TPH toxicity reference values (TRVs) (EPA 2008a). The lowest value among these SQGs was selected for each chemical and used in the screening process (Table 2-1). For chemical SQGs reported on both a dry weight (dw) and organic carbon-normalized (OC) basis, both values were used in the screening. SQGs were not available for polychlorinated biphenyl (PCB) congeners; these chemicals were assessed as part of total PCBs. SQGs were not available for individual dioxins and furans other than 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD); dioxins and furans (other than 2,3,7,8-TCDD) will be discussed in the uncertainty section of the BERA.

2.2 SURFACE SEDIMENT SLERA

In the SLERA, the site-wide maximum concentrations of chemicals detected in surface sediments were compared to the selected SQGs (Table 2-1). Chemicals that exceeded the SQGs were carried forward to the refined screening process. Detected chemicals with no SQGs were discussed in the uncertainty section in the BERA. Chemicals not exceeding the SQGs were not evaluated in the BERA. Table 2-2 presents the surface sediment chemicals that were carried forward into the refined screen, and Table 2-3 lists the chemicals detected in surface sediments without an SQG, which will be discussed as an uncertainty.

2.3 SURFACE SEDIMENT REFINED SCREEN

The chemicals carried forward from the SLERA were evaluated in the refined screen by comparing the maximum detected concentrations to the SQGs (Table 2-1 and Figure 1-2, No. 2). Chemicals with maximum detected concentrations that did not exceed the SQGs were not carried forward to the BERA. There were only four sediment COIs (i.e., diethyl phthalate, dimethyl phthalate, 1,3-dichlorobenzene, and heptachlor) identified in the SLERA that were not carried forward to the BERA because the maximum detected values were lower than the maximum detection limits and did not exceed the screening level benchmarks.

The next step evaluated the detection frequency and detection limit of each chemical. A chemical was eliminated from the BERA if the detection frequency was < 5% and the detection limit was less than the SQG (No. 3). Because these two elimination criteria were never met for any of the chemicals, all chemicals with maximum detected concentration that exceeded their respective SQG were carried forward to the BERA. Table 2-4 presents the results of the refined screen.

2.5 SUMMARY OF SURFACE SEDIMENT COPCS

The surface sediment COPCs identified in the SLERA and refined screening process that will be evaluated for benthic risk in the BERA are presented in Table 2-5. The COPCs included 11 metals, 20 PAHs and PAH sums, 3 phthalates, 10 SVOCs, 13 pesticides and pesticide sums, 3 Aroclors, total PCBs, 2,3,7,8-TCDD, and 3 TPHs. Chemicals to be discussed in the uncertainty section of the BERA because they were detected in surface sediments but had no screening-level benchmarks were presented in Table 2-3.

3.0 TISSUE RESIDUE

All benthic invertebrate and fish tissue COIs were compared to tissue-residue screening-level benchmarks provided by EPA in both the SLERA and the refined screen, where screening-level benchmarks were available, except for PAH COIs. PAH COIs were not screened; PAHs are metabolized by fish and some invertebrates and were evaluated using other pathways. The COPCs identified through this process were evaluated as part of the baseline risk assessments for benthic invertebrates and fish. The tissue-residue screening-level benchmarks are presented in Section 3.1. The results of the SLERA and refined screen are presented in Section 3.2 and 3.3, respectively. The tissue residue COPCs for benthic invertebrates and fish evaluated in the BERA are presented in Section 3.4.

3.1 TISSUE RESIDUE SCREENING-LEVEL BENCHMARKS

The approach for developing aquatic tissue-residue screening-level benchmarks was developed by EPA and its partners (EPA 2005) for data evaluation in the ecological preliminary risk evaluation (Ecological PRE) (Windward 2005). A single screening-level benchmark was developed for each chemical to be protective of all aquatic species (i.e., representative of all fish and invertebrates). The only exception was 2,3,7,8-TCDD for which a benthic invertebrate screening-level benchmark was based on Isensee (1978).

The aquatic tissue-residue screening-level benchmarks for tissue COIs are presented in Table 3-1. Figure 3-1 presents the process used to select screening level TRVs.

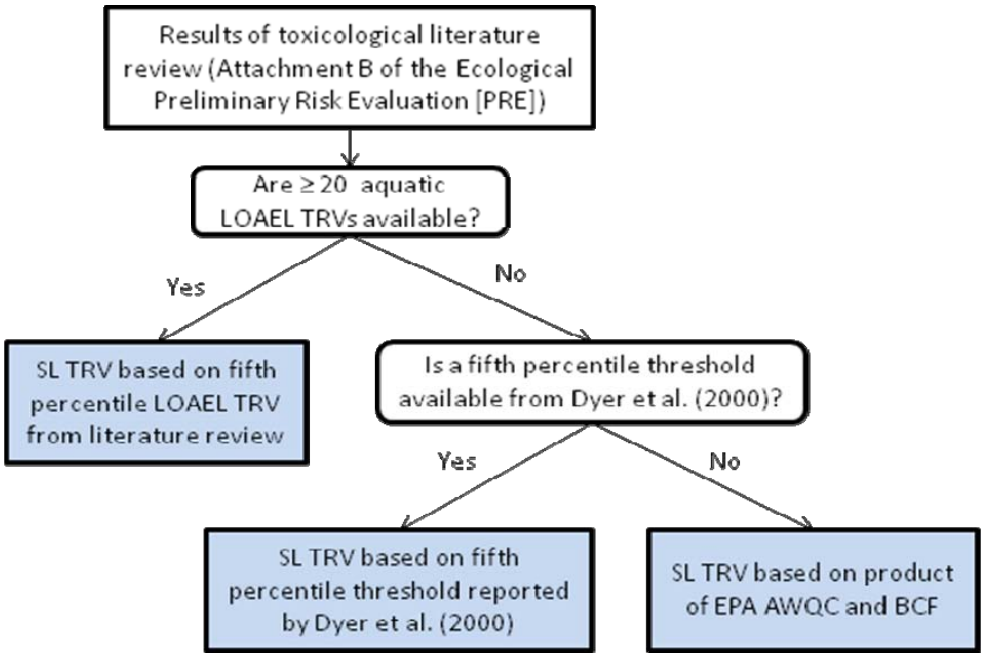

Figure 3-1. The SLERA Process

Screening-level benchmarks were developed using a two-tiered approach:

- **Tier 1.** For those COIs for which a sufficient number of studies (i.e., at least 20) were included in Appendix B of the Ecological PRE (Windward 2005), the screening-level benchmark was represented as the fifth percentile of all aquatic species lowest-observed-adverse-effect (LOAEL) data (including fish, crayfish, and clam). This approach (i.e., using species sensitivity distribution) was intended to define a tissue-residue concentration that would be protective of 95% of aquatic species. The TRV technical memorandum in Appendix B of the Ecological PRE presents the results of the entire literature search process and a detailed discussion of how each screening-level benchmark was derived from the reviewed studies.
- For those COIs for which fewer than 20 studies were identified in Appendix B of the Ecological PRE, the fifth percentile tissue screening concentration reported in Dyer et al. (2000) was selected as the screening-level benchmark. Literature-derived values included in Dyer et al. (2000) were based on single chemical laboratory tests that reported whole-body tissue concentrations associated with adverse effects on survival, reproduction, growth, behavior, and morphology. Whole-body tissue concentrations associated with adverse effects on biochemical or physiological endpoints were not used, nor were references that evaluated the toxicity of chemical mixtures (Dyer et al. 2000).
- **Tier 2.** For those COIs for which fewer than 20 studies were reviewed in Appendix B of the Ecological PRE or no fifth percentile screening was reported in Dyer et al. (2000), the tissue-residue screening-level benchmark was calculated as the product of EPA AWQC and a bioconcentration factor (BCF). AWQCs (EPA 2002) were used, when available. When current AWQC concentrations were not available, AWQC concentrations presented in the EPA Gold Book (the mid-1980s version of the national aquatic life criteria) were used, as provided by EPA (2005). BCFs were based on K_{OW}s for aquatic species developed according the methodology in Dyer et al. (2000) and Devillers (1996), as provided by EPA (2005). The data use to derive tissue screening-level benchmarks from AWQC are presented in Table 3-2.

Because the EPA draft chronic ambient water quality criterion for selenium is a whole-body fish tissue concentration, it was used as the screening-level benchmark for selenium. Different water bodies have different propensities for bioaccumulation of selenium; therefore, EPA has issued a draft freshwater aquatic life criterion for long-term effects (the chronic criterion) expressed as a concentration of the pollutant in fish tissue rather than a concentration in the water (EPA 2004). The tissue concentration is the most reliable indicator of selenium exposure and risk to fish under different environmental conditions. The draft chronic criterion of 7.91 mg/kg dw was used as the screening-level benchmark. It was converted from dry weight to 1.6 mg/kg ww assuming 80% moisture content in tissue.

No tissue screening-level benchmarks were available for butyltin, dibutyltin, and tetrabutyltin. However, because tributyltin is the most toxic butyltin, the assessment of tributyltin is assumed to be protective of the other butyltins. Screening-level benchmarks

were not available for individual PCB congeners and Aroclor mixtures; these chemicals were assessed as part of total PCBs. Dioxins and furans were evaluated based on 2,3,7,8-TCDD. Screening-level benchmarks were not available for 2,4′-DDD (dichlorodiphenyldichloro-ethane), 2,4′-DDE (dichlorodiphenyldichloroethylene), and 2,4′-DDT (dichlorodiphenyl-trichloroethane); these three pesticide isomers were assessed as part of total DDx (sum of all six DDT isomers [2,4′-DDD, 2,4′-DDE, 2,4′-DDT, 4,4′-DDD, 4,4′-DDE, and 4,4′-DDT]). Benthic invertebrate and fish tissue COIs with no tissue-residue screening-level benchmarks are presented in Table 3-3 and Table 3-4, respectively.

3.2 TISSUE RESIDUE SLERA

In the SLERA, the COIs reported in benthic invertebrate and fish tissue samples were compared to the screening-level benchmarks (Table 3-1). COIs that exceeded screening-level benchmarks based on their site-wide maximum concentration (regardless of detection status) were carried forward to the refined screening process. COIs that did not exceed screening-level benchmarks were eliminated from further evaluation. COIs with no screening-level benchmark were discussed as an uncertainty in the BERA.

The benthic invertebrate tissue-residue data included field collected clams (*Corbicula* spp.), mussels (*Margaritifera falcata* and *Anodonta nuttalliana*), crayfish (*Pacifasticus leniusculus*), and invertebrates collected with multiplate samplers deployed in the water column, and laboratory-exposed clams (*Corbicula fluminea*) and worms (*Lumbriculus variegatus*). Tissue-residues of laboratory-exposed clams and worms were assumed to have not reached steady-state conditions for some chemicals. Therefore, concentrations of neutral organic compounds (i.e., tributyltins, PAHs, pesticides, PCBs, phenols, phthalates, SVOCs, and dioxins and furans) measured in the laboratory-exposed organisms were adjusted according to the Inland Testing Manual (EPA and USACE 1998) to represent steady-state concentrations. The *Data Management* attachment (Attachment 1) presents the methods and assumptions (i.e., K_{OW} value) used to derive steady-state concentrations.

The fish tissue-residue data for all of the ecological receptors included largescale sucker (*Catostomus macrocheilus*), juvenile (pre-breeding) white sturgeon (*Acipenser transmontanus*), sculpin (*Cottus* sp.), peamouth (*Mylocheilus caurinus*), juvenile Chinook salmon (*Oncorhynchus tshawytscha)*, smallmouth bass (*Micropterus dolomieui)*, northern pikeminnow (*Ptychocheilus oregonensis*), and lamprey ammocoetes (*Lampreta* sp.). Carp (*Cyprinus carpio carpio)* tissue was available; however, carp was not selected as an ecological receptor. Carp was evaluated as a surrogate ecological receptor for the evaluation dioxins and dioxin-like furans only, and this was the only COI that was screened for carp.

Tables 3-5 and 3-6 present the chemicals in benthic invertebrates and fish, respectively, that were carried forward to the refined screening step.

3.3 TISSUE RESIDUE REFINED SCREEN

The tissue-residue COIs carried forward from the SLERA were further evaluated in the refined screen by comparing the maximum detected concentrations to the screening-level benchmarks (Figure 1-2, Step 2). COIs with maximum detected concentrations lower than their respective screening-level benchmarks were not evaluated further. There were several phthalate and pesticide tissue COIs identified in the SLERA that were not carried forward to the BERA because the maximum detected values were lower than the maximum detection limits and did not exceed the screening level benchmarks for various receptor tissues:

- Bis(2-ethylhexyl) phthalate (BEHP) (for juvenile Chinook salmon)
- Butylbenzylphthalate (for juvenile Chinook salmon)
- Dibutylphthalate (for crayfish, largescale sucker, juvenile Chinook salmon, sculpin, and smallmouth bass)
- Diethylphthalate (for crayfish, largescale sucker, juvenile Chinook salmon, and lamprey ammocoetes)
- Dimethylphthalate (for field clams and crayfish)
- Endrin (for largescale sucker, sculpin and smallmouth bass)
- alpha-Hexachlorocyclohexane (HCH) (for largescale sucker, sculpin, pikeminnow, and smallmouth bass)
- delta-HCH (for largescale sucker, sculpin, pikeminnow, and smallmouth bass)
- beta-HCH (for field clams, large-scale sucker, pikeminnow and smallmouth bass)
- Hexachlorobutadiene (for sculpin)

The detection frequency and detection limits were evaluated for those COIs with maximum concentrations greater than screening-level benchmarks. COIs were not further evaluated if the detection frequency was < 5% and the detection limits were less than the screening-level benchmark (Step 3). Because these two criteria were never met for any of these COIs, all COIs with maximum detected concentration exceeding the screening-level benchmarks were carried forward as COPCs that were evaluated in the BERA. Tables 3-7 through 3-12 present the results of the refined screen for benthic invertebrates, by species or endpoint. Tables 3-13 through 3-20 present the results of the refined screen for fish, by receptor.

3.4 SUMMARY OF TISSUE RESIDUE COPCS

The tissue-residue COPCs identified in screening process were evaluated further in the BERA to assess risks to benthic invertebrates and fish receptors. Benthic invertebrate and

fish COPCs are presented in Tables 3-21 and 3-22, respectively. The COPCs for benthic invertebrates included five metals (i.e., aluminum, arsenic, cadmium, copper, and zinc), tributyltin (TBT), six individual PAHs, total PAH, BEHP, dibutyl phthalate, total PCBs, 4,4′-DDD, and total DDx. The COPCs for fish included eight metals (i.e., aluminum, antimony, cadmium, chromium, copper, lead, mercury, and zinc), BEHP, total PCBs, beta-hexachlorocyclohexane, 4,4′-DDD, 4,4′-DDT, and total DDx. COIs that had no screening-level benchmarks were presented in Table 3-3 and 3-4 and are discussed as an uncertainty in the BERA.

4.0 DIETARY DOSE

Section 4.1 presents the dietary screening assessment and receptor-specific COPCs for fish and wildlife, respectively. Section 4.2 presents the dietary screening assessment for modeled bird eggs.

4.1 DIETARY DOSE

Prey tissue and sediment concentrations were compared to receptor-specific screening-level benchmarks for dietary exposure. Screening-level benchmarks were represented by threshold tissue concentrations (TTCs) and threshold sediment concentrations (TSCs) back-calculated from dietary dose screening-level thresholds and receptor-specific parameters (i.e., body weight, biota [prey] ingestion rate, incidental sediment ingestion rate). Dietary dose screening-level thresholds (expressed as mg/kg bw/d) provided by EPA (2008c) were based on EPA's Ecological Soil Screening-Level (Eco SSL) documents or based on no-observed-adverse-effect level (NOAEL) TRVs derived from the toxicological literature.

The receptor-specific dietary screening process identified COPCs for each receptor using maximum sediment and prey tissue concentrations. The prey tissue concentration is the maximum concentration across all of the prey for a given receptor. Fish, bird, and mammal dietary COIs with concentrations greater than TTCs or TSCs in the SLERA and refined screen were evaluated further in the BERA.

The following equations were used to develop receptor-specific TSCs and TTCs for use in the SLERA and refined screen:

$$TTC = \frac{TRV_{diet}}{\left(\frac{IR_{prey}}{BW}\right)} \qquad \textbf{Equation 4-1}$$

Where:

TTC	=	threshold tissue concentration (mg/kg ww)
TRV_{diet}	=	dietary dose toxicity threshold value (mg/kg bw/day) – NOAEL TRVs or Eco SSLs are used for this screening assessment
IR_{prey}	=	prey ingestion rate (kg ww food/day)
BW	=	body weight (kg)

And:

$$TSC = \frac{TRV_{diet}}{\left(\frac{IR_{sed}}{BW}\right)}$$ **Equation 4-2**

Where:

TSC = threshold sediment concentration (mg/kg dw)

TRV_{diet} = dietary dose toxicity threshold value (mg/kg bw/day) – NOAEL TRVs or Eco SSLs are used for this screening assessment

IR_{sed} = incidental sediment ingestion rate (kg dw sediment/day)

BW = body weight (kg)

Sections 4.1.1 and 4.1.2 present the dietary screening assessment and receptor-specific COPCs for fish and wildlife, respectively. Dietary exposure assumptions and dietary dose screening-level thresholds used to calculate receptor-specific TTCs and TSCs are also presented.

4.1.1 Fish

Dietary COIs for fish were screened for each of the following ecological receptors: largescale sucker, pre-breeding white sturgeon, juvenile chinook salmon sculpin, peamouth, smallmouth bass, and northern pikeminnow. The following sections present the result of the dietary dose screening assessment for these fish and the COPCs that were further assessed in the risk characterization section of the BERA.

4.1.1.1 Fish Dietary Dose Screening Assessment Parameters

The calculation of dietary dose estimate requires the input of receptor-specific parameters. Tables 4-1 and 4-2 present the receptor-specific exposure parameters (i.e., body weights and ingestion rates) and representative prey that were used for this screening assessment for each fish receptor.

Dietary COIs were compared to TTCs and TSCs, where screening-level benchmarks were available to derive these thresholds. Dietary fish COIs were limited to metals, butyltins, and PAHs that are metabolized in fish and were detected in either surface sediment or prey tissue samples. Table 4-3 presents all of the fish dietary COIs.

Dietary dose screening-level thresholds were developed for all COIs, where toxicological data were available. Table 4-4 presents the dietary screening-level thresholds for fish. Table 4-5 presents the dietary COIs for which no dietary screening-level threshold could be calculated.

4.1.1.2 SLERA Results for Fish Dietary COIs

In the SLERA, maximum COI concentrations in surface sediment and prey tissue were compared to TTCs and TSCs. Because receptor-specific parameters used to back-calculate

threshold screening concentrations are receptor-specific, COIs were evaluated on a receptor-specific basis.

COIs were carried forward to the refined screen for the following conditions: 1) the maximum prey tissue concentration was greater than the respective TTC, 2) the sediment concentration was greater than the respective TSCs, and/or 3) the sum of the tissue and sediment concentration exceedances factors was greater than 1.0 for given COI.[3] COIs for which the maximum prey tissue or sediment concentrations were less than TTCs or TSCs, respectively, or the sum of their exceedences of these threshold concentrations was < 1.0, were not further evaluated. Tables 4-6 through 4-12 present the SLERA results for each fish receptor. COIs for which no dietary screening benchmark thresholds were available are discussed in the uncertainty analysis of the BERA. Based on the results of the SLERA, the following COIs were further evaluated in the refined screen: three metals (i.e., cadmium, copper, and mercury); butyltin, dibutyltin, tetrabutyltin, and tributyltin ion; benzo(a)pyrene and total PAHs.

4.1.1.3 Fish Dietary Dose Results of Refined Screen

In the refined screen, the detected concentrations of COPCs that were carried forward from the SLERA were compared to surface sediment, and prey tissue were compared to receptor-specific TTCs and TSCs. Consistent with the SLERA, the refined screen was done on a receptor-specific basis using the parameters outlined in Section 4.1.1. Tables 4-13 through 4-19 present the results of the refined dietary screen, by receptor. COIs for which the maximum detected prey tissue or sediment concentrations were greater than TTCs or TSCs were retained as COPCs for analysis in the BERA. COIs for which the maximum detected prey tissue or sediment concentrations were less than TTCs and TSCs were not further evaluated.

4.1.1.4 Summary of Fish Dietary Dose COPCs

Based on the results of the SLERA and refined screen, the following COPCs were identified: three metals (i.e., cadmium, copper, mercury), butyltin, dibutyltin, tetrabutyltin, tributyltin, benzo(a)pyrene, and total PAHs. Table 4-20 provides a summary of the COPCs for each receptor that are further assessed in the BERA.

4.1.2 Wildlife

Dietary COIs for wildlife were screened for each of the following ecological wildlife (i.e., bird and mammal) receptors: spotted sandpiper, hooded merganser, bald eagle, osprey, mink and river otter. The following sections present the result of the dietary dose screening assessment for these fish and the COPCs that were further assessed in the risk characterization section of the BERA.

[3] This third condition takes into account the cumulative ingestion of both prey and incidental ingestion of sediment.

4.1.2.1 Wildlife Dietary Dose Screening Assessment Parameters

The calculation of dietary dose estimate requires the input of receptor-specific parameters. Tables 4-21 and 4-22 present the receptor-specific exposure parameters (i.e., body weights and ingestion rates) and representative prey that were used for this screening assessment for each wildlife receptor.

Dietary COIs were compared to back-caculated screening-level thresholds, where screening-level benchmarks were available. Table 4-23 presents all of the wildlife dietary COIs. Wildlife dietary COIs were defined as all chemicals that were detected in both tissue and sediment. Individual dioxin, furan, and PCB congeners were not listed as individual COIs because these chemicals will be analyzed as part of a group. Total PCBs will be analyzed both as the sum of all PCBs (PCB Aroclors or PCB congeners), and dioxin-like PCB congeners were evaluated as a PCB TEQ. Dioxin and furan congeners were evaluated as a dioxin/furan TEQ.

Dietary dose screening-level thresholds were developed for all COIs, where toxicological data were available. Tables 4-24 and 4-25 present the dietary screening-level thresholds for birds and mammals, respectively. Table 4-26 presents dietary COIs for which no bird or mammal dietary screening-level threshold was available.

4.1.2.2 SLERA Results for Wildlife Dietary COIs

In the SLERA, maximum COI concentrations in surface sediment and prey tissue were compared to receptor-specific TTCs and TSCs back-calculated from dietary screening-level thresholds. COIs were carried forward to the refined screen for the following conditions: 1) the maximum prey tissue concentration was greater than the respective TTC, 2) the sediment concentration was greater than the respective TSC, and/or 3) the sum of the tissue and sediment concentration exceedances factors was greater than 1.0 for given COI.[4] COIs for which the maximum prey tissue or sediment concentrations were less than TTCs and TSCs were not further evaluated. Tables 4-27 through 4-32 present the SLERA results for each wildlife receptor. COIs for which no dietary screening benchmark thresholds were available are discussed in the uncertainty analysis of the BERA. Based on the results of the bird SLERA, the following COIs were further evaluated in the refined screen for avian receptors: ten metals (i.e., aluminum, arsenic, cadmium, chromium, copper, lead, mercury, selenium, thallium, and zinc); benzo(a)pyrene, HPAHs, LPAHs, total PAHs, BEHP, dibutyl phthalate, total PCBs, PCB TEQ, dioxin/furan TEQ, total TEQ, aldrin, sum DDE, and total DDx. Based on the results of the mammal SLERA, the following COIs were further evaluated in the refined screen for mammal receptors: six metals (i.e., aluminum antimony, copper, lead, mercury, and selenium), HPAHs, total PCBs, PCB TEQ, dioxin/furan TEQ, total TEQ, and total DDx.

[4] This third condition takes into account the cumulative ingestion of both prey and incidental ingestion of sediment.

4.1.2.3 Wildlife Dietary Dose Results of Refined Screen

In the refined screen, the detected concentrations of COPCs that were carried forward from the SLERA were compared to surface sediment, and prey tissue were compared to receptor-specific TTCs and TSCs. Consistent with the SLERA, the refined screen was done on a receptor-specific basis using the parameters outlined in Section 4.2.1. Tables 4-33 through 4-38 present the results of the refined dietary screen, by receptor. COIs for which the maximum detected prey tissue or sediment concentrations were greater than their respective TTCs or TSCs were retained as COPCs for analysis in the BERA. COIs for which the maximum detected prey tissue or sediment concentrations were less than TTCs and TSCs were not further evaluated. Dibutyl phthalate (in the osprey diet) was the only COI identified in the SLERA that was not evaluated further in the BERA based on these screening criteria.

4.1.2.4 Summary of Wildlife Dietary Dose COPCs

Based on the results of the SLERA and refined screen, the following COPCs were identified for birds: ten metals (i.e., aluminum, arsenic, cadmium, chromium, copper, lead, mercury, selenium, thallium, and zinc), benzo(a)pyrene, HPAHs, LPAHs, total PAHs, BEHP, dibutyl phthalate, total PCBs, PCB TEQ, dioxin/furan TEQ, total TEQ, aldrin, sum DDE, and total DDx. Based on the results of the SLERA and refined screen, the following COPCs were identified for mammals: six metals (i.e., aluminum antimony, copper, lead, mercury, and selenium), HPAHs, total PCBs, PCB TEQ, dioxin/furan TEQ, total TEQ, and total DDx. Table 4-39 provides a summary of the COPCs for each receptor that are further assessed in the BERA.

4.2 BIRD EGG

As an additional dietary line of evidence for evaluating risks to piscivorous birds (i.e., bald eagle and osprey), selected dietary COIs were screened based on estimated bird egg tissue-residue concentrations.[5] The following section presents the result of the bird egg screening assessment.

Prey tissue concentrations were compared to receptor-specific screening-level benchmarks. Screening-level benchmarks were represented by fish prey TTCs back-calculated from bird egg tissue-residue screening-level thresholds and piscivorous bird egg biomagnifications factors (BMFs). Bird egg screening-level thresholds were recommended by EPA (2008d) based on NOAEL TRVs derived from the toxicological literature.

The bird egg screening process identified COPCs for piscivorous bird species using maximum prey tissue concentrations. The prey tissue concentration is the maximum concentration across all of the dietary prey for a given receptor. COIs with concentrations greater than TTCs in the SLERA and refined screen were evaluated further in the BERA.

[5] Previously collected bird egg data were not available in time for inclusion in the BERA.

The following equation was used to develop receptor-specific bird egg TTCs for use in the SLERA and refined screen:

$$TTC = \frac{TRV_{egg}}{BMF} \qquad \textbf{Equation 4-3}$$

Where:

TTC = threshold tissue concentration (mg/kg ww)

TRV_{egg} = bird egg tissue-residue threshold value (mg/kg ww) – NOAEL TRVs are used for this screening assessment

BMF = biomagnification factor of prey-to-egg tissue residue ratio (unitless)

4.2.1 Egg Dietary Dose Screening Assessment Parameters

Selected dietary COIs were compared to back-caculated TTCs, where bird egg screening-level benchmarks were available. The COIs that were evaluated are limited to specific bioaccumulative chemicals, as agreed upon by LWG and EPA for the Ecological PRE (Windward 2005), including: mercury, total PCBs, dioxins, furans, and dioxin-like PCB congeners (evaluated as PCB-TEQ, dioxin/furan TEQ, and total TEQ), and 4,4′-DDE. Bird egg tissue-residue screening-level thresholds were developed for each of these COIs. Table 4-40 presents the bird egg screening-level thresholds.

The calculation of bird egg tissue residues requires the input of piscivorous bird egg BMFs. Table 4-41 presents the region-specific BMFs that were used for this screening assessment.

4.3.2 SLERA Results for Bird Egg COIs

In the SLERA, maximum COI concentrations in prey tissue were compared to receptor-specific TTCs. Because the BMFs used to back-calculate threshold screening concentrations were the same for both bald eagle and osprey, COIs were evaluated for both receptors using the same assumptions. COIs for which the maximum prey tissue concentrations were greater than TTCs were carried forward to the refined screen. COIs for which the maximum prey tissue concentrations were less than TTCs were not further evaluated. Table 4-42 presents the SLERA results for the bird egg COIs. Based on the results of the SLERA, all of the COIs were further evaluated in the refined screen: mercury, total PCBs, PCB-TEQ, dioxin/furan TEQ, total TEQ, and 4,4′-DDE.

4.3.3 Egg Dietary Dose Results of Refined Screen

In the refined screen, site-wide maximum detected concentrations of those COIs in prey tissue were compared to receptor-specific TTCs. Table-43 presents the results of the refined bird egg screen. Bird egg COIs for which the maximum detected prey tissue concentrations were greater than TTCs were retained as COPCs for analysis in the BERA. Based on the

results of the refined screen, all of the bird egg COIs were retained as COPCs because all of the maximum prey concentrations are based on detected concentrations.

4.3.4 Summary of Egg Dietary Dose COPCs

Based on the results of the SLERA and refined screen, the following six chemicals were identified as bird egg COPCs for bald eagles and osprey: mercury, total PCBs, PCB TEQ, dioxin/furan TEQ, total TEQ, and 4,4′-DDE. These COPCs will be further assessed in the BERA.

5.0 SURFACE WATER

All surface water COIs were compared to chronic TRVs provided by EPA (EPA 2008d) in both the SLERA and the refined screen, where chronic TRVs were available. The COPCs identified through this process were evaluated in the ecological risk assessment for benthic invertebrates, fish, aquatic plants, and amphibians. Surface water COIs are presented in Table 5-1. Surface water COIs were defined as any chemical detected in surface water. Conventional parameters were not included as surface water COIs. Surface water TRVs are presented in Section 5.1. The results of the SLERA and refined screen are presented in Sections 5.2 and 5.3, respectively. Section 5.4 presents the surface water COPCs that will be evaluated in the BERA.

5.1 SURFACE WATER ECOLOGICAL SCREENING LEVELS

The chronic TRVs used to screen surface water COIs are presented in Table 5-2. The majority of the TRVs were developed in cooperation with EPA for the *Comprehensive Round 2 Site Characterization Summary and Data Gaps Analysis Report* (Integral et al. 2007). TRVs are based on a review of water quality regulatory benchmarks and literature-based thresholds (EPA 2006a; LWG 2006) using the following hierarchy:

- **Level 1 –** The lower of the national recommended water quality criteria (i.e., ambient water quality criteria [AWQC]) and the proposed State of Oregon water quality criteria[6]
- **Level 2 –** The Tier II values from Suter and Tsao (1996)
- **Level 3 –** EPA-proposed PAH-specific final chronic values for individual PAH compounds (Table 3-4 of EPA 2003). Use of these individual PAH guidelines as screening levels eliminates the need to use benzo(a)pyrene as a surrogate for other PAH compounds.
- **Level 4 –** Canadian water environmental quality guidelines
- **Level 5 –**Either acute ODEQ guidance values (ODEQ 2006) or Tier II acute values from Suter and Tsao (1996) divided by an acute to chronic ratio (ACR) of 8.3,[7] whichever results in a lower concentration
- **Level 6 –** Literature-derived values

TRVs were developed for all surface water COIs except for those chemicals summarized in Table 5-3.

[6] AWQC based on the proposed State of Oregon water quality criteria as specified in Table 20 or OAR 340-41 Table 33.

[7] An ACR of 8.3 was used to calculate a chronic screening value from an acute screening value when no chronic data were available per agreement with EPA (EPA 2008b).

5.2 SURFACE WATER SLERA

In the SLERA, the site-wide maximum concentrations of chemicals detected in surface water samples were compared to the chronic TRVs (Table 5-2). COIs that exceeded the chronic TRVs were carried forward to the refined screening process. COIs that did not exceed chronic TRVs were eliminated from further evaluation. COIs with no screening-level benchmark were carried forward to the BERA and discussed in the uncertainty section. Table 5-4 presents the comparison of surface water COPCs to TRVs.

5.3 SURFACE WATER REFINED SCREEN

The surface water COIs identified in the SLERA were further evaluated in the refined screen by comparing the maximum detected concentrations to the chronic TRVs (Figure 1-2, Step 2). COIs with maximum detected concentrations lower than their respective chronic TRVs were not evaluated further; based on this step, all COIs identified in the SLERA were carried forward to the BERA. Table 5-5 presents the results of the refined screen for surface water.

5.4 SUMMARY OF SURFACE WATER COPCs

The surface water COPCs identified in SLERA and refined screening were evaluated further in the BERA to assess risks to benthic invertebrates, fish, amphibians, and aquatic plants are presented in Table 5-6. The COPCs for surface water included two metals (aluminum and zinc), butyltin, three individual PAHs, BEHP, total PCBs, 2,4′-DDD, 2,4′-DDT, 4,4′-DDT, 4,4′-DDD, total DDx, and two VOCs. Surface water COIs that had no screening-level benchmarks were presented in Table 5-3 and are discussed in the uncertainty section of the BERA.

6.0 TRANSITION ZONE WATER

The screening process of TZW was identical to the surface water screening process. All shallow TZW COIs were compared to chronic TRVs provided by EPA (EPA 2008d) in both the SLERA and the refined screen, where chronic TRVs were available. The COPCs identified through this process were evaluated in the ecological risk assessment for benthic invertebrates, fish, aquatic plants, and amphibians. Table 6-1 presents the TZW COIs. TZW TRVs are presented in Section 6.1. The results of the SLERA and refined screen are presented in Sections 6.2 and 6.3, respectively. Section 6.4 presents the TZW COPCs that are evaluated in the BERA.

6.1 TRANSITION ZONE WATER SCREENING CRITERIA

The chronic TRVs used in the screening process of TZW were identical to the TRVs used in the surface water screening process. Section 5.1 describes how the water TRVs were derived and Table 6-2 presents all the TRVs used for TZW and surface water COIs. TZW COIs were defined as any chemical detected in shallow TZW. Conventional parameters were not included as TZW COIs. TZW COIs with no chronic TRVs are summarized in Table 6-3.

6.2 TRANSITION ZONE WATER SLERA

In the SLERA, the site-wide maximum concentrations of chemicals detected in TZW samples were compared to the chronic TRVs. COIs exceeding the chronic TRVs were carried forward to the refined screening process. COIs that did not exceed chronic TRVs were eliminated from further evaluation. COIs with no TRVs were carried forward to the BERA and discussed in the uncertainty section. Table 6-4 presents the the comparison of maximum TZW concentrations to chronic TRVs.

6.3 TRANSITION ZONE WATER REFINED SCREEN

Table 6-5 presents the results of the refined screen for TZW. The COIs identified in the SLERA were further evaluated in the refined screen by comparing the maximum detected concentrations to the chronic TRVs (Figure 1-2, Step 2). TZW COPCs were identitifed as those COIs where maximum detected concentrations exceeded chronic TRVs. Selenium and styrene were the only two COIs identified in the SLERA for which the maximum detected concentration did not exceed the chronic TRVs and were not carried forward in the BERA.

6.4 SUMMARY OF TRANSITION ZONE WATER COPCS

The TZW COPCs identified in SLERA and refined screening are presented in Table 6-6. The COPCs for TZW included 16 metals (i.e., aluminum, barium, beryllium, cadmium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, and zinc), 16 individual PAHs, 3 SVOCs, total DDx and metabolites (2,4′-DDD, 2,4′-DDT, 4,4′-DDD, 4,4′-DDE, 4,4′-DDT), 16 VOCs, gasoline range hydrocarbons, cyanide, and perchlorate.

7.0 BACKGROUND CONCENTRATIONS

As part of the refined screen outlined in EPA's Problem Formulation (Attachment 2), EPA included a final step to identify chemicals that have background concentrations greater than their respective screening thresholds. To satisfy this step, maximum background concentrations for sediment and surface water were compared to screening thresholds. This comparison was conducted for informational purposes only and was not used to eliminate COPCs as part of the SLERA process. Additional evaluation of background data is presented in the risk characterization for each medium/receptor in the BERA, where comparative data exist. The sediment and surface water data included in the background dataset in are defined in Section 7.0 of the draft remedial investigation (RI).

7.1 SEDIMENT DATA

The data that constitute the background sediment dataset are defined in Section 7.0 of the draft RI. Surface sediment chemistry in the background dataset includes LWG-collected data (from Rounds 2 and 3) and non-LWG collected data. These data were collected in the upriver reach of the LWR (from RM 15.3 to RM 28.4). All surface sediment data included in the upriver dataset were collected from within the top 30.5 cm of the sediment horizon. The following surface sediment samples collected during LWG and non-LWG investigations were included in the background dataset:

- LWG Round 2A Sediment Sampling, November 2004
- LWG Round 3B Sediment Sampling, November 2007
- McCormick & Baxter RI Phase 3, October 1999
- 2005 Portland District Operation and Maintenance (O&M) Sediment Characterization, May 2005
- Corps Dredged Materials O&M Sediment Characterization, September 2004
- EPA Blue Heron & West Linn Paper Mill Site Investigations, August 2007

Maximum concentrations in background surface sediment were compared to SQGs (Table 7-1). Twenty chemicals had maximum detected concentrations in background sediment that exceeded their respective SQGs: chromium, copper, manganese, nickel, zinc, benzo(a)anthracene, benzo(a)pyrene, chrysene, phenanthrene, pyrene, total PCBs, 4,4′-DDE, total DDx, 2,4-dimethylphenol, 2-methylphenol, BEHP, 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, hexachlorobenzene, and hexachlorobutadiene. Maximum detected concentrations of total PCBs and 4,4′-DDE were based on N-qualified data; maximum detected concentrations of these two chemicals that were not N-qualified did not exceed SQGs.

7.2 SURFACE WATER DATA

The data that constitute the background surface water dataset are defined in Section 7.0 of the draft RI. Surface water data used in the background dataset includes all samples collected from RM 11 and RM 16 of the LWR during the following sampling events:

- Round 2, Event 1 (November 2004)
- Round 2, Event 2 (March 2005)
- Round 2, Event 3 (July 2005)
- Round 3, Event 1 (January 2006)
- Round 3, Event 2 (September 2006)
- Round 3, Event 3 (November 2006)
- Round 3, Event 4 (January – March 2007[8])

Maximum concentrations in background surface water data were compared to chronic TRVs (Table 7-2). Aluminum and butyltin were the only chemicals that had maximum detected concentrations in background surface water that exceeded their respective chronic TRVs.

[8] The high-flow event (Event 4) of Round 3 was conducted over 3 months in order to sample during the targeted high-flow period.

TABLES

Table 2-1. Surface Sediment SQGs

COI	SQG (dry weight)			SQG (OC normalized)		
	SQG	**Unit (dw)**	**SQG Source**	**SQG**	**Unit (OC)**	**SQG Source**
Metals						
Antimony	64	mg/kg	JSCS[a]	NA	NA	NA
Arsenic	5.9	mg/kg	TEL[b]	NA	NA	NA
Cadmium	0.596	mg/kg	TEL[b]	NA	NA	NA
Chromium	37.3	mg/kg	TEL[b]	NA	NA	NA
Copper	31.6	mg/kg	TEC[c]	NA	NA	NA
Lead	35	mg/kg	TEL[b]	NA	NA	NA
Manganese	1,100	mg/kg	JSCS[a]	NA	NA	NA
Mercury	0.174	mg/kg	TEL[b]	NA	NA	NA
Nickel	18	mg/kg	TEL[b]	NA	NA	NA
Selenium	5	mg/kg	JSCS[a]	NA	NA	NA
Silver	6.1	mg/kg	SQS	NA	NA	NA
Zinc	121	mg/kg	TEC[c]	NA	NA	NA
PAHs						
2-Methylnaphthalene	NA	NA	NA	38	mg/kg OC	SQS[d]
Acenaphthene	NA	NA	NA	16	mg/kg OC	SQS[d]
Acenaphthylene	NA	NA	NA	66	mg/kg OC	SQS[d]
Anthracene	57.2	µg/kg	TEC[c]	220	mg/kg OC	SQS[d]
Benzo(a)anthracene	31.7	µg/kg	TEL[b]	110	mg/kg OC	SQS[d]
Benzo(a)pyrene	31.9	µg/kg	TEL[b]	99	mg/kg OC	SQS[d]
Benzo(g,h,i)perylene	NA	NA	NA	31	mg/kg OC	SQS[d]
Benzo(k)fluoranthene	13,000	µg/kg	JSCS[a]	NA	NA	NA
Total Benzofluoranthenes	NA	NA	NA	230	mg/kg OC	SQS[d]
Chrysene	57.1	µg/kg	TEL[b]	110	mg/kg OC	SQS[d]
Dibenzo(a,h)anthracene	33	µg/kg	TEC[c]	12	mg/kg OC	SQS[d]
Fluoranthene	111	µg/kg	TEL[b]	160	mg/kg OC	SQS[d]
Fluorene	77.4	µg/kg	TEC[c]	23	mg/kg OC	SQS[d]
Total HPAHs	NA	NA	NA	960	mg/kg OC	SQS[d]
Indeno(1,2,3-cd)pyrene	NA	NA	NA	34	mg/kg OC	SQS[d]
Total LPAHs	NA	NA	NA	370	mg/kg OC	SQS[d]
Naphthalene	176	µg/kg	TEC[c]	99	mg/kg OC	SQS[d]
Total PAHs	1,610	µg/kg	TEC[c]	NA	NA	NA
Phenanthrene	41.9	µg/kg	TEL[b]	100	mg/kg OC	SQS[d]
Pyrene	53	µg/kg	TEL[b]	1,000	mg/kg OC	SQS[d]

Table 2-1. Surface Sediment SQGs

COI	SQG (dry weight)			SQG (OC normalized)		
	SQG	**Unit (dw)**	**SQG Source**	**SQG**	**Unit (OC)**	**SQG Source**
VOCs						
Tetrachloroethene	500	µg/kg	JSCS[a]	NA	NA	NA
Trichloroethene	2,100	µg/kg	JSCS[a]	NA	NA	NA
SVOCs						
1,2,4-Trichlorobenzene	NA	NA	NA	0.81	mg/kg OC	SQS[d]
1,2-Dichlorobenzene	NA	NA	NA	2.3	mg/kg OC	SQS[d]
1,3-Dichlorobenzene	300	µg/kg	JSCS[a]	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	3.1	mg/kg OC	SQS[d]
Benzoic acid	650	µg/kg	SQS	NA	NA	NA
Benzyl alcohol	57	µg/kg	SQS	NA	NA	NA
Carbazole	1,600	µg/kg	JSCS[a]	NA	NA	NA
Dibenzofuran	NA	NA	NA	15	mg/kg OC	SQS[d]
Hexachlorobenzene	NA	NA	NA	0.38	mg/kg OC	SQS[d]
Hexachlorobutadiene	NA	NA	NA	3.9	mg/kg OC	SQS[d]
Hexachlorocyclopentadiene	400	µg/kg	JSCS[a]	NA	NA	NA
N-Nitrosodiphenylamine	NA	NA	NA	11	mg/kg OC	SQS[d]
Phthalates						
BEHP	NA	NA	NA	47	mg/kg OC	SQS[d]
Butylbenzyl phthalate	NA	NA	NA	4.9	mg/kg OC	SQS[d]
Dibutyl phthalate	NA	NA	NA	220	mg/kg OC	SQS[d]
Diethyl phthalate	NA	NA	NA	61	mg/kg OC	SQS[d]
Dimethyl phthalate	NA	NA	NA	53	mg/kg OC	SQS[d]
Di-n-octyl phthalate	NA	NA	NA	58	mg/kg OC	SQS[d]
Phenols						
2,4-Dimethylphenol	29	µg/kg	SQS	NA	NA	NA
2-Methylphenol	63	µg/kg	SQS	NA	NA	NA
4-Methylphenol	670	µg/kg	SQS	NA	NA	NA
Pentachlorophenol	360	µg/kg	SQS	NA	NA	NA
Phenol	420	µg/kg	SQS	NA	NA	NA
PCBs						
Aroclor 1016	530	µg/kg	JSCS[a]	NA	NA	NA
Aroclor 1248	1500	µg/kg	JSCS[a]	NA	NA	NA
Aroclor 1254	300	µg/kg	JSCS[a]	NA	NA	NA
Aroclor 1260	200	µg/kg	JSCS[a]	NA	NA	NA
Total PCBs	34.1	µg/kg	TEL[b]	12	mg/kg OC	SQS[d]
Dioxins and Furans						
2,3,7,8-TCDD	9	pg/g	JSCS[a]	NA	NA	NA

Table 2-1. Surface Sediment SQGs

COI	SQG (dry weight)			SQG (OC normalized)		
	SQG	**Unit (dw)**	**SQG Source**	**SQG**	**Unit (OC)**	**SQG Source**
Pesticides						
4,4′-DDD	3.54	µg/kg	TEL[b]	NA	NA	NA
4,4′-DDE	1.42	µg/kg	TEL[b]	NA	NA	NA
Sum DDD	4.88	µg/kg	TEC[c]	NA	NA	NA
Sum DDE	3.16	µg/kg	TEC[c]	NA	NA	NA
Sum DDT	4.16	µg/kg	TEC[c]	NA	NA	NA
Total DDx	5.28	µg/kg	TEC[c]	NA	NA	NA
Aldrin	40	µg/kg	JSCS[a]	NA	NA	NA
Chlordane (cis and trans)	3.24	µg/kg	TEC[c]	NA	NA	NA
Total chlordane	3.24	µg/kg	TEC[c]	NA	NA	NA
Dieldrin	1.9	µg/kg	TEC[c]	NA	NA	NA
Endrin	2.22	µg/kg	TEC[c]	NA	NA	NA
gamma-HCH	0.94	µg/kg	TEL[b]	NA	NA	NA
Heptachlor	10	µg/kg	JSCS[a]	NA	NA	NA
Heptachlor epoxide	0.6	µg/kg	TEL[b]	NA	NA	NA
TPH						
Diesel-range hydrocarbons	90.6	mg/kg	Alaska TPH TRV[e]	9,063	mg/kg OC	Alaska TPH TRV[e]
Gasoline-range hydrocarbons	12.2	mg/kg	Alaska TPH TRV[e]	1,219	mg/kg OC	Alaska TPH TRV[e]
Residual-range hydrocarbons	1,175	mg/kg	Alaska TPH TRV[e]	117,476	mg/kg OC	Alaska TPH TRV[e]

[a] JSCS SQGs are based on ODEQ and EPA (2005).

[b] TEL SQGs are based on Smith et al. (1996).

[c] TEC SQGs are based on MacDonald et al. (2000).

[d] SQS values are based on Ecology (1995).

[e] SQG values are based on Alaska TPH TRV (EPA 2008a).

dw – dry weight
BEHP – bis(2-ethylhexyl) phthalate
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
HCH – hexachlorocyclohexane
JSCS – Joint Source Control Strategy
NA – not available
OC – organic carbon
SQG – sediment quality guideline
PAH – polycyclic aromatic hydrocarbon
PCB – polychlorinated biphenyl
SQS – Washington state sediment quality standard
SVOC – semivolatile organic compound
TCDD – tetrachlorodibenzo-*p*-dioxin
TEC –threshold effects concentration
TEL – threshold effects level
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
TPH – total petroleum hydrocarbons
TRV – toxicity reference value
VOC – volatile organic compound

Table 2-2. Comparison of Maximum Surface Sediment COI Concentrations to SQGs

COI	Unit	Maximum Concentrationa	SQG	Maximum Concentration > SQG?
Metals				
Antimony	mg/kg dw	32.1	64	No
Arsenic	mg/kg dw	75.6	5.9	**Yes**
Cadmium	mg/kg dw	46.2	0.596	**Yes**
Chromium	mg/kg dw	774	37.3	**Yes**
Copper	mg/kg dw	2,830	31.6	**Yes**
Lead	mg/kg dw	13,400 T	35	**Yes**
Manganese	mg/kg dw	2,130	1,100	**Yes**
Mercury	mg/kg dw	65.2 T	0.174	**Yes**
Nickel	mg/kg dw	594	18	**Yes**
Selenium	mg/kg dw	20	5	**Yes**
Silver	mg/kg dw	14.8	6.1	**Yes**
Zinc	mg/kg dw	2,850	121	**Yes**
PAHs				
2-Methylnaphthalene	mg/kg OC	1,900	38	**Yes**
Acenaphthene	mg/kg OC	15,000	16	**Yes**
Acenaphthylene	mg/kg OC	1,600	66	**Yes**
Anthracene	mg/kg OC	11,000	220	**Yes**
	µg/kg dw	390,000	57.2	**Yes**
Benzo(a)anthracene	mg/kg OC	10,000	110	**Yes**
	µg/kg dw	320,000	31.7	**Yes**
Benzo(a)pyrene	mg/kg OC	12,000	99	**Yes**
	µg/kg dw	340,000	31.9	**Yes**
Benzo(g,h,i)perylene	mg/kg OC	7,800	31	**Yes**
Benzo(k)fluoranthene	µg/kg dw	100,000	13,000	**Yes**
Total benzofluoranthenes	mg/kg OC	14,000	230	**Yes**
Chrysene	mg/kg OC	12,000	110	**Yes**
	µg/kg dw	370,000	57.1	**Yes**
Dibenzo(a,h)anthracene	mg/kg OC	1,000	12	**Yes**
	µg/kg dw	25,000	33	**Yes**
Fluoranthene	mg/kg OC	32,000	160	**Yes**
	µg/kg dw	1,200,000	111	**Yes**
Fluorene	mg/kg OC	5,400	23	**Yes**

Table 2-2. Comparison of Maximum Surface Sediment COI Concentrations to SQGs

COI	Unit	Maximum Concentrationa	SQG	Maximum Concentration > SQG?
	µg/kg dw	220,000	77.4	**Yes**
Total HPAHs	mg/kg OC	120,000	960	**Yes**
Indeno(1,2,3-cd)pyrene	mg/kg OC	7,600	34	**Yes**
Total LPAHs	mg/kg OC	66,000	370	**Yes**
Naphthalene	mg/kg OC	3,200	99	**Yes**
	µg/kg dw	100,000 J	176	**Yes**
Total PAHs	µg/kg dw	7,300,000 T	1,610	**Yes**
Phenanthrene	mg/kg OC	31,000	100	**Yes**
	µg/kg dw	1,700,000	41.9	**Yes**
Pyrene	mg/kg OC	29,000	1,000	**Yes**
	µg/kg dw	1,300,000	53	**Yes**
Phthalates				
BEHP	mg/kg OC	23,000	47	**Yes**
Butylbenzyl phthalate	mg/kg OC	130	4.9	**Yes**
Dibutyl phthalate	mg/kg OC	220	220	No
Diethyl phthalate	mg/kg OC	128 U[b]	61	**Yes**
Dimethyl phthalate	mg/kg OC	128 U[b]	53	**Yes**
Di-n-octyl phthalate	mg/kg OC	561	58	**Yes**
SVOCs				
1,2,4-Trichlorobenzene	mg/kg OC	128 U[b]	0.81	**Yes**
1,2-Dichlorobenzene	mg/kg OC	128 U[b]	2.3	**Yes**
1,3-Dichlorobenzene	µg/kg dw	1,075 UJ[b]	300	**Yes**
1,4-Dichlorobenzene	mg/kg OC	128 U[b]	3.1	**Yes**
Benzoic acid	µg/kg dw	26,500 U[b]	650	**Yes**
Benzyl alcohol	µg/kg dw	1,075 UJ[b]	57	**Yes**
Carbazole	µg/kg dw	32,000 J	1,600	**Yes**
Dibenzofuran	mg/kg OC	710	15	**Yes**
Hexachlorobenzene	mg/kg OC	44 U[b]	0.38	**Yes**
Hexachlorobutadiene	mg/kg OC	230 T	3.9	**Yes**
n-Nitrosodiphenylamine	mg/kg OC	128 U[b]	11	**Yes**
Phenols				
2,4-Dimethylphenol	µg/kg dw	1,400 UJ[b]	29	**Yes**
2-Methylphenol	µg/kg dw	1,075 UJ[b]	63	**Yes**
4-Methylphenol	µg/kg dw	2,500	670	**Yes**

Table 2-2. Comparison of Maximum Surface Sediment COI Concentrations to SQGs

COI	Unit	Maximum Concentrationa	SQG	Maximum Concentration > SQG?
Pentachlorophenol	µg/kg dw	8,410 J	360	**Yes**
Phenol	µg/kg dw	1,075 UJ[b]	420	**Yes**
PCBs				
Aroclor 1016	µg/kg dw	1,000 U[b]	530	**Yes**[c]
Aroclor 1248	µg/kg dw	22,300 J	1,500	**Yes**[c]
Aroclor 1254	µg/kg dw	2,100	300	**Yes**[c]
Aroclor 1260	µg/kg dw	5,070 J	200	**Yes**[c]
Total PCBs	µg/kg dw	30,800 JT	34.1	**Yes**
	mg/kg OC	1,700	12	**Yes**
Dioxins and Furans				
2,3,7,8-TCDD	pg/g dw	111.091	9	**Yes**
Pesticides				
4,4′-DDD	µg/kg dw	2,780 NJ	3.54	**Yes**
4,4′-DDE	µg/kg dw	2,240 J	1.42	**Yes**
Sum DDD	µg/kg dw	3,040 NJT	4.88	**Yes**
Sum DDE	µg/kg dw	2,530 NJT	3.16	**Yes**
Sum DDT	µg/kg dw	13,000 NJT	4.16	**Yes**
Total DDx	µg/kg dw	16,000 NJT	5.28	**Yes**
Aldrin	µg/kg dw	691 J	40	**Yes**
Total chlordane	µg/kg dw	669 NJT	3.24	**Yes**
Dieldrin	µg/kg dw	356 J	1.9	**Yes**
Endrin	µg/kg dw	100 U[b]	2.22	**Yes**
gamma-HCH	µg/kg dw	430	0.94	**Yes**
Heptachlor	µg/kg dw	49.5 U[b]	10	**Yes**
Heptachlor epoxide	µg/kg dw	49.5 U[b]	0.6	**Yes**
VOCs				
Tetrachloroethene	µg/kg dw	25 U[b]	500	No
Trichloroethene	µg/kg dw	25 U[b]	2,100	No
TPH				
Diesel-range hydrocarbons	mg/kg OC	380,000	9,063	**Yes**
	mg/kg dw	20,000 J	90.6	**Yes**

Table 2-2. Comparison of Maximum Surface Sediment COI Concentrations to SQGs

COI	Unit	Maximum Concentrationa	SQG	Maximum Concentration > SQG?
Gasoline-range hydrocarbons	mg/kg OC	3,800	1219	**Yes**
	mg/kg dw	260 J	12.2	**Yes**
Residual-range hydrocarbons	mg/kg OC	670,000	117,476	**Yes**
	mg/kg dw	18,000 J	1,175	**Yes**

[a] For dry weight concentrations, the maximum concentration is either the maximum detected concentration or one-half detection limit; for the OC-normalized concentrations, the maximum concentration is either the maximum detected concentration or the maximum detection limit.

[b] Maximum concentration is based on detection limit.

[c] Exceedance of an individual Aroclor SQG is used as evidence that total PCBs should be carried forward.

BEHP – bis(2-ethylhexyl) phthalate
COI – chemical of interest
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
dw – dry weight
HCH – hexachlorocyclohexane
J – estimated concentration
N – presumptive evidence of a compound
OC – organic carbon
PAH – polycyclic aromatic hydrocarbon
PCB – polychlorinated biphenyl
SQG – sediment quality guideline
SVOC – semivolatile organic compound
TPH – total petroleum hydrocarbons
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
T – value calculated or selected from multiple results
U – not detected at given concentration
VOC – volatile organic compound

Table 2-3. Surface sediment COIs with no SQG

COIs	
Metals	
Aluminum	Thallium
Chromium (hexavalent)	Tin
Cobalt	Titanium
Magnesium	Vanadium
Butyltins	
Butyltin ion	Tetrabutyltin
Dibutyltin ion	Tributyltin ion
Monobutyltin trichloride	
PAHs	
1,6,7-Trimethylnaphthalene	Benzo(e)pyrene
1-Methylnaphthalene	Dibenzothiophene
1-Methylphenanthrene	Perylene
2,6-Dimethylnaphthalene	
Dioxins/Furans	
1,2,3,4,6,7,8-Heptachlorodibenzofuran	1,2,3,7,8,9-Hexachlorodibenzofuran
1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin	1,2,3,7,8,9-Hexachlorodibenzo-*p*-dioxin
1,2,3,4,7,8,9-Heptachlorodibenzofuran	1,2,3,7,8-Pentachlorodibenzofuran
1,2,3,4,7,8-Hexachlorodibenzofuran	1,2,3,7,8-Pentachlorodibenzo-*p*-dioxin
1,2,3,4,7,8-Hexachlorodibenzo-*p*-dioxin	2,3,4,6,7,8-Hexachlorodibenzofuran
1,2,3,6,7,8-Hexachlorodibenzofuran	2,3,4,7,8-Pentachlorodibenzofuran
1,2,3,6,7,8-Hexachlorodibenzo-*p*-dioxin	2,3,7,8-Tetrachlorodibenzofuran
VOCs	
1,1,1,2-Tetrachloroethane	Methyl isobutyl ketone
1,1,2,2-Tetrachloroethane	Methyl n-butyl ketone
1,1-Dichloroethane	Methyl tert-butyl ether
1,2,3-Trichloropropane	Methylene chloride
1,2-Dichloroethane	Methylethyl ketone
Acetone	Styrene

Table 2-3. Surface sediment COIs with no SQG

COIs	
Benzene	Toluene
Chloroform	trans-1,2-Dichloroethene
cis-1,2-Dichloroethene	Vinyl chloride
Dichlorodifluoromethane	m,p-Xylene[f]
Ethylbenzene	o-Xylene[f]
Isopropylbenzene	Total xylenes
SVOCs	
2-Chloronaphthalene	Bis(2-chloro-1-methylethyl) ether
3-Nitroaniline	Bis(2-chloroisopropyl) ether
4-Chloroaniline	Diphenyl
4-Nitroaniline	Hexachloroethane
Aniline	
Phenols	
2,3,4,5-Tetrachlorophenol	2,4,6-Trichlorophenol
2,3,4,6-Tetrachlorophenol	2,4-Dichlorophenol
2,3,5,6-Tetrachlorophenol	2-Chlorophenol
2,4,5-Trichlorophenol	4-Chloro-3-methylphenol
Pesticides	
2,4′-DDD[a]	Endrin ketone
2,4′-DDE[b]	alpha-Hexachlorocyclohexane
2,4′-DDT[c]	beta-Hexachlorocyclohexane
4,4′-DDT[c]	delta-Hexachlorocyclohexane
cis-Chlordane[d]	Methoxychlor
trans-Chlordane[d]	Mirex
alpha-Endosulfan[e]	cis-Nonachlor[d]
beta-Endosulfan[e]	trans-Nonachlor[d]
Total endosulfan	Oxychlordane[d]
Endosulfan sulfate[e]	Toxaphene
Endrin aldehyde	

Table 2-3. Surface sediment COIs with no SQG

COIs	
Herbicides	
2,4,5-T	MCPA
2,4-D	MCPP
2,4-DB	Silvex
Dichloroprop	
Other chemicals	
Ammonia	Perchlorate
Cyanide	

[a] Evaluated as a component of Sum DDD and total DDx.

[b] Evaluated as a component of Sum DDD and total DDx, for which SQGs exist.

[c] Evaluated as a component of Sum DDT and total DDx, for which SQGs exist.

[d] Evaluated as a component of total chlordanes, for which an SQG exists.

[e] Evaluated as a component of total endosulfans, for which an SQG exists.

[f] Evaluated as a component of total xylenes; however, no SQG exists for total xylenes.

COI – chemical of interest

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

MCPA – 2-methyl-4-chlorophenoxyacetic acid

MCPP – methylchlorophenoxypropionic acid

PAH – polycyclic aromatic hydrocarbon

SQG – sediment quality guidelines

SVOC – semivolatile organic compound

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

VOC – volatile organic compound

Table 2-4. Refined Screening Results Identifying COPCs

		Comparison of Maximum Detect Concentration to SQG			Conditions for Exclusion from COPC List			
COI	**Unit**	**Max Detect**	**SQG**	**Does Maximum Detection Exceed the SQG?**	**Is Detection Frequency < 5%? (DF, %)**	**Are Detection Limits < SQG? (No. of Exceedances)**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Metals								
Arsenic	mg/kg dw	75.6	5.9	Yes	No (91)	Yes	No	**Yes**
Cadmium	mg/kg dw	46.2	0.596	Yes	No (93)	Yes	No	**Yes**
Chromium	mg/kg dw	774	37.3	Yes	No (100)	Yes	No	**Yes**
Copper	mg/kg dw	2830	31.6	Yes	No (100)	Yes	No	**Yes**
Lead	mg/kg dw	13,400 T	35	Yes	No (100)	Yes	No	**Yes**
Manganese	mg/kg dw	2130	1,100	Yes	No (100)	Yes	No	**Yes**
Mercury	mg/kg dw	65.2 T	0.174	Yes	No (93)	Yes	No	**Yes**
Nickel	mg/kg dw	594	18	Yes	No (99)	Yes	No	**Yes**
Selenium	mg/kg dw	20	5	Yes	No (46)	Yes	No	**Yes**
Silver	mg/kg dw	14.8	6.1	Yes	No (96)	Yes	No	**Yes**
Zinc	mg/kg dw	2,850	121	Yes	No (100)	Yes	No	**Yes**
PAHs								
2-Methylnaphthalene	mg/kg OC	1,900	38	Yes	No (81)	Yes	No	**Yes**
Acenaphthene	mg/kg OC	15,000	16	Yes	No (86)	Yes	No	**Yes**
Acenaphthylene	mg/kg OC	1,600	66	Yes	No (81)	Yes	No	**Yes**
Anthracene	mg/kg OC	11,000	220	Yes	No (90)	Yes	No	**Yes**
	µg/kg dw	390,000	57.2	Yes		No (2)	No	
Benzo(a)anthracene	mg/kg OC	10,000	110	Yes	No (98)	Yes	No	**Yes**
	µg/kg dw	320,000	31.7	Yes		No (5)	No	

Table 2-4. Refined Screening Results Identifying COPCs

		Comparison of Maximum Detect Concentration to SQG			Conditions for Exclusion from COPC List			
COI	**Unit**	**Max Detect**	**SQG**	**Does Maximum Detection Exceed the SQG?**	**Is Detection Frequency < 5%? (DF, %)**	**Are Detection Limits < SQG? (No. of Exceedances)**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Benzo(a)pyrene	mg/kg OC	12,000	99	Yes	No (97)	Yes	No	**Yes**
	µg/kg dw	340,000	31.9	Yes		No (6)	No	
Benzo(g,h,i)perylene	mg/kg OC	7,800	31	Yes	No (96)	Yes	No	**Yes**
Benzo(k)fluoranthene	µg/kg dw	100,000	13,000	Yes	No (98)	Yes	No	**Yes**
Total benzofluoranthenes	mg/kg OC	14,000	230	Yes	No (99)	Yes	No	**Yes**
Chrysene	mg/kg OC	12,000	110	Yes	No (98)	Yes	No	**Yes**
	µg/kg dw	370,000	57.1	Yes		No (3)	No	
Dibenzo(a,h)anthracene	mg/kg OC	1,000	12	Yes	No (85)	No (1)	No	**Yes**
	µg/kg dw	25,000	33	Yes		No (4)	No	
Fluoranthene	mg/kg OC	32,000	160	Yes	No (99)	Yes	No	**Yes**
	µg/kg dw	1,200,000	111	Yes		Yes	No	
Fluorene	mg/kg OC	5,400	23	Yes	No (86)	Yes	No	**Yes**
	µg/kg dw	220,000	77.4	Yes		No (3)	No	
Total HPAHs	mg/kg OC	120,000	960	Yes	No (100)	Yes	No	**Yes**
Indeno(1,2,3-cd)pyrene	mg/kg OC	7,600	34	Yes	No (96)	Yes	No	**Yes**
Total LPAHs	mg/kg OC	66,000	370	Yes	No (98)	Yes	No	**Yes**
Naphthalene	mg/kg OC	3,200	99	Yes	No (69)	Yes	No	**Yes**
	µg/kg dw	100,000 J	176	Yes		Yes	No	
Total PAHs	µg/kg dw	7,300,000 T	1,610	Yes	No (100)	Yes	No	**Yes**

Table 2-4. Refined Screening Results Identifying COPCs

		Comparison of Maximum Detect Concentration to SQG			Conditions for Exclusion from COPC List			
COI	**Unit**	**Max Detect**	**SQG**	**Does Maximum Detection Exceed the SQG?**	**Is Detection Frequency < 5%? (DF, %)**	**Are Detection Limits < SQG? (No. of Exceedances)**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Phenanthrene	mg/kg OC	31,000	100	Yes	No (97)	Yes	No	**Yes**
	µg/kg dw	1,700,000	41.9	Yes		No (2)	No	
Pyrene	mg/kg OC	29,000	1,000	Yes	No (99)	Yes	No	**Yes**
	µg/kg dw	1,300,000	53	Yes		Yes	No	
Phthalates								
BEHP	mg/kg OC	23,000	47	Yes	No (62)	No (10)	No	**Yes**
Butylbenzyl phthalate	mg/kg OC	130	4.9	Yes	No (32)	No (109)	No	**Yes**
Diethyl phthalate	mg/kg OC	18	61	No	NA	NA	NA	No
Dimethyl phthalate	mg/kg OC	18	53	No	NA	NA	NA	No
Di-n-octyl phthalate	mg/kg OC	561	58	Yes	No (9)	No (6)	No	**Yes**
SVOCs								
1,2,4-Trichlorobenzene	mg/kg OC	12	0.81	Yes	Yes (1)	No (468)	No	**Yes**
1,2-Dichlorobenzene	mg/kg OC	24	2.3	Yes	Yes (1)	No (161)	No	**Yes**
1,3-Dichlorobenzene	µg/kg dw	98	300	No	NA	NA	NA	No
1,4-Dichlorobenzene	mg/kg OC	83	3.1	Yes	Yes (2)	No (135)	No	**Yes**
Benzoic acid	µg/kg dw	4,110 J	650	Yes	No (6)	No (69)	No	**Yes**
Benzyl alcohol	µg/kg dw	244 J	57	Yes	No (13)	No (85)	No	**Yes**
Carbazole	µg/kg dw	32,000 J	1,600	Yes	No (59)	Yes	No	**Yes**
Dibenzofuran	mg/kg OC	710	15	Yes	No (79)	No (19)	No	**Yes**
Hexachlorobenzene	mg/kg OC	13.4	0.38	Yes	No (33)	No (298)	No	**Yes**
Hexachlorobutadiene	mg/kg OC	12	3.9	Yes	No (6)	No (12)	No	**Yes**

Table 2-4. Refined Screening Results Identifying COPCs

		Comparison of Maximum Detect Concentration to SQG			Conditions for Exclusion from COPC List			
COI	**Unit**	**Max Detect**	**SQG**	**Does Maximum Detection Exceed the SQG?**	**Is Detection Frequency < 5%? (DF, %)**	**Are Detection Limits < SQG? (No. of Exceedances)**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
n-Nitrosodiphenylamine	mg/kg OC	120	11	Yes	Yes (1)	No (37)	No	**Yes**
Phenols								
2,4-Dimethylphenol	µg/kg dw	300	29	Yes	Yes (0)	No (154)	No	**Yes**
2-Methylphenol	µg/kg dw	290	63	Yes	Yes (0)	No (72)	No	**Yes**
4-Methylphenol	µg/kg dw	2500	670	Yes	No (50)	No (6)	No	**Yes**
Pentachlorophenol	µg/kg dw	8,410 J	360	Yes	No (19)	No (4)	No	**Yes**
Phenol	µg/kg dw	680	420	Yes	No (31)	No (6)	No	**Yes**
PCBs								
Total PCBs	mg/kg OC	1,700	12	Yes	No (76)	No (10)	No	**Yes**
	µg/kg dw	30,800 JT	34.1	Yes		No (22)	No	
Dioxins/Furans								
2,3,7,8-TCDD	pg/g	111.091	9	Yes	No (19)	Yes	No	**Yes**
Pesticides								
4,4′-DDD	µg/kg dw	2,780 NJ	3.54	Yes	No (84)	No (8)	No	**Yes**
4,4′-DDE	µg/kg dw	2,240 J	1.42	Yes	No (82)	No (40)	No	**Yes**
Sum DDD	µg/kg dw	3,040 NJT	4.88	Yes	No (86)	No (7)	No	**Yes**
Sum DDE	µg/kg dw	2,530 NJT	3.16	Yes	No (83)	No (32)	No	**Yes**
Sum DDT	µg/kg dw	13,000 NJT	4.16	Yes	No (76)	No (15)	No	**Yes**
Total DDx	µg/kg dw	16,000 NJT	5.28	Yes	No (91)	No (12)	No	**Yes**
Aldrin	µg/kg dw	691 J	40	Yes	No (24)	No (3)	No	**Yes**
Chlordane (cis and trans)	µg/kg dw	26	3.24	Yes	Yes (1)	No (77)	No	**Yes**

Table 2-4. Refined Screening Results Identifying COPCs

		Comparison of Maximum Detect Concentration to SQG			Conditions for Exclusion from COPC List			
COI	**Unit**	**Max Detect**	**SQG**	**Does Maximum Detection Exceed the SQG?**	**Is Detection Frequency < 5%? (DF, %)**	**Are Detection Limits < SQG? (No. of Exceedances)**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Total chlordane	µg/kg dw	669 NJT	3.24	Yes	No (68)	No (37)	No	**Yes**
Dieldrin	µg/kg dw	356 J	1.9	Yes	No (23)	No (42)	No	**Yes**
Endrin	µg/kg dw	32 J	2.22	Yes	No (9)	No (39)	No	**Yes**
gamma-HCH	µg/kg dw	430	0.94	Yes	No (17)	No (61)	No	**Yes**
Heptachlor	µg/kg dw	6	10	No	NA	NA	NA	No
Heptachlor epoxide	µg/kg dw	17 J	0.6	Yes	No (8)	No (81)	No	**Yes**
Petroleum								
Diesel-range hydrocarbons	mg/kg dw	20,000 J	90.6	Yes	No (97)	Yes	No	**Yes**
	mg/kg OC	380,000	9063	Yes		No (2)	No	
Gasoline-range hydrocarbons	mg/kg dw	260 J	12.2	Yes	No (14)	Yes	No	**Yes**
	mg/kg OC	3,800	1219	Yes		No (9)	No	
Residual-range hydrocarbons	mg/kg dw	18,000 J	1175	Yes	No (97)	Yes	No	**Yes**
	mg/kg OC	670,000	117476	Yes		Yes	No	

BEHP – bis (2-ethylhexyl) phthalate
COPC – chemical of potential concern
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
dw – dry weight
HCH – hexachlorocyclohexane
HPAH – high-molecular-weight polycyclic aromatic hydrocarbon
J – estimated concentration
LPAH – low-molecular-weight polycyclic aromatic hydrocarbon
N – presumptive evidence of a compound
OC – organic carbon
PCB – polychlorinated biphenyl
PAH – polycyclic aromatic hydrocarbon
SQG – sediment quality guideline
SVOC – semivolatile organic compound
T – value calculated or selected from multiple results
TPH – total petroleum hydrocarbons
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

Table 2-5. Surface Sediment COPCs

COPCs	
Metals	
Arsenic	Mercury
Cadmium	Nickel
Chromium	Selenium
Copper	Silver
Lead	Zinc
Manganese	
PAHs	
2-Methylnaphthalene	Dibenzo(a,h)anthracene
Acenaphthene	Fluoranthene
Acenaphthylene	Fluorene
Anthracene	Total HPAHs
Benzo(a)anthracene	Indeno(1,2,3-cd)pyrene
Benzo(a)pyrene	Total LPAHs
Benzo(g,h,i)perylene	Naphthalene
Benzo(k)fluoranthene	Total PAHs
Total benzofluoranthenes	Phenanthrene
Chrysene	Pyrene
Phthalates	
Bis(2-ethylhexyl) phthalate	Di-n-octyl phthalate
Butylbenzyl phthalate	
SVOCs	
1,2,4-Trichlorobenzene	Carbazole
1,2-Dichlorobenzene	Dibenzofuran
1,4-Dichlorobenzene	Hexachlorobenzene
Benzoic acid	Hexachlorobutadiene
Benzyl alcohol	n-Nitrosodiphenylamine
Phenols	
2,4-Dimethylphenol	Pentachlorophenol
2-Methylphenol	Phenol
4-Methylphenol	
PCBs	
Total PCBs	
Dioxins and Furans	
2,3,7,8-TCDD	

Table 2-5. Surface Sediment COPCs

COPCs	
Pesticides	
4,4′-DDD	Chlordane (cis & trans)
4,4′-DDE	Total chlordane
Sum DDD	Dieldrin
Sum DDE	Endrin
Sum DDT	gamma-Hexachlorocyclohexane
Total DDx	Heptachlor epoxide
Aldrin	
TPHs	
Diesel-range hydrocarbons	Residual-range hydrocarbons
Gasoline-range hydrocarbons	

COPC – chemical of potential concern
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
HPAH – high-molecular-weight polycyclic aromatic hydrocarbon
LPAH – low-molecular-weight polycyclic aromatic hydrocarbon
PAH – polycyclic aromatic hydrocarbon
PCB – polychlorinated biphenyl
SVOC – semivolatile organic compound
TCDD – tetrachlorodibenzo-*p*-dioxin
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
TPH – total petroleum hydrocarbons
VOC – volatile organic compound

Table 3-1. Tissue-Residue Screening-Level Benchmarks

COI	Unit (ww)	Benchmark	Source
Metals			
Aluminum	mg/kg	33	Dyer et al. (2000)
Antimony	mg/kg	0.03	Estimated from AWQC and BCF[a]
Arsenic	mg/kg	1.7	Dyer et al. (2000)
Cadmium	mg/kg	0.09	Windward (2005)
Chromium	mg/kg	2.7	Estimated from AWQC and BCF[a]
Copper	mg/kg	3.1	Dyer et al. (2000)
Lead	mg/kg	2.2	Dyer et al. (2000)
Mercury	mg/kg	0.46	Dyer et al. (2000)
Nickel	mg/kg	18.4	Dyer et al. (2000)
Selenium	mg/kg	1.6	EPA draft AWQC criterion
Silver	mg/kg	0.27	Dyer et al. (2000)
Thallium	mg/kg	4.6	Estimated from AWQC and BCF[a]
Zinc	mg/kg	27	Dyer et al. (2000)
Butyltins			
Tributyltin ion	µg/kg	49.9[b]	Estimated from AWQC and BCF[a]
Phthalates			
Bis(2-ethylhexyl) phthalate	µg/kg	390	Windward (2005)
Butylbenzyl phthalate	µg/kg	1,200	Estimated from AWQC and BCF[a]
Dibutyl phthalate	µg/kg	270	Estimated from AWQC and BCF[a]
Diethyl phthalate	µg/kg	220	Estimated from AWQC and BCF[a]
Dimethyl phthalate	µg/kg	110	Estimated from AWQC and BCF[a]
Di-n-octyl phthalate	µg/kg	41,000	Estimated from AWQC and BCF[a]
SVOCs			
1,2,4-Trichlorobenzene	µg/kg	18,000	Estimated from AWQC and BCF[a]
1,2-Dichlorobenzene	µg/kg	42,000	Estimated from AWQC and BCF[a]
1,3-Dichlorobenzene	µg/kg	31,000	Estimated from AWQC and BCF[a]
1,4-Dichlorobenzene	µg/kg	29,000	Estimated from AWQC and BCF[a]
Dibenzofuran	µg/kg	1,000	Estimated from AWQC and BCF[a]
Hexachlorobenzene	µg/kg	490	Dyer et al. (2000)
Hexachlorobutadiene	µg/kg	26	Estimated from AWQC and BCF[a]
Hexachloroethane	µg/kg	47,000	Estimated from AWQC and BCF[a]
N-Nitrosodiphenylamine	µg/kg	88,000	Estimated from AWQC and BCF[a]

Table 3-1. Tissue-Residue Screening-Level Benchmarks

COI	Unit (ww)	Benchmark	Source
Phenols			
2,4-Dimethylphenol	µg/kg	17,000	Estimated from AWQC and BCF[a]
2-Methylphenol	µg/kg	76,500[c]	LC50 as reported in Windward (2005)
4-Methylphenol	µg/kg	76,500	LC50 as reported in Windward (2005)
Pentachlorophenol	µg/kg	3,100	Estimated from AWQC and BCF[a]
Phenol	µg/kg	6,200	Estimated from AWQC and BCF[a]
PCBs			
Total PCBs	µg/kg	720	Windward (2005)
Dioxins and Furans			
2,3,7,8-TCDD[d] (invertebrates)	pg/g	767	Isensee (1978)
2,3,7,8-TCDD (fish)	pg/g	90	Windward (2005)
Dioxin/furan TEQ (fish)	pg/g	90	Windward (2005)
PCB TEQ (fish)	pg/g	90	Windward (2005)
Total TEQ (fish)	pg/g	90	Windward (2005)
Pesticides			
4,4′-DDD	µg/kg	54	Estimated from AWQC and BCF[a,e]
4,4′-DDE	µg/kg	1,000	Dyer et al. (2000)
4,4′-DDT	µg/kg	470	Dyer et al. (2000)
Total DDx	µg/kg	290	Windward (2005)
Aldrin	µg/kg	810	Estimated from AWQC and BCF[a]
cis-Chlordane	µg/kg	550[f]	Dyer et al. (2000)
trans-Chlordane	µg/kg	550[f]	Dyer et al. (2000)
Total Chlordane	µg/kg	550	Dyer et al. (2000)
Dieldrin	µg/kg	220	Dyer et al. (2000)
alpha-Endosulfan	µg/kg	73	Dyer et al. (2000)
beta-Endosulfan	µg/kg	73	Dyer et al. (2000)
Endosulfan sulfate	µg/kg	73	Dyer et al. (2000)
Total Endosulfan	µg/kg	73	Dyer et al. (2000)
Endrin	µg/kg	25	Dyer et al. (2000)
Endrin aldehyde	µg/kg	25[g]	Dyer et al. (2000)
Endrin ketone	µg/kg	25[g]	Dyer et al. (2000)
alpha-Hexachlorocyclohexane	µg/kg	4.9	Estimated from AWQC and BCF[a]
beta-Hexachlorocyclohexane	µg/kg	4.9	Estimated from AWQC and BCF[a]

Table 3-1. Tissue-Residue Screening-Level Benchmarks

COI	Unit (ww)	Benchmark	Source
delta-Hexachlorocyclohexane	µg/kg	4.9	Estimated from AWQC and BCF[a]
gamma-Hexachlorocyclohexane	µg/kg	23	Dyer et al. (2000)
Heptachlor	µg/kg	60	Estimated from AWQC and BCF[a]
Heptachlor epoxide	µg/kg	55	Estimated from AWQC and BCF[a]
Methoxychlor	µg/kg	200	Dyer et al. (2000)
cis-Nonachlor	µg/kg	550[f]	Dyer et al. (2000)
trans-Nonachlor	µg/kg	550[f]	Dyer et al. (2000)
Oxychlordane	µg/kg	550[f]	Dyer et al. (2000)

[a] See Table 3-2 for AWQC and BCFs used to estimate benchmarks.

[b] No toxicity data were available for butyltin ion, dibutyltin ion, or tetrabutyltin; thus, only tributyltin ion was evaluated.

[c] Benchmark based on TRV for 4-methylphenol.

[d] 2,3,7,8-Tetrachlorodibenzo-*p*-dioxin was evaluated as a representative for all dioxins and furans.

[e] The AWQC TRV for 4,4′-DDT (EPA 1980) is intended to protect birds via consumption of fish and may overestimate risks to fish and invertebrates.

[f] Benchmark based on TRV for total chlordane.

[g] Benchmark based on TRV for endrin.

AWQC – ambient water quality criteria

BCF – bioconcentration factor

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

LC50 – concentration lethal to 50% of an exposed population

PCB – polychlorinated biphenyl

SVOC – semivolatile organic compound

TCDD – tetrachlorodibenzo-*p*-dioxin

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

TRV – toxicity reference value

ww – wet weight

Table 3-2. Tissue Residue Screening-Level Benchmarks based on AWQC

Chemical	AWQC (µg/L)	Criterion Basis[a]	BCF (L/kg)	Benchmark (mg/kg ww)
Metals				
Antimony	30	FC	1	0.03
Chromium	23.8	FC (EPA 2002)	115	2.7
Thallium	40	FC	116	4.6
Butyltins				
Tributyltin	0.072	FC (EPA 2002)	693	0.0499
Phthalates				
Butylbenzyl phthalate	3	FC	414	1.2
Dibutyl phthalate	3	FC	89	0.27
Diethyl phthalate	3	FC	73	0.22
Dimethyl phthalate	3	FC	36	0.11
Di-n-octyl phthalate	3	FC	13,600	41
SVOCs				
1,2,4-Trichlorobenzene	50	FC	356	18
1,2-Dichlorobenzene	763	FC	55.6	42
1,3-Dichlorobenzene	763	FC	41.2	31
1,4-Dichlorobenzene	763	FC	37.5	29
Dibenzofuran	300	PAHMA	30	1.0
Hexachlorobutadiene	9.3	FC	2.8	0.026
Hexachloroethane	540	FC	87	47
n-Nitrosodiphenylamine	5850[b]	FA	136	88[c]
Phenols				
2,4-Dimethylphenol	110	MC	150	17
Pentachlorophenol	4.0[c]	FC	770	3.1
Phenol	2,560	FC	2.44	6.2
Pesticides				
4,4′-DDD	0.001	FC	53,600	0.054
alpha-HCH	0.34[b]	MA	130	0.0049
beta-HCH	0.34[b]	MA	130	0.0049
delta-HCH	0.34[b]	MA	130	0.0049
Heptachlor	0.0038	MC (EPA 2002)	15,700	0.060
Heptachlor epoxide	0.0038	MC (EPA 2002)	14,400	0.055

[a] AWQC based on values based on EPA's Gold Book (the mid-1980s version of the national aquatic life criteria) as provided by EPA (2005), except where noted.

[b] Acute AWQC was divided by an ACR of 9 to derive benchmark.

[c] AWQC is pH dependent.

ACR—acute-chronic ratio
AWQC—ambient water quality criteria
BCF—bioconcentration factor
DDD – dichlorodiphenyldichloroethane
EPA – US Environmental Protection Agency
FA – freshwater acute
FC – freshwater chronic
HCH – hexachlorocyclohexane
MA – marine acute
MC – marine chronic
PAH—polycyclic aromatic hydrocarbon
PAHMA – PAH marine acute
SVOC—semivolatile organic compound

Table 3-3. Benthic Invertebrate Tissue COIs with No Screening-Level Benchmarks

	Tissue Type				
COI	**Clam**	**Crayfish**	**Mussel**	**Lab Clam**	**Lab Worm**
Metals					
Manganese	X	X			
SVOCs					
Benzoic acid	X				
Benzyl alcohol	X		X	X	X
Bis(2-chloroethoxy) methane	X				
Nitrobenzene	X				
Phenols					
4-Nitrophenol	X				

COI – chemical of interest
PAH – polycyclic aromatic hydrocarbon
SVOC – semivolatile organic compound

Table 3-4. Fish Tissue COIs with No Screening-Level Benchmarks

	Tissue Type							
COI	**Largescale Sucker**	**Juvenile Sturgeon**	**Juvenile Chinook**	**Peamouth**	**Sculpin**	**Smallmouth Bass**	**Northern Pikeminnow**	**Lamprey**
Metals								
Manganese	X		X	X	X	X	X	
SVOCs								
Benzoic acid					X	X		
Benzyl alcohol		X	X		X	X		
Bis(2-chloroethoxy) methane						X		
Phenols								
4-Chloro-3-methylphenol					X			
4-Nitrophenol						X		

COI – chemical of interest
PAH – polycyclic aromatic hydrocarbon
SVOC – semivolatile organic compound

Table 3-5. Comparison of Maximum Benthic Invertebrate Tissue Concentrations to SL Benchmarks

COI	SL Benchmark	Maximum Concentration[a]					
		Field Clam	Crayfish	Multiplate Invertebrates	Mussel	Lab Clam[b]	Lab Worm[b]
Metals (mg/kg ww)							
Aluminum	33	**202**	**203**	**1,420**	**211**	**76.5 T**	**539**
Antimony	0.03	0.006 U	0.02 J	0.0022 J	0.0035 J	0.0035 U	0.014 J
Arsenic	1.7	1.25	0.5 J	0.45	0.616	0.548	**3.04**
Cadmium	0.09	**0.218**	0.036 J	0.0366	**0.188**	0.0666	**0.254**
Chromium	2.7	1.05 T	0.9	1.73	0.34 U	0.49	0.89
Copper	3.1	**13.5**	**20.2 T**	**6 J**	1.82	**5.94 J**	**20.2**
Lead	2.2	0.316	1.3 JT	1.06 J	0.22	0.221	0.847 T
Mercury	0.46	0.0263 J	0.041		0.0061 J	0.0162	0.0105
Nickel	18.4	0.485 J	0.83	1.12	0.712	0.313 J	0.535
Selenium	1.6	0.22	0.39	0.06	0.128	0.247	0.37
Silver	0.27	0.101	0.0472 J	0.0287 J	0.0759	0.0181	0.0133
Thallium	4.6	0.002 J	0.0079 J				
Zinc	27	**54**	20.3 J	24.8 J	**41.5**	16.8	**31.5**
Butyltins (µg/kg ww)							
Tributyltin ion	49.9	**530**	2.3	NA	16 J	**680**	**1,700**
Phthalates (µg/kg ww)							
BEHP	390	340 UT	270 UJT	NA	120 J	**8,600**	220 J
Butylbenzyl phthalate	1,200	330 U	370 U	NA	260 UJ	14 U	28 U
Dibutyl phthalate	270	**1,300**	**650 U**	NA	32 J	210 U	**470 J**
Diethyl phthalate	220	160 U	**950 U**	NA	26 UJ	19 J	28 U

Table 3-5. Comparison of Maximum Benthic Invertebrate Tissue Concentrations to SL Benchmarks

COI	SL Benchmark	Maximum Concentration[a]					
		Field Clam	Crayfish	Multiplate Invertebrates	Mussel	Lab Clam[b]	Lab Worm[b]
Dimethyl phthalate	110	**160 U**	**190 U**	NA	22 UJ	5.6 J	11 U
SVOCs (µg/kg ww)							
Dibenzofuran	1,000	33 UT	66 UT	NA		1.2	27
Hexachlorobenzene	490	12 U	2 UT	0.544	0.181 J	0.318	3.11
Hexachlorobutadiene	26	23 U	10 U	0.063 UJ	11 UJ	8.6 U	17 U
N-Nitrosodiphenylamine	88,000	160 U	190 U	NA	24 UJ	9.5 U	190
Phenols (µg/kg ww)							
2-Methylphenol	76,500	160 U	190 U	NA	40 UJ	99	350
4-Methylphenol	76,500	40 U	190 T	NA	40 UJ	15 U	290
Pentachlorophenol	3,100	160 UT	190 UT	NA	40 UJ	33 U	33 U
Phenol	6,200	2,600 T	520	NA	40 UJ	180	50 J
PCBs (µg/kg ww)							
Total PCBs	720	**2,660 JT**	**1,190 JT**	498 T	108 JT	364 T	**9,900 JT**
Dioxins/Furans (pg/g ww)							
2,3,7,8-TCDD	767	1.05 U	0.252	0.329 U	0.127 U	46.6	493
Pesticides (µg/kg ww)							
4,4′-DDD	54	**160 T**	17 NJ	30.3	1.22 J	**1,410**	**2,130**
4,4′-DDE	1,000	94.5 T	51	29.4	3.15 J	23	461
4,4′-DDT	470	75 T	14 J	12.2	0.239 J	263	115
Total DDx	290	**460 JT**	85 NJT	94.8 T	4.4 JT	**2,150 T**	**3,110 T**
Aldrin	810	5.07	2 U	0.0872	0.067 J	6.36	110

Table 3-5. Comparison of Maximum Benthic Invertebrate Tissue Concentrations to SL Benchmarks

		Maximum Concentration[a]					
COI	**SL Benchmark**	**Field Clam**	**Crayfish**	**Multiplate Invertebrates**	**Mussel**	**Lab Clam[b]**	**Lab Worm[b]**
cis-Chlordane	550	5.12	2 UJ	0.6	0.261 J	5.58	69.7
trans-Chlordane	550	5.57	2.7 NJ	0.466	0.232 J	6.84	74.3
Total chlordane	550	16 JT	4.7 NJT	2.1 JT	0.87 JT	19 JT	180 T
Dieldrin	220	2.62	2 UJ	0.396	0.186 J	5.76	37.1
alpha-Endosulfan	73	1 U	2 U	0.137 U	0.034 UJ	0.049 J	0.181 J
beta-Endosulfan	73	2.1 UT	3.1 J	0.156 U	0.117 UJ	0.119 U	0.492
Endosulfan sulfate	73	1	2 UJ	0.296	0.267 J	0.086 U	0.743
Total endosulfan	73	2.1 UT	4.1 JT	0.49 JT	0.31 JT	0.15 JT	1.42 JT
Endrin	25	2.4 UT	2.8 NJ	0.146 U	0.0222 UJ	0.0618 J	0.158 J
Endrin aldehyde	25	1 UJ	2 UJ	0.109 U	0.0844 UJ	0.0602 U	0.0574 U
Endrin ketone	25	1 U	2 UJ	0.228 U	0.0844 UJ	0.0895 U	0.0852 U
alpha-HCH	4.9	1.06 U	2 U	0.0195 J	0.426 UJ	0.0633 U	0.0633 U
beta-HCH	4.9	**8.5 UT**	2 UJ	0.0268 U	0.136 UJ	0.0517 U	0.31 U
delta-HCH	4.9	1 U	2.8 U	0.0174 U	0.0596 UJ	0.0361 U	0.0195 U
gamma-HCH	23	1 U	2 U	0.0214 J	0.062 UJ	0.109 J	0.215 U
Heptachlor	60	1 U	2 U	0.012 J	0.0806 UJ	0.0789 U	0.0291 U
Heptachlor epoxide	55	8 UT	2 U	0.025 J	0.0135 J	0.094 J	0.0714 J
Methoxychlor	200	1.6 UJ	2 U	0.109 U	0.0136 J	0.0284 U	0.486 U
cis-Nonachlor	550	12 U	2.3 U	0.24	0.092 J	2.53	7.66
trans-Nonachlor	550	4.15	2 UJ	0.697	0.261 J	7.7	25
Oxychlordane	550	1.13 U	2 U	0.183	0.186 UJ	0.218 J	0.465 J

[a] The maximum concentration is the higher of either the maximum detect or maximum detection limit.

[b] Values for neutral organic compounds are based on concentrations that have been adjusted to represent steady-state conditions (see Attachment 1). All other values are based on empirical laboratory measured concentrations.

BEHP – bis(2-ethylhexyl) phthalate
COI – chemical of interest
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
HCH – hexachlorocyclohexane
PCB – polychlorinated biphenyl
NA – not analyzed
SL—screening level
SVOC – semivolatile organic compound
T – value calculated or selected from multiple results
TCDD- tetrachlorodibenzo-*p*-dioxin
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
ww – wet weight

Bold identifies chemicals carried forward to refined screening step.

Table 3-6. Comparison of Maximum Fish Tissue Concentrations to SL Benchmarks

		Maximum Concentration[a]								
COI	**SL Bench-mark**	**Largescale Sucker**	**Juvenile White Sturgeon**	**Carp**	**Juvenile Chinook Salmon**	**Peamouth**	**Sculpin**	**Smallmouth Bass**	**Northern Pikeminnow**	**Pacific Lamprey**
Metals (mg/kg ww)										
Aluminum	33	**154 J**	**51.8 J**	NE	19.6	**185**	**79.8 J**	11 JT	2.8 J	**281**
Antimony	0.03	0.003 J	0.006 U	NE	0.00429 U	0.005 U	0.025 J	**5.9 JT**	0.002 U	0.004 J
Arsenic	1.7	0.27	1.06	NE	0.25	0.48	0.35	0.39	0.36	0.19
Cadmium	0.09	0.0325 JT	0.019 T	NE	0.027	0.053	0.022	**0.2 T**	0.012 J	0.005
Chromium	2.7	**2.77 T**	**40.2**	NE	0.19	0.49	0.6	1.14	0.67	0.32
Copper	3.1	1.1 T	0.959	NE	2.15	1.61	**7.16**	1.92 T	0.89	**6.2**
Lead	2.2	0.191 T	0.024	NE	0.0741 U	**10.6**	0.96 J	**1,100 JT**	0.016	0.153
Mercury	0.46	0.085	0.14 T	NE	0.02	0.054	0.127 T	0.166 JT	**0.494**	0.355
Nickel	18.4	0.81	0.461	NE	0.492 J	0.482 J	1.01	0.2	0.461 J	0.292
Selenium	1.6	0.3 U	0.4	NE	0.4 U	0.4	0.3	1.2 T	0.4	0.37
Silver	0.27	0.0074 UJ	0.004 JT	NE	0.002992 U	0.0043 U	0.0067	0.064 T	0.0052 U	0.0352
Thallium	4.6	0.0038 J		NE	0.0105	0.0093	0.0136	0.0085	0.004 J	
Zinc	27	19.7 T	11.9	NE	**33.3**	25.2	18	16.3	20	26.7
Butyltins (µg/kg ww)										
Tributyltin ion	49.9	NA	1.8 U	NE	4.1 J	NA	4 J	4.9 UT	NA	4.1
Phthalates (µg/kg ww)										
BEHP	390	**3,000 JT**	300	NE	**860 UT**	NA	**28,000 JT**	**87,000 JT**	NA	170 J
Butylbenzyl phthalate	1,200	330 U	7.3 U	NE	**3,700 U**	NA	330 U	330 U	NA	7.3 U

Table 3-6. Comparison of Maximum Fish Tissue Concentrations to SL Benchmarks

		Maximum Concentration[a]								
COI	**SL Bench-mark**	**Largescale Sucker**	**Juvenile White Sturgeon**	**Carp**	**Juvenile Chinook Salmon**	**Peamouth**	**Sculpin**	**Smallmouth Bass**	**Northern Pikeminnow**	**Pacific Lamprey**
Dibutyl phthalate	270	**520 U**	240 U	NE	**520 U**	NA	**330 U**	**330 U**	NA	16 U
Diethyl phthalate	220	**1,600 U**	37 U	NE	**1,300 U**	NA	170 U	160 U	NA	**660 U**
Di-n-octyl phthalate	41,000	1,100 U	11 U	NE	560 U	NA	600 J	2,100 T	NA	11 U
SVOCs (µg/kg ww)										
Dibenzofuran	1,000	39 UT	NA	NE	33 UT	NA	33 T	52 T	NA	NA
Hexachlorobenzene	490	32 UT	2.38	NE	33 UT	7.3 NT	33 UT	6.4 UT	9.8 U	4.62
Hexachlorobutadiene	26	4.6 UT	0.0395 UJ	NE	1.1 U	1 UJT	**33 UT**	4.6 UT	9.8 UJ	10 U
Hexachloroethane	47,000	33 UT	20 U	NE	120 U	3.7 NJT	33 UT	20 UT	13 UT	20 U
Phenols (µg/kg ww)										
2-Methylphenol	76,500	170 U	9.9 J	NE	720 U	NA	170 U	160 U	NA	8.2 U
4-Methylphenol	76,500	33 UT	19 J	NE	210 U	NA	62 T	33 UT	NA	7.7 U
Pentachlorophenol	3,100	170 UT	30 U	NE	420 U	NA	170 UT	160 UT	NA	30 U
Phenol	6,200	330 U	170 U	NE	330 U	NA	330 U	330 U	NA	45 U
PCBs (µg/kg ww)										
Total PCBs	720	**2,000 JT**	325 JT	**25,100 JT**	277 JT	290 T	**8,770 JT**	**6,600 JT**	**1,900 T**	399 JT
Dioxins/Furans (pg/g ww)										
2,3,7,8-TCDD	90	NA	0.356 U	1.12 T	0.876	NA	0.553	1.72 T	NA	0.819
Dioxin/furan TEQ	90	NA	1.21 T	10.8 T	4.32 T	NA	32.3 T	69.4 T	NA	4.23 T
PCB TEQ	90	NA	0.0836 T	5.2 T	0.225 T	NA	2.11 T	2.13 T	NA	0.379 T
Total TEQ	90	NA	1.26 T	12.1 T	4.44 T	NA	33 T	69.9 T	NA	4.43 T

Table 3-6. Comparison of Maximum Fish Tissue Concentrations to SL Benchmarks

		Maximum Concentration[a]								
COI	**SL Bench-mark**	**Largescale Sucker**	**Juvenile White Sturgeon**	**Carp**	**Juvenile Chinook Salmon**	**Peamouth**	**Sculpin**	**Smallmouth Bass**	**Northern Pikeminnow**	**Pacific Lamprey**
Pesticides (µg/kg ww)										
4,4′-DDD	54	**150 T**	24.9	NE	**130**	29.5 T	**305 T**	**385 T**	48 T	**54.7**
4,4′-DDE	1,000	185 T	156 T	NE	93	185 T	630 T	456 T	545 T	39.6
4,4′-DDT	470	245 T	7.49	NE	38	7 T	**1,700 T**	366 T	53 J	8.65
Total DDx	290	**670 T**	180 JT	NE	290 T	230 T	**3,100 T**	**1,460 T**	**760 T**	121 T
Aldrin	810	13 UT	0.0554 J	NE	1.2 U	1.7 UT	13 UT	13 UT	13 UT	1.82
cis-Chlordane	550	20 U	4.81 T	NE	1.6 N	3.4 N	20 U	20 U	19 U	9.37
trans-Chlordane	550	8.4 UT	1.88	NE	4	5.6 UT	9.6 U	8.4 UT	9.8 U	6.83
Total chlordane	550	24 NJT	20 T	NE	19 UT	15 NT	23 NJT	32 UT	19 UT	29 JT
Dieldrin	220	14 UT	3.11	NE	2.7 UT	3.3 UT	24 JT	20 UT	14 UT	6.38
alpha-Endosulfan	73	20 U	0.803	NE	1.1 U	1 U	20 U	20 U	19 U	1.19
beta-Endosulfan	73	15 UT	0.368 J	NE	19 UT	1.2 UT	15 UT	20 UT	15 UT	0.431
Endosulfan sulfate	73	12 UT	2.23	NE	1 J	1 UT	12 UT	20 UT	12 UT	1.31
Total endosulfan	73	20 UT	3.4 JT	NE	19 UT	1.2 UT	20 UT	28 JT	19 UT	2.82 T
Endrin	25	**31 UT**	0.107 J	NE	1.1 U	1 UT	**31 UT**	**31 UT**	19 UT	0.0416 U
Endrin aldehyde	25	8.5 UT	0.0848 U	NE	3.5 U	1.6 UT	9.6 U	20 UT	9.8 U	0.0574 UJ
Endrin ketone	25	7.5 UT	0.0848 U	NE	3 U	1 UT	9.6 U	20 UT	9.8 U	0.0479 U
alpha-HCH	4.9	**6.4 UT**	0.0505 J	NE	1 U	1 UT	**9.6 U**	**6.4 UT**	**9.8 U**	0.0467 J
beta-HCH	4.9	**8.5 UT**	0.0281 U	NE	1.2 UT	4.1 UT	**9.6 U**	**8.5 UT**	**9.8 U**	0.0257 J
delta-HCH	4.9	**7.3 UT**	0.0599 U	NE	1.1 U	2.2 UT	**9.6 U**	**7.3 UT**	**9.8 U**	0.006 U
gamma-HCH	23	9.6 UT	0.0618 J	NE	1.1 U	3.3 UT	9.6 UT	9.6 UT	9.8 U	0.0696 J
Heptachlor	60	13 UT	0.0649 U	NE	1.2	2.3 UT	13 UT	13 UT	13 UT	0.049 J

Table 3-6. Comparison of Maximum Fish Tissue Concentrations to SL Benchmarks

		Maximum Concentration[a]								
COI	**SL Bench-mark**	**Largescale Sucker**	**Juvenile White Sturgeon**	**Carp**	**Juvenile Chinook Salmon**	**Peamouth**	**Sculpin**	**Smallmouth Bass**	**Northern Pikeminnow**	**Pacific Lamprey**
Heptachlor epoxide	55	8 UT	0.5	NE	2.1 NJ	1 UT	9.6 U	8 UT	9.8 U	0.326
Methoxychlor	200	4.8 UT	0.0499 U	NE	19 U	4.8 UT	9.6 U	20 UT	17 JT	0.238
cis-Nonachlor	550	17 U	3.43 T	NE	17 U	7.1 UT	11 U	7.1 UT	9.8 U	3.4
trans-Nonachlor	550	11 UT	9.8 T	NE	19 UT	11 UT	11 UT	11 UT	14 U	9.68
Oxychlordane	550	20 UT	1.02 T	NE	1 U	1 UT	20 UT	32 UT	19 UT	0.616

[a] The maximum concentration is the higher of either the maximum detect or maximum detection limit.

COI – chemical of interest

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

HCH – hexachlorocyclohexane

NA – not analyzed

NE – not evaluated as an ecological receptor-COI pair

PCB – polychlorinated biphenyl

SVOC – semivolatile organic compound

T – value calculated or selected from multiple results

TEQ – toxic equivalent

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

ww – wet weight

Bold identifies chemicals carried forward to refined screening step.

Table 3-7. Refined Screening Results for Field-Collected Clam Tissue

	Comparison of Maximum Detect to Benchmark			Conditions for Exclusion from COPC List			
COI	**Benchmark**	**Maximum Detect**	**Does Maximum Detect Exceed Benchmark?**	**Is Detection Frequency < 5%? (DF %)**	**Are Detection Limits < Benchmark? (No. of Exceedances)**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Metals (mg/kg ww)							
Aluminum	33	202	Yes	No (100)	Yes	No	**Yes**
Cadmium	0.09	0.218	Yes	No (100)	Yes	No	**Yes**
Copper	3.1	13.5	Yes	No (100)	Yes	No	**Yes**
Zinc	27	54	Yes	No (100)	Yes	No	**Yes**
Butyltins (µg/kg ww)							
Tributyltin ion	49.9	530	Yes	No (65)	Yes	No	**Yes**
Phthalates (µg/kg ww)							
Dibutyl phthalate	270	1,300	Yes	Yes (3)	No (3)	No	**Yes**
Dimethyl phthalate	110	ND	No	NA	NA	NA	No
PCBs (µg/kg ww)							
Total PCBs	720	2,660 JT	Yes	No (100)	Yes	No	**Yes**
Pesticides (µg/kg ww)							
4,4′-DDD	54	160 T	Yes	No (100)	Yes	No	**Yes**
Total DDx	290	460 JT	Yes	No (100)	Yes	No	**Yes**
beta-HCH	4.9	1.2 NJ	No	NA	NA	NA	No

COPC – chemical of potential concern
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
HCH – hexachlorocyclohexane
PCB – polychlorinated biphenyl

NA – not available
ND – no data
T – value calculated or selected from multiple results
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
ww – wet weight

Table 3-8. Refined Screening Results for Crayfish Tissue

	Comparison of Maximum Detect to Benchmark			Conditions for Exclusion from COPC List			
COI	**Benchmark**	**Maximum Detect**	**Does Maximum Detect Exceed Benchmark?**	**Is Detection Frequency < 5%? (DF %)**	**Are Detection Limits < Benchmark?**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Metals (mg/kg ww)							
Aluminum	33	203	Yes	No (100)	Yes	No	**Yes**
Copper	3.1	20.2 T	Yes	No (100)	Yes	No	**Yes**
Phthalates (µg/kg ww)							
Dibutyl phthalate	270	ND	No	NA	NA	NA	No
Diethyl phthalate	220	ND	No	NA	NA	NA	No
Dimethyl phthalate	110	ND	No	NA	NA	NA	No
PCBs (µg/kg ww)							
Total PCBs	720	1,190 JT	Yes	No (53)	Yes	No	**Yes**

BERA – baseline ecological risk assessment
COPC – chemical of potential concern
DF – detection frequency
J – estimated concentration
NA – not available
ND – no data
PCB – polychlorinated biphenyl
T – value calculated or selected from multiple results
ww – wet weight

Table 3-9. Refined Screening Results for Multiplate Invertebrate Tissue

	Comparison of Maximum Detect to Benchmark			Conditions for Exclusion from COPC List			
COI	**Benchmark**	**Maximum Detect**	**Does Maximum Detect Exceed Benchmark?**	**Is Detection Frequency < 5%? (DF %)**	**Are Detection Limits < Benchmark?**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Metals (mg/kg ww)							
Aluminum	33	1,420	Yes	No (100)	Yes	No	**Yes**
Copper	3.1	6 J	Yes	No (100)	Yes	No	**Yes**

BERA – baseline ecological risk assessment
COI – chemical of interest
COI – chemical of interest
J – estimated concentration
ww – wet weight

Table 3-10. Refined Screening Results for Mussel Tissue

	Comparison of Maximum Detect to Benchmark			Conditions for Exclusion from COPC List			
COI	**Benchmark**	**Maximum Detect**	**Does Maximum Detect Exceed Benchmark?**	**Is Detection Frequency < 5%? (DF %)**	**Are Detection Limits < Benchmark?**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Metals (mg/kg ww)							
Aluminum	33	211	Yes	No (100)	Yes	No	**Yes**
Cadmium	0.09	0.188	Yes	No (100)	Yes	No	**Yes**
Zinc	27	41.5	Yes	No (100)	Yes	No	**Yes**

BERA – baseline ecological risk assessment
COI – chemical of interest
COPC – chemical of potential concern
ww – wet weight

Table 3-11. Refined Screening Results for Laboratory Clam Tissue[a]

	Comparison of Maximum Detect to Benchmark			Conditions for Exclusion from COPC List			
COI	**Benchmark**	**Maximum Detect**	**Does Maximum Detect Exceed Benchmark?**	**Is Detection Frequency < 5%? (DF %)**	**Are Detection Limits < Benchmark?**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Metals (mg/kg ww)							
Aluminum	33	76.5 T	Yes	No (100)	Yes	No	**Yes**
Copper	3.1	5.94 J	Yes	No (100)	Yes	No	**Yes**
Butyltins (µg/kg ww)							
Tributyltin ion	49.9	680	Yes	No (26)	Yes	No	**Yes**
Phthalates (µg/kg ww)							
BEHP	390	8,600	Yes	No (77)	Yes	No	**Yes**
Pesticides (µg/kg ww)							
4,4′-DDD	54	1,410	Yes	No (100)	Yes	No	**Yes**
Total DDx	290	2,150 T	Yes	No (100)	Yes	No	**Yes**

[a] Values for neutral organic compounds are based on concentrations that have been adjusted to represent steady-state conditions (see Attachment 1). All other values are based on empirical laboratory measured concentrations.

BEHP – bis(2-ethylhexyl) phthalate
BERA – baseline ecological risk assessment
COI – chemical of interest
COPC – chemical of potential concern
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
J – estimated concentration
T – value calculated or selected from multiple results
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
ww – wet weight

Table 3-12. Refined Screening Results for Laboratory Worm Tissue[a]

	Comparison of Maximum Detect to Benchmark			Conditions for Exclusion from COPC List			
COI	**Benchmark**	**Maximum Detect**	**Does Maximum Detect Exceed Benchmark?**	**Is Detection Frequency < 5%? (DF %)**	**Are Detection Limits < Benchmark?**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Metals (mg/kg ww)							
Aluminum	33	539	Yes	No (100)	Yes	No	**Yes**
Arsenic	1.7	3.04	Yes	No (100)	Yes	No	**Yes**
Cadmium	0.09	0.254	Yes	No (100)	Yes	No	**Yes**
Copper	3.1	20.2	Yes	No (100)	Yes	No	**Yes**
Zinc	27	31.5	Yes	No (100)	Yes	No	**Yes**
Butyltins (µg/kg ww)							
Tributyltin ion	49.9	1,700	Yes	No (43)	Yes	No	**Yes**
Phthalates (µg/kg ww)							
Dibutyl phthalate	270	470 J	Yes	No (11)	No (6)	No	**Yes**
PCBs (µg/kg ww)							
Total PCBs	720	9,900 JT	Yes	No (100)	Yes	No	**Yes**
Pesticides (µg/kg ww)							
4,4′-DDD	54	2,130	Yes	No (100)	Yes	No	**Yes**
Total DDx	290	3,110 T	Yes	No (100)	Yes	No	**Yes**

[a] Values for neutral organic compounds are based on concentrations that have been adjusted to represent steady-state conditions (see Attachment 1). All other values are based on empirical laboratory measured concentrations.

BERA – baseline ecological risk assessment
COI – chemical of interest
COPC – chemical of potential concern
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
J – estimated concentration
PCB – polychlorinated biphenyl
T – value calculated or selected from multiple results
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
ww – wet weight

Table 3-13. Refined Screening Results for Largescale Sucker Tissue

	Comparison of Maximum Detect to Benchmark			Conditions for Exclusion from COPC List			
COI	**Benchmark**	**Maximum Detect**	**Does Maximum Detect Exceed Benchmark?**	**Is Detection Frequency < 5%? (DF %)**	**Are Detection Limits < Benchmark?**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Metals (mg/kg ww)							
Aluminum	33	154 J	Yes	No (100)	Yes	No	**Yes**
Chromium	2.7	2.77 T	Yes	No (100)	Yes	No	**Yes**
Phthalates (µg/kg ww)							
BEHP	390	3,000 JT	Yes	No (33)	Yes	No	**Yes**
Dibutyl phthalate	270	ND	No	NA	NA	NA	No
Diethyl phthalate	220	ND	No	NA	NA	NA	No
PCBs (µg/kg ww)							
Total PCBs	720	2,000 JT	Yes	No (100)	Yes	No	**Yes**
Pesticides (µg/kg ww)							
4,4′-DDD	54	150 T	Yes	No (100)	Yes	No	**Yes**
Total DDx	290	670 T	Yes	No (100)	Yes	No	**Yes**
Endrin	25	ND	No	NA	NA	NA	No
alpha-HCH	4.9	ND	No	NA	NA	NA	No
beta-HCH	4.9	ND	No	NA	NA	NA	No
delta-HCH	4.9	ND	No	NA	NA	NA	No

BEHP – bis(2-ethylhexyl) phthalate
BERA – baseline ecological risk assessment
COI – chemical of interest
COPC – chemical of potential concern
DDD – dichlorodiphenyldichloroethane
DDT – dichlorodiphenyltrichloroethane
HCH – hexachlorocyclohexane
J – estimated concentration
NA – not applicable
ND – not detected
PCB – polychlorinated biphenyl
T – value calculated or selected from multiple results
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
ww – wet weight

DDE – dichlorodiphenyldichloroethylene

Table 3-14. Refined Screening Results for Juvenile Sturgeon Tissue

	Comparison of Maximum Detect to Benchmark			Conditions for Exclusion from COPC List			
COI	**Benchmark**	**Maximum Detect**	**Does Maximum Detect Exceed Benchmark?**	**Is Detection Frequency < 5%? (DF %)**	**Are Detection Limits < Benchmark?**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Metals (mg/kg ww)							
Aluminum	33	51.8 J	Yes	No (100)	Yes	No	**Yes**
Chromium	2.7	40.2	Yes	No (13)	Yes	No	**Yes**

BERA – baseline ecological risk assessment
COI – chemical of interest
COPC – chemical of potential concern
DF – detection frequency
J – estimated concentration
ww – wet weight

Table 3-15. Refined Screening Results for Juvenile Chinook Salmon Tissue

	Comparison of Maximum Detect to Benchmark			Conditions for Exclusion from COPC List			
COI	**Benchmark**	**Maximum Detect**	**Does Maximum Detect Exceed Benchmark?**	**Is Detection Frequency < 5%? (DF %)**	**Are Detection Limits < Benchmark?**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Metals (mg/kg ww)							
Zinc	27	33.3	Yes	No (100)	Yes	No	**Yes**
Phthalates (µg/kg ww)							
BEHP	390	ND	No	NA	NA	NA	No
Butylbenzyl phthalate	1,200	220	No	NA	NA	NA	No
Dibutyl phthalate	270	48 J	No	NA	NA	NA	No
Diethyl phthalate	220	ND	No	NA	NA	NA	No
Pesticides (µg/kg ww)							
4,4′-DDD	54	130	Yes	No (100)	Yes	No	**Yes**

BEHP – bis (2-ethylhexyl) phthalate
BERA – baseline ecological risk assessment
COI – chemical of interest
COPC – chemical of potential concern
DDD – dichlorodiphenyldichloroethane
DF – detection frequency
J – estimated concentration
NA – not applicable
ND – not detected
ww – wet weight

Table 3-16. Refined Screening Results for Peamouth Tissue

	Comparison of Maximum Detect to Benchmark			Conditions for Exclusion from COPC List			
COI	**Benchmark**	**Maximum Detect**	**Does Maximum Detect Exceed Benchmark?**	**Is Detection Frequency < 5%? (DF %)**	**Are Detection Limits < Benchmark?**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Metals (mg/kg ww)							
Aluminum	33	185	Yes	No (100)	Yes	No	**Yes**
Lead	2.2	10.6	Yes	No (100)	Yes	No	**Yes**

BERA – baseline ecological risk assessment

COI – chemical of interest

COPC – chemical of potential concern

DF – detection frequency

ww – wet weight

Table 3-17. Refined Screening Results for Sculpin Tissue

	Comparison of Maximum Detect to Benchmark			Conditions for Exclusion from COPC List			
COI	**Benchmark**	**Maximum Detect**	**Does Maximum Detect Exceed Benchmark?**	**Is Detection Frequency < 5%? (DF %)**	**Are Detection Limits < Benchmark? (No. of exceedances)**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Metals (mg/kg ww)							
Aluminum	33	79.8 J	Yes	No (92)	No (1)	No	**Yes**
Copper	3.1	7.16	Yes	No (100)	Yes	No	**Yes**
Phthalates (µg/kg ww)							
BEHP	390	28,000 JT	Yes	No (18)	No (2)	No	**Yes**
Dibutyl phthalate	270	ND	No	NA	NA	NA	No
SVOCs (µg/kg ww)							
Hexachlorobutadiene	26	2 JT	No	NA	NA	NA	No
PCBs (µg/kg ww)							
Total PCBs	720	8,770 JT	Yes	No (100)	Yes	No	**Yes**
Pesticides (µg/kg ww)							
4,4′-DDD	54	305 T	Yes	No (82)	Yes	No	**Yes**
4,4′-DDT	470	1,700 T	Yes	No (87)	Yes	No	**Yes**
Total DDx	290	3,100 T	Yes	No (100)	Yes	No	**Yes**
Endrin	25	0.0348 J	No	NA	NA	NA	No
alpha-HCH	4.9	0.0232 J	No	NA	NA	NA	No
beta-HCH	4.9	6.2 NJ	Yes	No (42)	No (9)	No	**Yes**
delta-HCH	4.9	1.6 NJ	No	NA	NA	NA	No

BEHP – bis (2-ethylhexyl) phthalate
BERA – baseline ecological risk assessment
COI – chemical of interest
COPC – chemical of potential concern
DF – detection frequency
HCH – hexachlorocyclohexane
J – estimated concentration
NA – not available
SVOC – semivolatile organic compound
T – value calculated or selected from multiple results
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
ND – no data
PCB – polychlorinated biphenyl
ww – wet weight

Table 3-18. Refined Screening Results for Smallmouth Bass Tissue

	Comparison of Maximum Detect to Benchmark			Conditions for Exclusion from COPC List			
COI	Benchmark	Maximum Detect	Does Maximum Detect Exceed Benchmark?	Is Detection Frequency < 5%? (DF %)	Are Detection Limits < Benchmark? (No. of exceedances)	Are Both Conditions for Exclusion Met?	BERA COPC?
Metals (mg/kg ww)							
Antimony	0.03	5.9 JT	Yes	No (16)	Yes	No	**Yes**
Cadmium	0.09	0.2 T	Yes	No (81)	Yes	No	**Yes**
Lead	2.2	1,100 JT	Yes	No (100)	Yes	No	**Yes**
Phthalates (µg/kg ww)							
BEHP	390	87,000 JT	Yes	No (19)	No (4)	No	**Yes**
Dibutyl phthalate	270	37 T	No	NA	NA	NA	No
PCBs (µg/kg ww)							
Total PCBs	720	6,600 JT	Yes	No (100)	Yes	No	**Yes**
Pesticides (µg/kg ww)							
4,4′-DDD	54	385 T	Yes	No (100)	Yes	No	**Yes**
Total DDx	290	1,460 T	Yes	No (100)	Yes	No	**Yes**
Endrin	25	0.054 JT	No	NA	NA	NA	No
alpha-HCH	4.9	0.042 JT	No	NA	NA	NA	No
beta-HCH	4.9	0.036 JT	No	NA	NA	NA	No
delta-HCH	4.9	ND	No	NA	NA	NA	No

BEHP – bis (2-ethylhexyl) phthalate
BERA – baseline ecological risk assessment
DDT – dichlorodiphenyltrichloroethane
DF – detection frequency
T – value calculated or selected from multiple results
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-

COI – chemical of interest
COPC – chemical of potential concern
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
J – estimated concentration
NA – not available
ND – no data
PCB – polychlorinated biphenyl
DDT; and 4,4′-DDT)
ww – wet weight

Table 3-19. Refined Screening Results for Northern Pikeminnow Tissue

	Comparison of Maximum Detect to Benchmark			Conditions for Exclusion from COPC List			
COI	**Benchmark**	**Maximum Detect**	**Does Maximum Detect Exceed Benchmark?**	**Is Detection Frequency < 5%? (DF %)**	**Are Detection Limits < Benchmark?**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Metals (mg/kg ww)							
Mercury	0.46	0.494	Yes	No (100)	Yes	No	**Yes**
PCBs (µg/kg ww)							
Total PCBs	720	1,900 T	Yes	No (100)	Yes	No	**Yes**
Pesticides (µg/kg ww)							
Total DDx	290	760 T	Yes	No (100)	Yes	No	**Yes**
alpha-HCH	4.9	ND	No	NA	NA	NA	No
beta-HCH	4.9	ND	No	NA	NA	NA	No
delta-HCH	4.9	ND	No	NA	NA	NA	No

BERA – baseline ecological risk assessment
COI – chemical of interest
COPC – chemical of potential concern
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
DF – detection frequency
HCH – hexachlorocyclohexane
PCB – polychlorinated biphenyl
T – value calculated or selected from multiple results
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
ww – wet weight

Table 3-20. Refined Screening Results for Lamprey Ammocoete Tissue

	Comparison of Maximum Detect to Benchmark			Conditions for Exclusion from COPC List			
COI	**Benchmark**	**Maximum Detect**	**Does Maximum Detect Exceed Benchmark?**	**Is Detection Frequency < 5%? (DF %)**	**Are Detection Limits < Benchmark?**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Metals (mg/kg ww)							
Aluminum	33	281	Yes	No (100)	Yes	No	**Yes**
Copper	3.1	6.2	Yes	No (100)	Yes	No	**Yes**
Phthalates (µg/kg ww)							
Diethyl phthalate	220	ND	No	NA	NA	NA	No
Pesticides (µg/kg ww)							
4,4′-DDD	54	54.7	Yes	No (100)	Yes	No	**Yes**

BERA – baseline ecological risk assessment
COI – chemical of interest
COPC – chemical of potential concern
DDD – dichlorodiphenyldichloroethane
DF – detection frequency
NA – not available
ND – no data
ww – wet weight

Table 3-21. Benthic Invertebrate Tissue COPCs

	Tissue Type					
COPC	**Field Clam**	**Mussels**	**Crayfish**	**Multiplate Invertebrates**	**Lab Clam**	**Lab Worm**
Metals						
Aluminum	X	X	X	X	X	X
Arsenic						X
Cadmium	X	X				X
Copper	X		X	X	X	X
Zinc	X	X				X
Butyltins						
Tributyltin ion	X				X	X
Phthalates						
BEHP					X	
Dibutyl phthalate	X					X
PCBs						
Total PCBs	X					X
Pesticides						
4,4′-DDD	X				X	X
Total DDx	X				X	X

BEHP – bis(2-ethylhexyl) phthalate
COPC – chemical of potential concern
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
PCB – polychlorinated biphenyl
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

Table 3-22. Fish Tissue COPCs

	Tissue Type							
COPC	**Large-scale Sucker**	**Juvenile White Sturgeon**	**Juvenile Chinook Salmon**	**Pea-mouth**	**Sculpin**	**Small-mouth Bass**	**Northern Pike-minnow**	**Pacific Lamprey**
Metals								
Aluminum	X	X		X	X			X
Antimony						X		
Cadmium						X		
Chromium	X	X						
Copper					X			X
Lead				X		X		
Mercury							X	
Zinc			X					
Phthalates								
BEHP	X				X	X		
PCBs								
Total PCBs	X				X	X	X	
Pesticides								
4,4′-DDD	X		X		X	X		X
4,4′-DDT					X			
Total DDx	X				X	X	X	
beta-HCH					X			

BEHP – bis(2-ethylhexyl)phthalate
COPC – chemical of potential concern
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
HCH – hexachlorocyclohexane
PCB – polychlorinated biphenyl
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

Table 4-1. Body Weights and Ingestion Rates for Fish Receptors

Receptor	Body Weight (kg)[a]	FIR (kg ww/day)[b]	Prey Moisture Content (%)	Sediment Consumption (% of diet)	SIR (kg dw/day)[c]
Largescale sucker	0.79	0.041	85%[d]	8%	0.00048
Juvenile white sturgeon	7.6	0.27	85%[d]	56%	0.023
Juvenile Chinook salmon	0.012	0.0012	79%[e]	1%	0.0000024
Sculpin	0.020	0.0017	79%[e]	5%	0.000018
Peamouth	0.10	0.0072	79%[e]	5%	0.000075
Smallmouth bass	0.40	0.022	74%[f]	1%	0.000058
Northern pikeminnow	0.56	0.030	74%[f]	1%	0.000078

[a] Body weights are based on averages of field-collected data (including Round 3 data).

[b] FIR was calculated based on the equation from Arnot and Gobas (2004): FIR (ww) = $(0.022 \times BW^{0.85}) \times (\exp^{(0.06 \times T)})$; where exp = 2.71828 and T = 13.4°C (average of temperatures collected by ODEQ from 1995 to 2005 from a station near the SP&S Railroad Bridge).

[c] The SIR was calculated as a percent of the FIR on a dw basis. The dw FIR was calculated based on the following equation: FIR (dw) = FIR (ww) x (1 – moisture content of diet).

[d] Based on average percent moisture of all invertebrate tissue collected from Study Area.

[e] Based on average percent moisture of all invertebrate tissue (excluding laboratory-exposed clams and crayfish) collected from Study Area.

[f] Based on average percent moisture of all ecological fish receptor tissue collected from the Study Area.

dw – dry weight

FIR – food ingestion rate

SIR – sediment ingestion rate

ww – wet weight

Table 4-2. Prey for Fish Receptors

Receptor	Representative Prey Tissue
Largescale sucker	clam[a, b] worm[b]
Juvenile (pre-breeding) white sturgeon	clam[a, b] worm[b] mussels stomach contents[c]
Juvenile Chinook salmon	clam[a, b] multiplate invertebrates worm[b] stomach contents[c]
Sculpin	clam[a, b] worm[b] sculpin
Peamouth	clam[a, b] multiplate invertebrates worm[b] sculpin
Smallmouth bass	worm[b] crayfish sculpin
Northern pikeminnow	worm[b] crayfish carp largescale sucker northern pikeminnow peamouth sculpin

[a] Concentrations from both field-collected and laboratory-exposed clams were used in the dietary screen.

[b] Both laboratory-measured and estimated steady-state concentrations were used in the dietary screen.

[c] Tissue-residues based on stomach content tissues were evaluated in the dietary screen.

Table 4-3. Fish Dietary COIs

COI	Detection Status[a]		
	Benthic Tissue	Fish Tissue	Surface Sediment
Metals			
Aluminum	Yes	Yes	Yes
Antimony	Yes	Yes	Yes
Arsenic	Yes	Yes	Yes
Barium	NA	NA	Yes
Beryllium	NA	NA	Yes
Cadmium	Yes	Yes	Yes
Calcium	NA	NA	Yes
Chromium	Yes	Yes	Yes
Chromium hexavalent	NA	NA	Yes
Cobalt	NA	NA	Yes
Copper	Yes	Yes	Yes
Iron	NA	NA	Yes
Lead	Yes	Yes	Yes
Magnesium	NA	NA	Yes
Manganese	Yes	Yes	Yes
Mercury	Yes	Yes	Yes
Nickel	Yes	Yes	Yes
Potassium	NA	NA	Yes
Selenium	Yes	Yes	Yes
Silver	Yes	Yes	Yes
Sodium	NA	NA	Yes
Thallium	Yes	Yes	Yes
Tin	NA	NA	Yes
Titanium	NA	NA	Yes
Vanadium	NA	NA	Yes
Zinc	Yes	Yes	Yes
Butyltins			
Butyltin ion	Yes	Yes	Yes
Dibutyltin ion	Yes	Yes	Yes
Tetrabutyltin	Yes	No	Yes
Tributyltin ion	Yes	Yes	Yes
PAHs			
1,6,7-Trimethylnaphthalene	NA	NA	Yes
1-Methylnaphthalene	Yes	Yes	Yes
1-Methylphenanthrene	NA	NA	Yes
2,6-Dimethylnaphthalene	NA	NA	Yes

Table 4-3. Fish Dietary COIs

COI	Detection Status[a]		
	Benthic Tissue	Fish Tissue	Surface Sediment
2-Methylnaphthalene	Yes	Yes	Yes
Acenaphthene	Yes	Yes	Yes
Acenaphthylene	Yes	Yes	Yes
Anthracene	Yes	Yes	Yes
Benzo(a)anthracene	Yes	Yes	Yes
Benzo(a)pyrene	Yes	Yes	Yes
Benzo(b)fluoranthene	Yes	Yes	Yes
Benzo(b+k)fluoranthene	NA	NA	Yes
Benzo(e)pyrene	Yes	NA	Yes
Benzo(g,h,i)perylene	Yes	Yes	Yes
Benzo(j+k)fluoranthene	NA	Yes	Yes
Benzo(k)fluoranthene	Yes	Yes	Yes
C1-Chrysenec	Yes	NA	Yes
C1-Dibenzothiophenec	Yes	NA	Yes
C1-Fluoranthene/pyrenec	Yes	NA	Yes
C1-Fluorenec	Yes	NA	Yes
C1-Naphthalenec	NA	NA	Yes
C1-Phenanthrene/anthracenec	Yes	NA	Yes
C2-Chrysenec	No	NA	Yes
C2-Dibenzothiophenec	No	NA	Yes
C2-Fluoranthene/pyrenec	Yes	NA	Yes
C2-Fluorenec	Yes	NA	Yes
C2-Naphthalenec	Yes	NA	Yes
C2-Phenanthrene/anthracenec	Yes	NA	Yes
C3-Chrysenec	No	NA	Yes
C3-Dibenzothiophenec	Yes	NA	Yes
C3-Fluoranthene/pyrenec	No	NA	Yes
C3-Fluorenec	Yes	NA	Yes
C3-Naphthalenec	Yes	NA	Yes
C3-Phenanthrene/anthracenec	Yes	NA	Yes
C4-Chrysenec	No	NA	Yes
C4-Dibenzothiophenec	NA	NA	Yes
C4-Naphthalenec	Yes	NA	Yes
C4-Phenanthrene/anthracenec	Yes	NA	Yes
Chrysene	Yes	Yes	Yes
Dibenzo(a,h)anthracene	Yes	Yes	Yes
Dibenzothiophene	Yes	Yes	Yes
Fluoranthene	Yes	Yes	Yes

Table 4-3. Fish Dietary COIs

COI	Detection Status[a]		
	Benthic Tissue	**Fish Tissue**	**Surface Sediment**
Fluorene	Yes	Yes	Yes
Total HPAHs	Yes	Yes	Yes
Indeno(1,2,3-c,d)pyrene	Yes	Yes	Yes
Total LPAHs	Yes	Yes	Yes
Naphthalene	Yes	Yes	Yes
Total PAHs	Yes	Yes	Yes
Perylene	Yes	NA	Yes
Phenanthrene	Yes	Yes	Yes
Pyrene	Yes	Yes	Yes

[a] Detection status columns indicate whether chemical was detected (yes) or not detected (no).

[b] Benzo(a)pyrene was used as a surrogate for these chemicals.

COI – chemical of interest

HPAH – high-molecular-weight polycyclic aromatic hydrocarbon

LPAH – low-molecular-weight polycyclic aromatic hydrocarbon

NA – not analyzed

PAH – polycyclic aromatic hydrocarbon

Table 4-4. Fish Dietary Screening-Level Thresholds

COI	Unit	Dietary SL Threshold	Source
Metals			
Aluminum	mg/kg bw/day	500	Handy (1993)
Arsenic	mg/kg bw/day	0.40	Oladimeji et al. (1984)
Cadmium	mg/kg bw/day	0.002[a]	Kim et al. (2004); Kang et al. (2005)
Copper	mg/kg bw/day	0.24	Murai et al. (1981)
Lead	mg/kg bw/day	134	Goettl et al. (1976)
Mercury	mg/kg bw/day	0.005	Matta et al. (2001)
Selenium	mg/kg bw/day	0.10	Cleveland et al. (1993)
Silver	mg/kg bw/day	70	Galvez and Wood (1999)
Zinc	mg/kg bw/day	19	Takeda and Shimma (1977)
Butyltins			
Butyltin ion	µg/kg bw/day	0.42[a, b]	Shimasaki et al. (2003)
Dibutyltin ion	µg/kg bw/day	0.42[a, b]	Shimasaki et al. (2003)
Tetrabutyltin	µg/kg bw/day	0.42[a, b]	Shimasaki et al. (2003)
Tributyltin ion	µg/kg bw/day	0.42[a]	Shimasaki et al. (2003)
PAHs[c]			
Benzo(a)pyrene	µg/kg bw/day	0.66	Rice et al. (2000)
Total HPAHs	µg/kg bw/day	6,100[d]	Meador et. al. (2006)
Total LPAHs	µg/kg bw/day	6,100[d]	Meador et. al. (2006)
Total PAHs	µg/kg bw/day	6,100	Meador et. al. (2006)

[a] Threshold based on an extrapolation from a LOAEL reported in cited study using an uncertainty factor of 5.

[b] The screening-level threshold for TBT was used as a surrogate.

[c] SL thresholds were not available for indiviudal PAH COIs other than benzo(a)pyrene; however, indivudal PAHs (i.e., acenaphthene, acenaphthylene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, fluoranthene, fluorine, indeno[1,2,3-cd]pyrene, naphthalene, phenanthrene, and pyrene) were evaluated as total PAHs and HPAHs or LPAHs.

[d] The screening-level threshold for total PAHs was used as a surrogate.

bw – body weight

COI – chemical of interest

HPAH – high-molecular-weight polycyclic aromatic hydrocarbon

LOAEL – lowest-observed-adverse-effect level

LPAH – low-molecular-weight polycyclic aromatic hydrocarbon

PAH – polycyclic aromatic hydrocarbon

SL – screening level

TBT – tributyltin

Table 4-5. Fish Dietary COIs with No Screening-Level Threshold

COI	
Metals	
Antimony	Nickel
Chromium	Thallium
Manganese	
Butyltins	
Dibutyltin dichloride	Tributyltin chloride
Monobutyltin trichloride	
PAHs	
1-Methylnaphthalene	Dibenzothiophene
2-Methylnaphthalene	Perylene
Benzo(e)pyrene	Alkylated PAHs

COI – chemical of interest

PAH – polycyclic aromatic hydrocarbon

Table 4-6. Comparison of Maximum Largescale Sucker Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Metals							
Aluminum	mg/kg	500	9,880	823,000	539	47,400	No
Arsenic	mg/kg	0.4	7.9	658	3.04	75.6	No
Cadmium	mg/kg	0.002	0.0395	3.29	**0.254**	**46.2**	**Yes**
Copper	mg/kg	0.24	4.74	395	**20.2 T**	**2,830**	**Yes**
Lead	mg/kg	134	2,650	221,000	0.847 T	13,400 T	No
Mercury	mg/kg	0.005	0.0988	8.23	0.0263 J	**65.2 T**	**Yes**
Selenium	mg/kg	0.1	1.98	165	0.37	20	No
Silver	mg/kg	70	1,380	115,000	0.101	14.8	No
Zinc	mg/kg	19	375	31,300	54	2,850	No
Butyltins							
Butyltin ion	µg/kg	0.42	8.3	691	**3,600**	**740 J**	**Yes**
Dibutyltin ion	µg/kg	0.42	8.3	691	**820**	**2,700**	**Yes**
Tetrabutyltin	µg/kg	0.42	8.3	691	5 U	**1,000**	**Yes**
Tributyltin ion	µg/kg	0.42	8.3	691	**1,700**	**47,000**	**Yes**
PAHs							
Benzo(a)pyrene	µg/kg	660	13,000	1,090,000	3,000	340,000	No
Total PAHs	µg/kg	6,100	120,000	10,000,000	48,000 T	7,300,000 T	**Yes**[b]

[a] The maximum concentration is the higher of either the maximum detect or maximum RL.

[b] Retained because the sum of tissue and sediment concentration exceedances compared to TTCs and TSCs is > 1.0.

COI – chemical of interest
J – estimated concentration
NOAEL – no-observed-adverse-effect level
RL – reporting limit
PAH – polycyclic aromatic hydrocarbon
T – value calculated or selected from multiple results
TRV – toxicity reference value
TSC – threshold sediment concentration
TTC – threshold tissue concentration
U – not detected at given concentration

Table 4-7. Comparison of Maximum Juvenile White Sturgeon Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Metals							
Aluminum	mg/kg	500	13,600	165,000	539	47,400	No
Arsenic	mg/kg	0.4	10.9	132	3.04	75.6	No
Cadmium	mg/kg	0.002	0.0543	0.661	**0.254**	**46.2**	**Yes**
Copper	mg/kg	0.24	6.51	79.3	**20.2 T**	**2,830**	**Yes**
Lead	mg/kg	134	3,640	44,300	0.847 T	13,400 T	No
Mercury	mg/kg	0.005	0.136	1.65	0.0263 J	**65.2 T**	**Yes**
Selenium	mg/kg	0.1	2.71	33	0.37	20	No
Silver	mg/kg	70	1,900	23,100	0.101	14.8	No
Zinc	mg/kg	19	516	6,280	54	2,850	No
Butyltins							
Butyltin ion	µg/kg	0.42	11.4	139	**3,600**	**740 J**	**Yes**
Dibutyltin ion	µg/kg	0.42	11.4	139	**820**	**2,700**	**Yes**
Tetrabutyltin	µg/kg	0.42	11.4	139	5 U	**1,000**	**Yes**
Tributyltin ion	µg/kg	0.42	11.4	139	**1,700**	**47,000**	**Yes**
PAHs							
Benzo(a)pyrene	µg/kg	660	17,900	218,000	3,000	**340,000**	**Yes**
Total PAHs	µg/kg	6,100	166,000	2,020,000	48,000 T	**7,300,000 T**	**Yes**

[a] The maximum concentration is the higher of either the maximum detect or maximum RL.

COI – chemical of interest

J – estimated concentration

NOAEL – no-observed-adverse-effect level

PAH – polycyclic aromatic hydrocarbon

RL – reporting limit

T – value calculated or selected from multiple results

TRV – toxicity reference value

TSC – threshold sediment concentration

TTC – threshold tissue concentration

U – not detected at given concentration

Table 4-8. Comparison of Maximum Juvenile Chinook Salmon Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Metals							
Aluminum	mg/kg	500	5,450	2,500,000	1,420	47,400	No
Arsenic	mg/kg	0.4	4.36	2,000	3.04	75.6	No
Cadmium	mg/kg	0.002	0.0218	10	**0.254**	**46.2**	**Yes**
Copper	mg/kg	0.24	2.62	1,200	**20.2 T**	**2,830**	**Yes**
Lead	mg/kg	134	1,460	670,000	1.06 J	13,400 T	No
Mercury	mg/kg	0.005	0.0545	25	0.0263 J	**65.2 T**	**Yes**
Selenium	mg/kg	0.1	1.09	500	0.37	20	No
Silver	mg/kg	70	764	350,000	0.101	14.8	No
Zinc	mg/kg	19	207	95,000	54	2,850	No
Butyltins							
Butyltin ion	µg/kg	0.42	4.58	2,100	**3,600**	740 J	**Yes**
Dibutyltin ion	µg/kg	0.42	4.58	2,100	**820**	**2,700**	**Yes**
Tetrabutyltin	µg/kg	0.42	4.58	2,100	**5 U**	1,000	**Yes**
Tributyltin ion	µg/kg	0.42	4.58	2,100	**1,700**	**47,000**	**Yes**
PAHs							
Benzo(a)pyrene	µg/kg	660	7,200	3,300,000	3,000	340,000	No
Total PAHs	µg/kg	6,100	66,500	30,500,000	48,000 T	7,300,000 T	No

[a] The maximum concentration is the higher of either the maximum detect or maximum RL.

COI – chemical of interest

J – estimated concentration

NOAEL – no-observed-adverse-effect level

PAH – polycyclic aromatic hydrocarbon

RL – reporting limit

T – value calculated or selected from multiple results

TRV – toxicity reference value

TSC – threshold sediment concentration

TTC – threshold tissue concentration

U – not detected at given concentration

Table 4-9. Comparison of Maximum Sculpin Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Metals							
Aluminum	mg/kg	500	5,880	556,000	539	47,400	No
Arsenic	mg/kg	0.4	4.71	444	3.04	75.6	No
Cadmium	mg/kg	0.002	0.0235	2.22	**0.254**	**46.2**	**Yes**
Copper	mg/kg	0.24	2.82	267	**20.2 T**	**2,830**	**Yes**
Lead	mg/kg	134	1,580	149,000	0.96 J	13,400 T	No
Mercury	mg/kg	0.005	0.0588	5.56	**0.127 T**	**65.2 T**	**Yes**
Selenium	mg/kg	0.1	1.18	111	0.37	20	No
Silver	mg/kg	70	824	77,800	0.101	14.8	No
Zinc	mg/kg	19	224	21,100	54	2,850	No
Butyltins							
Butyltin ion	µg/kg	0.42	4.94	467	**3,600**	**740 J**	**Yes**
Dibutyltin ion	µg/kg	0.42	4.94	467	**820**	**2,700**	**Yes**
Tetrabutyltin	µg/kg	0.42	4.94	467	**5 U**	**1,000**	**Yes**
Tributyltin ion	µg/kg	0.42	4.94	467	**1,700**	**47,000**	**Yes**
PAHs							
Benzo(a)pyrene	µg/kg	660	7,760	733,000	3,000	340,000	No
Total PAHs	µg/kg	6,100	71,800	6,780,000	48,000 T	**7,300,000 T**	**Yes**

[a] The maximum concentration is the higher of either the maximum detect or maximum RL.

COI – chemical of interest
J – estimated concentration
NOAEL – no-observed-adverse-effect level
PAH – polycyclic aromatic hydrocarbon
RL – reporting limit
T – value calculated or selected from multiple results
TRV – toxicity reference value
TSC – threshold sediment concentration
TTC – threshold tissue concentration
U – not detected at given concentration

Table 4-10. Comparison of Maximum Peamouth Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Metals							
Aluminum	mg/kg	500	6,940	667,000	1,420	47,400	No
Arsenic	mg/kg	0.4	5.56	533	3.04	75.6	No
Cadmium	mg/kg	0.002	0.0278	2.67	**0.254**	**46.2**	**Yes**
Copper	mg/kg	0.24	3.33	320	**20.2 T**	**2,830**	**Yes**
Lead	mg/kg	134	1,860	179,000	1.06 J	13,400 T	No
Mercury	mg/kg	0.005	0.0694	6.67	**0.127 T**	**65.2 T**	**Yes**
Selenium	mg/kg	0.1	1.39	133	0.37	20	No
Silver	mg/kg	70	972	93,300	0.101	14.8	No
Zinc	mg/kg	19	264	25,300	54	2,850	No
Butyltins							
Butyltin ion	µg/kg	0.42	5.83	560	**3,600**	**740 J**	**Yes**
Dibutyltin ion	µg/kg	0.42	5.83	560	**820**	**2,700**	**Yes**
Tetrabutyltin	µg/kg	0.42	5.83	560	5 U	**1,000**	**Yes**
Tributyltin ion	µg/kg	0.42	5.83	560	**1,700**	**47,000**	**Yes**
PAHs							
Benzo(a)pyrene	µg/kg	660	9,170	880,000	3,000	340,000	No
Total PAHs	µg/kg	6,100	84,700	8,130,000	48,000 T	7,300,000 T	**Yes**[b]

[a] The maximum concentration is the higher of either the maximum detect or maximum RL.

[b] Retained for further evaluation because the sum of tissue and sediment concentration exceedances of TTCs and TSCs is > 1.0.

COI – chemical of interest

J – estimated concentration

NOAEL – no-observed-adverse-effect level

PAH – polycyclic aromatic hydrocarbon

RL – reporting limit

T – value calculated or selected from multiple results

TRV – toxicity reference value

TSC – threshold sediment concentration

TTC – threshold tissue concentration

U – not detected at given concentration

Table 4-11. Comparison of Maximum Smallmouth Bass Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Metals							
Aluminum	mg/kg	500	9,090	3,450,000	539	47,400	No
Arsenic	mg/kg	0.4	7.27	2,760	3.04	75.6	No
Cadmium	mg/kg	0.002	0.0364	13.8	**0.254**	**46.2**	**Yes**
Copper	mg/kg	0.24	4.36	1,660	**20.2 T**	**2,830**	**Yes**
Lead	mg/kg	134	2,440	924,000	1.3 JT	13,400 T	No
Mercury	mg/kg	0.005	0.0909	34.5	**0.127 T**	**65.2 T**	**Yes**
Selenium	mg/kg	0.1	1.82	690	0.39	20	No
Silver	mg/kg	70	1,270	483,000	0.0472 J	14.8	No
Zinc	mg/kg	19	345	131,000	31.5	2,850	No
Butyltins							
Butyltin ion	µg/kg	0.42	7.64	2,900	**3,600**	740 J	**Yes**
Dibutyltin ion	µg/kg	0.42	7.64	2,900	**820**	2,700	**Yes**
Tetrabutyltin	µg/kg	0.42	7.64	2,900	4.2	1,000	No
Tributyltin ion	µg/kg	0.42	7.64	2,900	**1,700**	**47,000**	**Yes**
PAHs							
Benzo(a)pyrene	µg/kg	660	12,000	4,550,000	3,000	340,000	No
Total PAHs	µg/kg	6,100	111,000	42,100,000	48,000 T	7,300,000 T	No

[a] The maximum concentration is the higher of either the maximum detect or maximum RL.

COI – chemical of interest

J – estimated concentration

NOAEL – no-observed-adverse-effect level

PAH – polycyclic aromatic hydrocarbon

RL – reporting limit

T – value calculated or selected from multiple results

TRV – toxicity reference value

TSC – threshold sediment concentration

TTC – threshold tissue concentration

Table 4-12. Comparison of Maximum Northern Pikeminnow Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Metals							
Aluminum	mg/kg	500	9,330	3,590,000	539	47,400	No
Arsenic	mg/kg	0.4	7.47	2,870	3.04	75.6	No
Cadmium	mg/kg	0.002	0.0373	14.4	**0.254**	**46.2**	**Yes**
Copper	mg/kg	0.24	4.48	1,720	**20.2 T**	**2,830**	**Yes**
Lead	mg/kg	134	2,500	962,000	10.6	13,400 T	No
Mercury	mg/kg	0.005	0.0933	35.9	**0.494**	**65.2 T**	**Yes**
Selenium	mg/kg	0.1	1.87	718	0.4	20	No
Silver	mg/kg	70	1,310	503,000	0.0472 J	14.8	No
Zinc	mg/kg	19	355	136,000	113 T	2,850	No
Butyltins							
Butyltin ion	µg/kg	0.42	7.84	3,020	**3,600**	740 J	**Yes**
Dibutyltin ion	µg/kg	0.42	7.84	3,020	**820**	2,700	**Yes**
Tetrabutyltin	µg/kg	0.42	7.84	3,020	4.2	1,000	No
Tributyltin ion	µg/kg	0.42	7.84	3,020	**1,700**	**47,000**	**Yes**
PAHs							
Benzo(a)pyrene	µg/kg	660	12,300	4,740,000	3,000	340,000	No
Total PAHs	µg/kg	6,100	114,000	43,800,000	48,000 T	7,300,000 T	No

[a] The maximum concentration is the higher of either the maximum detect or maximum RL.

COI – chemical of interest
NOAEL – no-observed-adverse-effect level
PAH – polycyclic aromatic hydrocarbon
RL – reporting limit
T – value calculated or selected from multiple results
TRV – toxicity reference value
TSC – threshold sediment concentration
TTC – threshold tissue concentration

Table 4-13. Results of Refined Dietary Screen for Largescale Sucker

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Detection		BERA COPC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Metals							
Cadmium	mg/kg	0.002	0.0395	3.29	**0.254**	**46.2**	**Yes**
Copper	mg/kg	0.24	4.74	395	**20.2 T**	**2,830**	**Yes**
Mercury	mg/kg	0.005	0.0988	8.23	0.0263 J	**65.2 T**	**Yes**

Table 4-13. Results of Refined Dietary Screen for Largescale Sucker

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration TTC (ww)	Threshold Concentration TSC (dw)	Maximum Detection Tissue (ww)	Maximum Detection Sediment (dw)	BERA COPC?
Butyltins							
Butyltin ion	µg/kg	0.42	8.3	691	**3,600**	**740 J**	**Yes**
Dibutyltin ion	µg/kg	0.42	8.3	691	**820**	**2,700**	**Yes**
Tetrabutyltin	µg/kg	0.42	8.3	691	4.2	**1,000**	**Yes**
Tributyltin ion	µg/kg	0.42	8.3	691	**1,700**	**47,000**	**Yes**
PAHs							
Total PAHs	µg/kg	6,100	120,000	10,000,000	48,000 T	7,300,000 T	**Yes**[a]

[a] Retained as a COPC because the sum of tissue and sediment concentration exceedances compared to TTCs and TSCs is > 1.0.

BERA – baseline ecological risk assessment
COI – chemical of interest
NOAEL – no-observed-adverse-effect level
PAH – polycyclic aromatic hydrocarbon
T – value calculated or selected from multiple results
TRV – toxicity reference value
TSC – threshold sediment concentration
TTC – threshold tissue concentration

Table 4-14. Results of Refined Dietary Screen for Juvenile White Sturgeon

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration TTC (ww)	Threshold Concentration TSC (dw)	Maximum Detection Tissue (ww)	Maximum Detection Sediment (dw)	BERA COPC?
Metals							
Cadmium	mg/kg	0.002	0.0543	0.661	**0.254**	**46.2**	**Yes**
Copper	mg/kg	0.24	6.51	79.3	**20.2 T**	**2,830**	**Yes**
Mercury	mg/kg	0.005	0.136	1.65	0.0263 J	**65.2 T**	**Yes**
Butyltins							
Butyltin ion	µg/kg	0.42	11.4	139	**3,600**	**740 J**	**Yes**
Dibutyltin ion	µg/kg	0.42	11.4	139	**820**	**2,700**	**Yes**
Tetrabutyltin	µg/kg	0.42	11.4	139	4.2	**1,000**	**Yes**
Tributyltin ion	µg/kg	0.42	11.4	139	**1,700**	**47,000**	**Yes**
PAHs							
Benzo(a)pyrene	µg/kg	660	17,900	218,000	3,000	**340,000**	**Yes**
Total PAHs	µg/kg	6,100	166,000	2,020,000	48,000 T	**7,300,000 T**	**Yes**

BERA – baseline ecological risk assessment
COI – chemical of interest
NOAEL – no-observed-adverse-effect level
PAH – polycyclic aromatic hydrocarbon
T – value calculated or selected from multiple results
TRV – toxicity reference value
TSC – threshold sediment concentration
TTC – threshold tissue concentration

Table 4-15. Results of Refined Dietary Screen for Juvenile Chinook Salmon

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration TTC (ww)	Threshold Concentration TSC (dw)	Maximum Detection Tissue (ww)	Maximum Detection Sediment (dw)	BERA COPC?
Metals							
Cadmium	mg/kg	0.002	0.0218	10	**0.254**	**46.2**	**Yes**
Copper	mg/kg	0.24	2.62	1,200	**20.2 T**	**2,830**	**Yes**
Mercury	mg/kg	0.005	0.0545	25	0.0263 J	**65.2 T**	**Yes**
Butyltins							
Butyltin ion	µg/kg	0.42	4.58	2,100	**3,600**	740 J	**Yes**
Dibutyltin ion	µg/kg	0.42	4.58	2,100	**820**	**2,700**	**Yes**
Tetrabutyltin	µg/kg	0.42	4.58	2,100	4.2	1,000	**Yes**[a]
Tributyltin ion	µg/kg	0.42	4.58	2,100	**1,700**	**47,000**	**Yes**

[a] Retained as a COPC because the sum of tissue and sediment concentration exceedances compared to TTCs and TSCs is > 1.0

BERA – baseline ecological risk assessment
COI – chemical of interest
COPC – chemical of potential concern
J – estimated concentration
NOAEL – no-observed-adverse-effect level
PAH – polycyclic aromatic hydrocarbon
T – value calculated or selected from multiple results
TRV – toxicity reference value
TSC – threshold sediment concentration
TTC – threshold tissue concentration

Table 4-16. Results of Refined Dietary Screen for Sculpin

Preliminary COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration TTC (ww)	Threshold Concentration TSC (dw)	Maximum Detection Tissue (ww)	Maximum Detection Sediment (dw)	BERA COPC?
Metals							
Cadmium	mg/kg	0.002	0.0235	2.22	**0.254**	**46.2**	**Yes**
Copper	mg/kg	0.24	2.82	267	**20.2 T**	**2,830**	**Yes**
Mercury	mg/kg	0.005	0.0588	5.56	**0.127 T**	**65.2 T**	**Yes**
Butyltins							
Butyltin ion	µg/kg	0.42	4.94	467	**3,600**	**740 J**	**Yes**
Dibutyltin ion	µg/kg	0.42	4.94	467	**820**	**2,700**	**Yes**
Tetrabutyltin	µg/kg	0.42	4.94	467	4.2	**1,000**	**Yes**
Tributyltin ion	µg/kg	0.42	4.94	467	**1,700**	**47,000**	**Yes**
PAHs							
Total PAHs	µg/kg	6,100	71,800	6,780,000	48,000 T	**7,300,000 T**	**Yes**

[a] Retained as a COPC because the sum of tissue and sediment concentration exceedances compared to TTCs and TSCs is > 1.0

BERA – baseline ecological risk assessment
PAH – polycyclic aromatic hydrocarbon

COI – chemical of interest
COPC – chemical of potential concern
J – estimated concentration
NOAEL – no-observed-adverse-effect level
T – value calculated or selected from multiple results
TRV – toxicity reference value
TSC – threshold sediment concentration
TTC – threshold tissue concentration

Table 4-17. Results of Refined Dietary Screen for Peamouth

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration TTC (ww)	Threshold Concentration TSC (dw)	Maximum Detection Tissue (ww)	Maximum Detection Sediment (dw)	BERA COPC?
Metals							
Cadmium	mg/kg	0.002	0.0278	2.67	**0.254**	**46.2**	**Yes**
Copper	mg/kg	0.24	3.33	320	**20.2 T**	**2,830**	**Yes**
Mercury	mg/kg	0.005	0.0694	6.67	**0.127 T**	**65.2 T**	**Yes**
Butyltins							
Butyltin ion	µg/kg	0.42	5.83	560	**3,600**	**740 J**	**Yes**
Dibutyltin ion	µg/kg	0.42	5.83	560	**820**	**2,700**	**Yes**
Tetrabutyltin	µg/kg	0.42	5.83	560	4.2	**1,000**	**Yes**
Tributyltin ion	µg/kg	0.42	5.83	560	**1,700**	**47,000**	**Yes**
PAHs							
Total PAHs	µg/kg	6,100	84,700	8,130,000	48,000 T	7,300,000 T	**Yes**[a]

[a] Retained as a COPC because the sum of tissue and sediment concentration exceedances compared to TTCs and TSCs is > 1.0.

BERA – baseline ecological risk assessment
COI – chemical of interest
COPC – chemical of potential concern
NOAEL – no-observed-adverse-effect level
PAH – polycyclic aromatic hydrocarbon
T – value calculated or selected from multiple results
TRV – toxicity reference value
TSC – threshold sediment concentration
TTC – threshold tissue concentration

Table 4-18. Results of Refined Dietary Screen for Smallmouth Bass

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration TTC (ww)	Threshold Concentration TSC (dw)	Maximum Detection Tissue (ww)	Maximum Detection Sediment (dw)	BERA COPC?
Metals							
Cadmium	mg/kg	0.002	0.0364	13.8	**0.254**	**46.2**	**Yes**
Copper	mg/kg	0.24	4.36	1,660	**20.2 T**	**2,830**	**Yes**
Mercury	mg/kg	0.005	0.0909	34.5	**0.127 T**	**65.2 T**	**Yes**
Butyltins							
Butyltin ion	µg/kg	0.42	7.64	2,900	**3,600**	740 J	**Yes**

Table 4-18. Results of Refined Dietary Screen for Smallmouth Bass

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration TTC (ww)	Threshold Concentration TSC (dw)	Maximum Detection Tissue (ww)	Maximum Detection Sediment (dw)	BERA COPC?
Dibutyltin ion	µg/kg	0.42	7.64	2,900	**820**	2,700	**Yes**
Tributyltin ion	µg/kg	0.42	7.64	2,900	**1,700**	**47,000**	**Yes**

BERA – baseline ecological risk assessment
COI – chemical of interest
COPC – chemical of potential concern
NOAEL – no-observed-adverse-effect level
PAH – polycyclic aromatic hydrocarbon
T – value calculated or selected from multiple results
TRV – toxicity reference value
TSC – threshold sediment concentration
TTC – threshold tissue concentration

Table 4-19. Results of Refined Dietary Screen for Northern Pikeminnow

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration TTC (ww)	Threshold Concentration TSC (dw)	Maximum Detection Tissue (ww)	Maximum Detection Sediment (dw)	BERA COPC?
Metals							
Cadmium	mg/kg	0.002	0.0373	14.4	**0.254**	**46.2**	**Yes**
Copper	mg/kg	0.24	4.48	1,720	**20.2 T**	**2,830**	**Yes**
Mercury	mg/kg	0.005	0.0933	35.9	**0.494**	**65.2 T**	**Yes**
Butyltins							
Butyltin ion	µg/kg	0.42	7.84	3,020	**3,600**	740 J	**Yes**
Dibutyltin ion	µg/kg	0.42	7.84	3,020	**820**	2,700	**Yes**
Tributyltin ion	µg/kg	0.42	7.84	3,020	**1,700**	**47,000**	**Yes**

COI – chemical of interest
COPC – chemical of potential concern
N – presumptive evidence of a compound
NOAEL – no-observed-adverse-effect level
PAH – polycyclic aromatic hydrocarbon
TRV – toxicity reference value
TSC – threshold sediment concentration
TTC – threshold tissue concentration
RL – reporting limit
T – value calculated or selected from multiple results
U – not detected at given concentration

Table 4-20. Fish Dietary COPCs

	Omnivorous Fish		Invertivorous Fish			Piscivorous Fish	
COPC	**Largescale Sucker**	**Juvenile White Sturgeon**	**Juvenile Chinook Salmon**	**Sculpin**	**Peamouth**	**Small-mouth Bass**	**Northern Pike-minnow**
Metals							
Cadmium	X	X	X	X	X	X	X
Copper	X	X	X	X	X	X	X
Mercury	X	X	X	X	X	X	X
Butyltins							
Butyltin ion	X	X	X	X	X	X	X
Dibutyltin ion	X	X	X	X	X	X	X
Tetrabutyltin	X	X	X	X	X		
Tributyltin ion	X	X	X	X	X	X	X
PAHs							
Benzo(a)pyrene[a]		X					
Total PAHs	X	X		X	X		

[a] Individual PAHs (other than benzo[a]pyrene) will not be assessed in the BERA because the TRV for benzo(a)pyrene was used to screen these chemicals. The use of benzo(a)pyrene as a surrogate is not acceptable for use in the BERA.

COPC – chemical of potential concern

PAH – polycyclic aromatic hydrocarbon

Table 4-21. Body Weights and Ingestion Rates for Wildlife Receptors

Receptor[a]	Body weight (kg)	FIR (kg ww/day)	Food Ingestion Notes	Sediment Consumption	SIR (kg dw/day)	Sediment Ingestion Notes
Spotted sandpiper	0.047	0.055	The FIR was estimated as 17.5% of sandpiper body weight (dw). A dietary moisture content of 85% was assumed to convert to ww.	18% of diet	0.0015	The SIR was based on 18% of the FIR in dw units (FIR = 0.0082 kg dw/day).
Hooded merganser	0.54	0.20	The FIR was estimated using an allometric equation developed for carnivorous birds (Nagy 2001)[b].	2% of diet	0.0011	The dw FIR was estimated using equations from Nagy (2001)[b]. The SIR was based on 2% of the dw FIR (0.055 kg dw/day).
Bald eagle	4.5	0.54	The FIR was estimated as 12% of eagle body weight on a ww basis.	2% of diet	0.0028	The FIR was converted from ww to dw based on an assumed dietary moisture content of 74% (FIR = 0.14 kg dw/day). The SIR was based on 2% of this value.
Osprey	1.9	0.40	The FIR was estimated as 21% of osprey body weight on a ww basis.	2% of diet	0.0021	The FIR was converted from ww to dw based on an assumed dietary moisture content of 74% (FIR = 0.103 kg dw/day). The SIR was based on 2% of this value.
Mink	0.97	0.16	The FIR was estimated as 16% of mink body weight on a ww basis.	2% of diet	0.0038	The FIR was converted from ww to dw based on an assumed dietary moisture content of 74% (FIR = 0.0405 kg dw/day). The SIR was based on 9.4% of this value.
River otter	7.7	0.76	The FIR was estimated using an allometric equation developed for carnivorous mammals (Nagy 2001)[c].	2% of diet	0.0047	The dw FIR was estimated using equations from Nagy (2001)[c]. The SIR was based on 2% of the dw FIR (0.233 kg dw/day).

[a] Parameterization of wildlife receptors is based on females.

[b] The FIR equations used for merganser were: FIR (ww) = 3.048 x $BW^{0.665}$ and FIR (dw) = 0.849 x $BW^{0.663}$ (Nagy 2001).

[c] The FIR equations used for merganser were: FIR (ww) = 0.348 x $BW^{0.859}$ and FIR (dw) = 0.102 x $BW^{0.864}$ (Nagy 2001).

dw – dry weight

FIR – food ingestion rate

SIR – sediment ingestion rate

ww – wet weight

Table 4-22. Prey for Wildlife Receptors

Receptor	Prey
Spotted sandpiper	clam[a,b]
	worm[b]
Hooded merganser	clam[a,b]
	crayfish
	peamouth
	sculpin
	smallmouth bass
Bald eagle	carp
	largescale sucker
	northern pikeminnow
	peamouth
Osprey	brown bullhead
	carp
	largescale sucker
	northern pikeminnow
	smallmouth bass
Mink	crayfish
	black crappie
	brown bullhead
	carp
	juvenile chinook salmon
	largescale sucker
	northern pikeminnow
	peamouth
	sculpin
	smallmouth bass
River otter	clam[a,b]
	crayfish
	black crappie
	carp
	largescale sucker
	sculpin
	smallmouth bass

[a] Concentrations from both field-collected and laboratory-exposed clams were used in the dietary screen.

[b] Both laboratory measured and estimated steady-state concentrations were used in the dietary screen.

Table 4-23. Wildlife Dietary COIs

COI	Detection Statusa		
	Benthic Tissue	Fish Tissue	Surface Sediment
Metals			
Aluminum	Yes	Yes	Yes
Antimony	Yes	Yes	Yes
Arsenic	Yes	Yes	Yes
Cadmium	Yes	Yes	Yes
Chromium	Yes	Yes	Yes
Copper	Yes	Yes	Yes
Lead	Yes	Yes	Yes
Manganese	Yes	Yes	Yes
Mercury	Yes	Yes	Yes
Nickel	Yes	Yes	Yes
Selenium	Yes	Yes	Yes
Silver	Yes	Yes	Yes
Thallium	Yes	Yes	Yes
Zinc	Yes	Yes	Yes
Butyltins			
Butyltin ion	Yes	Yes	Yes
Dibutyltin ion	Yes	Yes	Yes
Tetrabutyltin	Yes	No	Yes
Tributyltin ion	Yes	Yes	Yes
PAHs			
1-Methylnaphthalene	Yes	Yes	Yes
2-Methylnaphthalene	Yes	Yes	Yes
Acenaphthene	Yes	Yes	Yes
Acenaphthylene	Yes	Yes	Yes
Anthracene	Yes	Yes	Yes
Benzo(a)anthracene	Yes	Yes	Yes
Benzo(a)pyrene	Yes	Yes	Yes
Benzo(b)fluoranthene	Yes	Yes	Yes
Benzo(e)pyrene	Yes	NA	Yes
Benzo(g,h,i)perylene	Yes	Yes	Yes
Benzo(j+k)fluoranthene	NA	Yes	Yes
Benzo(k)fluoranthene	Yes	Yes	Yes

Table 4-23. Wildlife Dietary COIs

	Detection Statusa		
COI	**Benthic Tissue**	**Fish Tissue**	**Surface Sediment**
C1-Chrysene	Yes	NA	Yes
C1-Dibenzothiophene	Yes	NA	Yes
C1-Fluoranthene/pyrene	Yes	NA	Yes
C1-Fluorene	Yes	NA	Yes
C1-Phenanthrene/anthracene	Yes	NA	Yes
C2-Fluoranthene/pyrene	Yes	NA	Yes
C2-Fluorene	Yes	NA	Yes
C2-Naphthalene	Yes	NA	Yes
C2-Phenanthrene/anthracene	Yes	NA	Yes
C3-Dibenzothiophene	Yes	NA	Yes
C3-Fluorene	Yes	NA	Yes
C3-Naphthalene	Yes	NA	Yes
C3-Phenanthrene/anthracene	Yes	NA	Yes
C4-Naphthalene	Yes	NA	Yes
C4-Phenanthrene/anthracene	Yes	NA	Yes
Chrysene	Yes	Yes	Yes
Dibenzo(a,h)anthracene	Yes	Yes	Yes
Dibenzothiophene	Yes	Yes	Yes
Fluoranthene	Yes	Yes	Yes
Fluorene	Yes	Yes	Yes
Total HPAHs	Yes	Yes	Yes
Indeno(1,2,3-cd)pyrene	Yes	Yes	Yes
Total LPAHs	Yes	Yes	Yes
Naphthalene	Yes	Yes	Yes
Total PAHs	Yes	Yes	Yes
Perylene	Yes	NA	Yes
Phenanthrene	Yes	Yes	Yes
Pyrene	Yes	Yes	Yes
Phthalates			
Bis(2-ethylhexyl) phthalate	Yes	Yes	Yes
Butylbenzyl phthalate	Yes	Yes	Yes
Dibutyl phthalate	Yes	Yes	Yes
Diethyl phthalate	Yes	Yes	Yes
Dimethyl phthalate	Yes	No	Yes

Table 4-23. Wildlife Dietary COIs

COI	Detection Statusa		
	Benthic Tissue	**Fish Tissue**	**Surface Sediment**
Di-n-octyl phthalate	No	Yes	Yes
SVOCs			
2-Methylphenol	Yes	Yes	Yes
4-Chloro-3-methylphenol	No	Yes	Yes
4-Methylphenol	Yes	Yes	Yes
Benzoic acid	Yes	Yes	Yes
Benzyl alcohol	Yes	Yes	Yes
Carbazole	Yes	No	Yes
Dibenzofuran	Yes	Yes	Yes
Hexachlorobenzene	Yes	Yes	Yes
Hexachlorobutadiene	Yes	Yes	Yes
Hexachloroethane	No	Yes	Yes
N-Nitrosodiphenylamine	Yes	No	Yes
Pentachlorophenol	Yes	Yes	Yes
Phenol	Yes	Yes	Yes
PCBs			
Total PCBs[c]	Yes	Yes	Yes
PCB TEQ	Yes	Yes	Yes
Dioxins/Furans			
Dioxin/Furan TEQ	Yes	Yes	Yes
Total TEQ	Yes	Yes	Yes
Pesticides			
2,4′-DDD	Yes	Yes	Yes
2,4′-DDE	Yes	Yes	Yes
2,4′-DDT	Yes	Yes	Yes
4,4′-DDD	Yes	Yes	Yes
4,4′-DDE	Yes	Yes	Yes
4,4′-DDT	Yes	Yes	Yes
Total DDx	Yes	Yes	Yes
Aldrin	Yes	Yes	Yes
cis-Chlordane	Yes	Yes	Yes
trans-Chlordane	Yes	Yes	Yes
Total chlordane	Yes	Yes	Yes

Table 4-23. Wildlife Dietary COIs

COI	Detection Statusa		
	Benthic Tissue	Fish Tissue	Surface Sediment
Dieldrin	Yes	Yes	Yes
alpha-Endosulfan	Yes	Yes	Yes
beta-Endosulfan	Yes	Yes	Yes
Endosulfan sulfate	Yes	Yes	Yes
Total endosulfan	Yes	Yes	Yes
Endrin	Yes	Yes	Yes
Endrin aldehyde	Yes	Yes	Yes
Endrin ketone	Yes	Yes	Yes
alpha-Hexachlorocyclohexane	Yes	Yes	Yes
beta-Hexachlorocyclohexane	Yes	Yes	Yes
delta-Hexachlorocyclohexane	Yes	Yes	Yes
gamma-Hexachlorocyclohexane	Yes	Yes	Yes
Heptachlor	Yes	Yes	Yes
Heptachlor epoxide	Yes	Yes	Yes
Methoxychlor	Yes	Yes	Yes
cis-Nonachlor	Yes	Yes	Yes
trans-Nonachlor	Yes	Yes	Yes
Oxychlordane	Yes	Yes	Yes

[a] Detection status columns indicate that chemical was detected (yes), not detected (no).

[b] TRV for benzo(a)pyrene used as a surrogate.

[c] PCB Aroclor mixtures and individual PCB congeners were evaluated as a total PCB concentration.

COI – chemical of interest

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

HPAH – high--molecular-weight polycyclic aromatic hydrocarbon

LPAH –low-molecular-weight polycyclic aromatic hydrocarbon

NA – not analyzed

PAH –polycyclic aromatic hydrocarbon

PCB –polychlorinated biphenyl

TEQ –toxic equivalent

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

Table 4-24. Bird Dietary Screening-Level Thresholds

COI	Unit	Dietary SL Threshold	Source
Metals			
Aluminum	mg/kg bw/d	157	Carriere et al. (1986)
Arsenic	mg/kg bw/d	2.24	Eco SSL
Cadmium	mg/kg bw/d	1.47	Eco SSL
Chromium	mg/kg bw/d	2.66	Eco SSL
Copper	mg/kg bw/d	4.05	Eco SSL
Lead	mg/kg bw/d	1.63	Eco SSL
Mercury	mg/kg bw/d	0.0064[a]	Heinz (1975, 1979)
Nickel	mg/kg bw/d	77	Cain and Pafford (1981)
Selenium	mg/kg bw/d	0.29	Eco SSL
Thallium	mg/kg bw/d	0.48[b]	Hudson et al. (1984)
Zinc	mg/kg bw/d	66.1	Eco SSL
Butyltins			
Butyltin ion	µg/kg bw/d	6.8[c]	Schlatterer et al. (1993)
Dibutyltin ion	µg/kg bw/d	6.8[c]	Schlatterer et al. (1993)
Tetrabutyltin	µg/kg bw/d	6.8[c]	Schlatterer et al. (1993)
Tributyltin ion	µg/kg bw/d	6.8	Schlatterer et al. (1993)
PAHs[e]			
Benzo(a)pyrene	µg/kg bw/d	0.28[e]	Hough et al. (1993)
Total HPAHs	µg/kg bw/d	40[f]	Patton and Dieter (1980)
Total LPAHs	µg/kg bw/d	40[f]	Patton and Dieter (1980)
Total PAHs	µg/kg bw/d	40	Patton and Dieter (1980)
Phthalates			
BEHP	µg/kg bw/d	1,100	Peakall (1974)
Butylbenzyl phthalate	µg/kg bw/d	110[g]	Peakall (1974)
Dibutyl phthalate	µg/kg bw/d	1,100[h]	Peakall (1974)
Diethyl phthalate	µg/kg bw/d	1,100[h]	Peakall (1974)
Dimethyl phthalate	µg/kg bw/d	1,100[h]	Peakall (1974)
Di-n-octyl phthalate	µg/kg bw/d	1,100[h]	Peakall (1974)
SVOCs			
Hexachlorobenzene	µg/kg bw/d	240[d]	Schwetz et al. (1974)
Hexachlorobutadiene	µg/kg bw/d	1,700	Schwetz et al. (1974)

Table 4-24. Bird Dietary Screening-Level Thresholds

COI	Unit	Dietary SL Threshold	Source
Pentachlorophenol	µg/kg bw/d	22,000	Prescott et al. (1982)
PCBs			
Total PCBs	µg/kg bw/d	290	Britton and Huston (1973)
PCB TEQ	ng/kg bw/d	14	Nosek et al. (1992)
Dioxins/Furans			
Dioxin/furan TEQ	ng/kg bw/d	14	Nosek et al. (1992)
Total TEQ	ng/kg bw/d	14	Nosek et al. (1992)
Pesticides			
Aldrin	µg/kg bw/d	8[d]	DeWitt (1956)
cis-Chlordane	µg/kg bw/d	600[i]	Ludke (1976)
trans-Chlordane	µg/kg bw/d	600[i]	Ludke (1976)
Total Chlordane	µg/kg bw/d	600	Ludke (1976)
Sum DDE	µg/kg bw/d	32[a]	Mendenhall et al. (1983)
Total DDx	µg/kg bw/d	227	ECO SSL
Dieldrin	µg/kg bw/d	66	Mendenhall et al. (1983)
alpha-Endosulfan	µg/kg bw/d	10,000[j]	Abiola (1992)
beta-Endosulfan	µg/kg bw/d	10,000[j]	Abiola (1992)
Endosulfan sulfate	µg/kg bw/d	10,000[j]	Abiola (1992)
Total endosulfan	µg/kg bw/d	10,000	Abiola (1992)
Endrin	µg/kg bw/d	12[d]	DeWitt (1956)
Endrin aldehyde	µg/kg bw/d	12[k]	DeWitt (1956)
Endrin ketone	µg/kg bw/d	12[k]	DeWitt (1956)
Heptachlor	µg/kg bw/d	100[b]	Hill et al. (1975)
Heptachlor epoxide	µg/kg bw/d	100[l]	Hill et al. (1975)
alpha-HCH	µg/kg bw/d	1,600[m]	Chakravarty and Lahiri (1986); Chakravarty et al. (1986)
beta-HCH	µg/kg bw/d	1,600[m]	Chakravarty and Lahiri (1986); Chakravarty et al. (1986)
delta-HCH	µg/kg bw/d	1,600[m]	Chakravarty and Lahiri (1986); Chakravarty et al. (1986)
gamma-HCH	µg/kg bw/d	1,600	Chakravarty and Lahiri (1986); Chakravarty et al. (1986)
Methoxychlor	µg/kg bw/d	34,600	Gee et al. (2004); Millam et al. (2002)
cis-Nonachlor	µg/kg bw/d	600[i]	Ludke (1976)
trans-Nonachlor	µg/kg bw/d	600[i]	Ludke (1976)

Table 4-24. Bird Dietary Screening-Level Thresholds

COI	Unit	Dietary SL Threshold	Source
Oxychlordane	µg/kg bw/d	600[i]	Ludke (1976)

[a] NOAEL extrapolated from LOAEL using a UF of 10.

[b] NOAEL extrapolated from LOAEL using an uncertainty factor (UF) of 50.

[c] The screening-level threshold for TBT was used as a surrogate.

[d] NOAEL extrapolated from LOAEL using an UF of 5.

[e] SL thresholds were not available for indiviudal PAH COIs other than benzo(a)pyrene; however, indivudal PAHs (acenaphthene, acenaphthylene, anthracene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, fluoranthene, fluorene, indeno[1,2,3-cd] pyrene, naphthalene, phenanthrene, and pyrene) were evaluated as total PAHs and HPAHs or LPAHs.

[f] The screening-level threshold for total PAHs was used as a surrogate.

[g] LOAEL extrapolated from NOAEL using an UF of 10.

[h] The screening-level threshold for BEHP was used as a surrogate.

[i] The screening-level threshold for total chlordane was used as a surrogate.

[j] The screening-level threshold for total endosulfan was used as a surrogate.

[k] The screening-level threshold for endrin was used as a surrogate.

[l] The screening-level threshold for heptachlor was used as a surrogate.

[m] The screening-level threshold for gamma-HCH was used as a surrogate.

BEHP – bis(2-ethylhexyl) phthalate

COI – chemical of interest

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

HPAH – high-molecular-weight polycyclic aromatic hydrocarbon

LOAEL – lowest-observed-adverse-effect level

LPAH –low-molecular-weight polycyclic aromatic hydrocarbon

NA – not analyzed

NOAEL – no-observed-adverse-effect level

PAH –polycyclic aromatic hydrocarbon

PCB –polychlorinated biphenyl

TEQ –toxic equivalent

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

Table 4-25. Mammal Dietary Screening-Level Thresholds

COI	Unit	Dietary SL Threshold	Source
Metals			
Aluminum	mg/kg bw/d	34	Ondreicka et al. (1966)
Antimony	mg/kg bw/d	0.059	Eco SSL
Arsenic	mg/kg bw/d	1.04	Eco SSL
Cadmium	mg/kg bw/d	0.77	Eco SSL
Chromium	mg/kg bw/d	5.66	Eco SSL
Copper	mg/kg bw/d	5.6	Eco SSL
Lead	mg/kg bw/d	4.7	Eco SSL
Mercury	mg/kg bw/d	0.02	Dansereau et al. (1999)
Nickel	mg/kg bw/d	8.4	Ambrose et al. (1976)
Selenium	mg/kg bw/d	0.143	Eco SSL
Thallium	mg/kg bw/d	0.74	Formigli et al. (1986)
Zinc	mg/kg bw/d	160	Schlicker and Cox (1968)
Butyltins			
Butyltin ion	µg/kg bw/d	400[a]	Omura et al. (2001)
Dibutyltin ion	µg/kg bw/d	3,800	Harazono and Ema (2003)
Tetrabutyltin	µg/kg bw/d	400[a]	Omura et al. (2001)
Tributyltin ion	µg/kg bw/d	400	Omura et al. (2001)
PAHs[b]			
1-Methylnaphthalene	µg/kg bw/d	54,000[c]	Murata et al. (1997)
2-Methylnaphthalene	µg/kg bw/d	54,000	Murata et al. (1997)
Benzo(a)pyrene	µg/kg bw/d	2,000[d]	MacKenzie and Angevine (1981)
Dibenzothiophene	µg/kg bw/d	47,000[f]	Leighton (1989)
Total HPAHs	µg/kg bw/d	65,600	ECO SSL
Total LPAHs	µg/kg bw/d	615	ECO SSL
Naphthalene	µg/kg bw/d	133,000	Shopp et al. (1984)
Phthalates			
BEHP	µg/kg bw/d	44,000	Tyl et al. (1988)
Butylbenzyl phthalate	µg/kg bw/d	831,000	Agarwal et al. (1985)
Dibutyl phthalate	µg/kg bw/d	16,000[d]	Wine et al. (1997)

Table 4-25. Mammal Dietary Screening-Level Thresholds

COI	Unit	Dietary SL Threshold	Source
Diethyl phthalate	µg/kg bw/d	1,860,000	Lamb et al. (1987)
Dimethyl phthalate	µg/kg bw/d	7,500,000	Heindel et al. (1989)
Di-n-octyl phthalate	µg/kg bw/d	44,000[e]	Tyl et al. (1988)
SVOCs			
Benzoic acid	µg/kg bw/d	50,000	Marquardt (1980 [as cited in IRIS (EPA 2006b)])
Hexachlorobenzene	µg/kg bw/d	26[d]	Bleavins et al. (1984)
Hexachlorobutadiene	µg/kg bw/d	2,000	Kociba et al. (1977b; 1977a); Schwetz et al. (1977)
Hexachloroethane	µg/kg bw/d	100,000	Weeks et al. (1979)
Pentachlorophenol	µg/kg bw/d	4,000	Welsh et al. (1987)
Phenol	µg/kg bw/d	60,000	Argus Research Laboratories 1997 & Charles River Laboratories 1988 an NTP 1983 [as cited in IRIS (EPA 2006b)])
PCBs			
Total PCBs	µg/kg bw/d	7.4[d]	Restum et al. (1998)
PCB TEQ	ng/kg bw/d	0.22[f]	Tillitt et al. (1996)
Dioxins/Furans			
Dioxin/furan TEQ	ng/kg bw/d	0.22[f]	Tillitt et al. (1996)
Total TEQ	ng/kg bw/d	0.22[f]	Tillitt et al. (1996)
Pesticides			
Aldrin	µg/kg bw/d	830	Reuber (1980)
cis-Chlordane	µg/kg bw/d	180[g]	Khasawinah and Grutsch (1989)
trans-Chlordane	µg/kg bw/d	180[g]	Khasawinah and Grutsch (1989)
Total Chlordane	µg/kg bw/d	80	Khasawinah and Grutsch (1989)
Total DDx	µg/kg bw/d	147	Eco SSL
Dieldrin	µg/kg bw/d	180	Good and Ware (1969); Virgo and Bellward (1977)
alpha-Endosulfan	µg/kg bw/d	840[h]	Hack et al. (1995)
beta-Endosulfan	µg/kg bw/d	840[h]	Hack et al. (1995)
Endosulfan sulfate	µg/kg bw/d	840[h]	Hack et al. (1995)
Total endosulfan	µg/kg bw/d	840	Hack et al. (1995)
Endrin	µg/kg bw/d	180	Good and Ware (1969)
Endrin aldehyde	µg/kg bw/d	180[i]	Good and Ware (1969)
Endrin ketone	µg/kg bw/d	180[i]	Good and Ware (1969)

Table 4-25. Mammal Dietary Screening-Level Thresholds

COI	Unit	Dietary SL Threshold	Source
Heptachlor	µg/kg bw/d	1,000	Crum et al. (1993)
Heptachlor epoxide	µg/kg bw/d	1,000[j]	Crum et al. (1993)
alpha-HCH	µg/kg bw/d	6,100[k]	Palmer et al. (1978)
beta-HCH	µg/kg bw/d	5,700	Van Velsen et al. (1986)
delta- HCH	µg/kg bw/d	6,100[k]	Palmer et al. (1978)
gamma-HCH	µg/kg bw/d	6,100	Palmer et al. (1978)
Methoxychlor	µg/kg bw/d	5,600	You et al. (2002)
cis-Nonachlor	µg/kg bw/d	2,500	Bondy et al. (2000)
trans-Nonachlor	µg/kg bw/d	2,500	Bondy et al. (2000)
Oxychlordane	µg/kg bw/d	180[g]	Khasawinah and Grutsch (1989)

[a] The screening-level threshold for TBT was used as a surrogate.

[b] SL thresholds were not available for indiviudal PAH COIs other than benzo(a)pyrene; however, indivudal PAHs (acenaphthene, acenaphthylene, anthracene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, fluoranthene, fluorene, indeno[1,2,3-cd] pyrene, phenanthrene, and pyrene) were evaluated as HPAHs or LPAHs.

[c] The screening-level threshold for 2-methylnaphthalene was used as a surrogate.

[d] NOAEL extrapolated from LOAEL using a UF of 5.

[e] The screening-level threshold for BEHP was used as a surrogate.

[f] NOAEL extrapolated from LOAEL using a UF of 10.

[g] The screening-level threshold for total chlordane was used as a surrogate.

[h] The screening-level threshold for total endosulfan was used as a surrogate.

[i] The screening-level threshold for endrin was used as a surrogate.

[j] The screening-level threshold for heptachlor was used as a surrogate.

[k] The screening-level threshold for gamma-HCH was used as a surrogate.

BEHP – bis(2-ethylhexyl)phthalate

COI – chemical of interestDDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

HPAH – high--molecular-weight polycyclic aromatic hydrocarbon

LOAEL – lowest-observed-adverse-effect level

LPAH –low-molecular-weight polycyclic aromatic hydrocarbon

NA – not analyzed

NOAEL – no-observed-adverse-effect level

PAH –polycyclic aromatic hydrocarbon

PCB –polychlorinated biphenyl

TEQ –toxic equivalent

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

Table 4-26. Dietary COIs with No Bird or Mammal Dietary Screening-Level Thresholds

COI	
Metals	
Antimony[a]	Silver
Manganese	
PAHs	
1-Methylnaphthalene[a]	Dibenzothiophene[a]
2-Methylnaphthalene[a]	Perylene
Benzo(e)pyrene	Alkylated PAHs
SVOCs	
Benzoic acid	N-Nitrosodiphenylamine
Benzyl alcohol[a]	2-Methylphenol
Carbazole	4-Chloro-3-methylphenol
Dibenzofuran	4-Methylphenol[a]
Hexachloroethane[a]	Phenol[a]

[a] No bird dietary screening-level threshold was available; however, a mammal dietary threshold was available.

COI – chemical of interest

PAH –polycyclic aromatic hydrocarbon

SVOC –semivolatile organic compound

Table 4-27. Comparison of Maximum Spotted Sandpiper Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Metals							
Aluminum	mg/kg	157	134	4,920	**539**	**47,400**	**Yes**
Arsenic	mg/kg	2.24	1.91	70.2	**3.04**	**75.6**	**Yes**
Cadmium	mg/kg	1.47	1.26	46.1	0.254	**46.2**	**Yes**
Chromium	mg/kg	2.66	2.27	83.3	1.05 T	**774**	**Yes**
Copper	mg/kg	4.05	3.46	127	**20.2 T**	**2,830**	**Yes**
Lead	mg/kg	1.63	1.39	51.1	0.847 T	**13,400 T**	**Yes**
Mercury	mg/kg	0.0064	0.00547	0.201	**0.0263 J**	**65.2 T**	**Yes**
Nickel	mg/kg	77.4	66.1	2,430	0.535	594	No
Selenium	mg/kg	0.29	0.248	9.09	**0.37**	**20**	**Yes**
Thallium	mg/kg	0.48	0.41	15	0.002 J	**27**	**Yes**
Zinc	mg/kg	66.1	56.5	2,070	54	**2,850**	**Yes**
Butyltins							
Butyltin ion	µg/kg	6,800	5,810	213,000	3,600	740 J	No
Dibutyltin ion	µg/kg	6,800	5,810	213,000	820	2,700	No
Tetrabutyltin	µg/kg	6,800	5,810	213,000	5 U	1,000	No
Tributyltin ion	µg/kg	6,800	5,810	213,000	1,700	47,000	No
PAHs							
Benzo(a)pyrene	µg/kg	280	239	8,770	**3,000**	**340,000**	**Yes**
Total HPAHs	µg/kg	40,000	34,200	1,250,000	**45,000 T**	**4,300,000 T**	**Yes**
Total LPAHs	µg/kg	40,000	34,200	1,250,000	3,800 T	**2,900,000 T**	**Yes**
Total PAHs	µg/kg	40,000	34,200	1,250,000	**48,000 T**	**7,300,000 T**	**Yes**
Phthalates							
BEHP	µg/kg	1,100	940	34,500	**8,600**	**440,000 J**	**Yes**
Dibutyl phthalate	µg/kg	110	94	3,450	**1,300**	**3,790 J**	**Yes**
Diethyl phthalate	µg/kg	1,100	940	34,500	160 U	2,150 UJ	No

Table 4-27. Comparison of Maximum Spotted Sandpiper Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Dimethyl phthalate	µg/kg	1,100	940	34,500	160 U	2,150 UJ	No
SVOCs							
Hexachlorobenzene	µg/kg	240	205	7,520	12 U	1,200 U	No
Hexachlorobutadiene	µg/kg	1,700	1,450	53,300	23 U	280 U	No
PCBs							
Total PCBs	µg/kg	290	248	9,090	**9,900 JT**	**30,800 JT**	**Yes**
Dioxins/Furans							
Dioxin/furan TEQ	pg/g	14	12	439	**2,500 T**	**35,300 T**	**Yes**
PCB TEQ	pg/g	14	12	439	**1,890 T**	**5,610 T**	**Yes**
Total TEQ	pg/g	14	12	439	**3,370 T**	**35,400 T**	**Yes**
Pesticides							
Aldrin	µg/kg	8	6.84	251	**110**	**691 J**	**Yes**
cis-Chlordane	µg/kg	600	513	18,800	69.7	203 J	No
trans-Chlordane	µg/kg	600	513	18,800	74.3	445 NJ	No
Total Chlordane	µg/kg	600	513	18,800	180 T	700 UT	No
Sum DDE	µg/kg	32	27.3	1,000	**495 T**	**2,530 NJT**	**Yes**
Total DDx	µg/kg	227	194	7,110	**3,110 T**	**16,000 NJT**	**Yes**
Dieldrin	µg/kg	66	56.4	2,070	37.1	356 J	No
alpha-Endosulfan	µg/kg	10,000	8,550	313,000	1 U	99 U	No
beta-Endosulfan	µg/kg	10,000	8,550	313,000	2.1 UT	235 NJ	No
Total endosulfan	µg/kg	10,000	8,550	313,000	2.1 UT	270 T	No
Endosulfan sulfate	µg/kg	10,000	8,550	313,000	1	240 T	No
Endrin	µg/kg	12	10.3	376	2.4 UT	200 U	No
Endrin aldehyde	µg/kg	12	10.3	376	1 UJ	200 U	No
Endrin ketone	µg/kg	12	10.3	376	1 U	200 U	No
alpha-HCH	µg/kg	1,600	1,370	50,100	1.06 U	99 U	No

Table 4-27. Comparison of Maximum Spotted Sandpiper Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
beta-HCH	µg/kg	1,600	1,370	50,100	8.5 UT	99 U	No
gamma-HCH	µg/kg	1,600	1,370	50,100	1 U	430	No
delta-HCH	µg/kg	1,600	1,370	50,100	1 U	99 U	No
Heptachlor	µg/kg	100	85.5	3,130	1 U	99 U	No
Heptachlor epoxide	µg/kg	100	85.5	3,130	8 UT	99 U	No
Methoxychlor	µg/kg	34,600	29,600	1,080,000	1.6 UJ	990 U	No
cis-Nonachlor	µg/kg	600	513	18,800	12 U	700 U	No
trans-Nonachlor	µg/kg	600	513	18,800	25	226 NJ	No
Oxychlordane	µg/kg	600	513	18,800	1.13 U	130 U	No

[a] The maximum concentration is the higher of either the maximum detect or maximum RL.

BEHP – bis(ethylhexyl) phthalate
COI – chemical of interest
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
J – estimated concentration
N – presumptive evidence of a compound
NOAEL – no-observed-adverse-effect level
PAH – polycyclic aromatic hydrocarbon
SVOC – semivolatile organic compound
T – value calculated or selected from multiple results
TRV – toxicity reference value
TSC – threshold sediment concentration
TTC – threshold tissue concentration
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
U – not detected at given concentration

Table 4-28. Comparison of Maximum Hooded Merganser Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Metals							
Aluminum	mg/kg	157	424	77,100	203	47,400	**Yes**[b]
Arsenic	mg/kg	2.24	6.05	1,100	1.25	75.6	No
Cadmium	mg/kg	1.47	3.97	722	0.218	46.2	No
Chromium	mg/kg	2.66	7.18	1,310	1.14	774	No
Copper	mg/kg	4.05	10.9	1,990	**20.2 T**	**2,830**	**Yes**
Lead	mg/kg	1.63	4.4	800	**1,100 JT**	**13,400 T**	**Yes**
Mercury	mg/kg	0.0064	0.0173	3.14	**0.166 JT**	**65.2 T**	**Yes**
Nickel	mg/kg	77.4	209	38,000	1.01	594	No
Selenium	mg/kg	0.29	0.783	142	**1.2 T**	20	**Yes**
Thallium	mg/kg	0.48	1.3	236	0.0136	27	No
Zinc	mg/kg	66.1	178	32,400	54	2,850	No
Butyltins							
Butyltin ion	µg/kg	6,800	18,400	3,340,000	97	740 J	No
Dibutyltin ion	µg/kg	6,800	18,400	3,340,000	560	2,700	No
Tributyltin ion	µg/kg	6,800	18,400	3,340,000	680	47,000	No
PAHs							
Benzo(a)pyrene	µg/kg	280	756	137,000	490	**340,000**	**Yes**
Total HPAHs	µg/kg	40,000	108,000	19,600,000	4,400 T	4,300,000 T	No
Total LPAHs	µg/kg	40,000	108,000	19,600,000	540 T	2,900,000 T	No
Total PAHs	µg/kg	40,000	108,000	19,600,000	5,000 T	7,300,000 T	No
Phthalates							
BEHP	µg/kg	1,100	2,970	540,000	**87,000 JT**	440,000 J	**Yes**
Butylbenzyl phthalate	µg/kg	1,100	2,970	540,000	370 U	2,800	No
Dibutyl phthalate	µg/kg	110	297	54,000	**1,300**	3,790 J	**Yes**
Diethyl phthalate	µg/kg	1,100	2,970	540,000	950 U	2,150 UJ	No
Dimethyl phthalate	µg/kg	1,100	2,970	540,000	190 U	2,150 UJ	No
Di-n-octyl phthalate	µg/kg	1,100	2,970	540,000	2,100 T	15,400 JT	No
SVOCs							
Hexachlorobenzene	µg/kg	240	648	118,000	33 UT	1,200 U	No

Table 4-28. Comparison of Maximum Hooded Merganser Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Hexachlorobutadiene	µg/kg	1,700	4,590	835,000	33 UT	280 U	No
Phenols							
Pentachlorophenol	µg/kg	22,000	59,400	10,800,000	190 UT	8,410 J	No
PCBs							
Total PCBs	µg/kg	290	783	142,000	**8,770 JT**	30,800 JT	**Yes**
Dioxins/Furans							
PCB TEQ	pg/g	14	37.8	6,870	**196 T**	5,610 T	**Yes**
Dioxin/furan TEQ	pg/g	14	37.8	6,870	**234 T**	**35,300 T**	**Yes**
Total TEQ	pg/g	14	37.8	6,870	**304 T**	**35,400 T**	**Yes**
Pesticides							
Aldrin	µg/kg	8	21.6	3,930	13 UT	691 J	No
cis-Chlordane	µg/kg	600	1,620	295,000	20 U	203 J	No
trans-Chlordane	µg/kg	600	1,620	295,000	9.6 U	445 NJ	No
Total chlordane	µg/kg	600	1,620	295,000	32 UT	700 UT	No
Sum DDE	µg/kg	32	86.4	15,700	**660 T**	2,530 NJT	**Yes**
Total DDx	µg/kg	227	613	111,000	**3,100 T**	16,000 NJT	**Yes**
Dieldrin	µg/kg	66	178	32,400	24 JT	356 J	No
alpha-Endosulfan	µg/kg	10,000	27,000	4,910,000	20 U	99 U	No
beta-Endosulfan	µg/kg	10,000	27,000	4,910,000	20 UT	235 NJ	No
Total endosulfan	µg/kg	10,000	27,000	4,910,000	28 JT	270 T	No
Endosulfan sulfate	µg/kg	10,000	27,000	4,910,000	20 UT	240 T	No
Endrin	µg/kg	12	32.4	5,890	31 UT	200 U	No
Endrin aldehyde	µg/kg	12	32.4	5,890	20 UT	200 U	No
Endrin ketone	µg/kg	12	32.4	5,890	20 UT	200 U	No
alpha-HCH	µg/kg	1,600	4,320	785,000	9.6 U	99 U	No
beta-HCH	µg/kg	1,600	4,320	785,000	9.6 U	99 U	No
delta-HCH	µg/kg	1,600	4,320	785,000	9.6 U	99 U	No
gamma-HCH	µg/kg	1,600	4,320	785,000	9.6 UT	430	No
Heptachlor	µg/kg	100	270	49,100	13 UT	99 U	No
Heptachlor epoxide	µg/kg	100	270	49,100	9.6 U	99 U	No
Methoxychlor	µg/kg	34,600	93,400	17,000,000	20 UT	990 U	No
cis-Nonachlor	µg/kg	600	1,620	295,000	12 U	700 U	No

Table 4-28. Comparison of Maximum Hooded Merganser Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
trans-Nonachlor	µg/kg	600	1,620	295,000	11 UT	226 NJ	No
Oxychlordane	µg/kg	600	1,620	295,000	32 UT	130 U	No

[a] The maximum concentration is the higher of either the maximum detect or maximum RL.

[b] Retained as a COPC because the sum of tissue and sediment concentration exceedances compared to TTCs and TSCs is > 1.0.

BEHP – bis(ethylhexyl) phthalate

COI – chemical of interest

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

J – estimated concentration

N – presumptive evidence of a compound

NOAEL – no-observed-adverse-effect level

PAH – polycyclic aromatic hydrocarbon

SVOC – semivolatile organic compound

T – value calculated or selected from multiple results

TRV – toxicity reference value

TSC – threshold sediment concentration

TTC – threshold tissue concentration

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

U – not detected at given concentration

Table 4-29. Comparison of Maximum Bald Eagle Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Metals							
Aluminum	mg/kg	157	1,310	252,000	185	47,400	No
Arsenic	mg/kg	2.24	18.7	3,600	0.48	75.6	No
Cadmium	mg/kg	1.47	12.3	2,360	0.108	46.2	No
Chromium	mg/kg	2.66	22.2	4,280	2.77 T	774	No
Copper	mg/kg	4.05	33.8	6,510	1.61	2,830	No
Lead	mg/kg	1.63	13.6	2,620	10.6	**13,400 T**	**Yes**
Mercury	mg/kg	0.0064	0.0533	10.3	**0.494**	**65.2 T**	**Yes**
Nickel	mg/kg	77.4	645	124,000	1.37 J	594	No
Selenium	mg/kg	0.29	2.42	466	0.4	20	No
Thallium	mg/kg	0.48	4	771	0.0093	27	No
Zinc	mg/kg	66.1	551	106,000	113 T	2,850	No
Butyltins							
Butyltin ion	µg/kg	6,800	56,700	10,900,000	27 T	740 J	No
Dibutyltin ion	µg/kg	6,800	56,700	10,900,000	5.1 JT	2,700	No
Tributyltin ion	µg/kg	6,800	56,700	10,900,000	8.6 T	47,000	No
PAHs							
Benzo(a)pyrene	µg/kg	280	2,330	450,000	33	340,000	No
Total HPAHs	µg/kg	40,000	333,000	64,300,000	200 T	4,300,000 T	No
Total LPAHs	µg/kg	40,000	333,000	64,300,000	510 T	2,900,000 T	No
Total PAHs	µg/kg	40,000	333,000	64,300,000	550 T	7,300,000 T	No
Phthalates							
BEHP	µg/kg	1,100	9,170	1,770,000	**87,000 JT**	440,000 J	**Yes**
Dibutyl phthalate	µg/kg	110	917	177,000	660 U	3,790 J	No
Diethyl phthalate	µg/kg	1,100	9,170	1,770,000	1,600 U	2,150 UJ	No
Di-n-octyl phthalate	µg/kg	1,100	9,170	1,770,000	2,100 T	15,400 JT	No
SVOCs							
Hexachlorobenzene	µg/kg	240	2,000	386,000	32 UT	1,200 U	No
Hexachlorobutadiene	µg/kg	1,700	14,200	2,730,000	9.8 UJ	280 U	No

Table 4-29. Comparison of Maximum Bald Eagle Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
PCBs							
Total PCBs	µg/kg	290	2,420	466,000	**25,100 JT**	30,800 JT	**Yes**
Dioxins/Furans							
Dioxin/furan TEQ	pg/g	14	117	22,500	**232 T**	**35,300 T**	**Yes**
PCB TEQ	pg/g	14	117	22,500	**196 T**	5,610 T	**Yes**
Total TEQ	pg/g	14	117	22,500	**262 T**	**35,400 T**	**Yes**
Pesticides							
Aldrin	µg/kg	8	66.7	12,900	13 UT	691 J	No
cis-Chlordane	µg/kg	600	5,000	964,000	20 U	203 J	No
trans-Chlordane	µg/kg	600	5,000	964,000	9.8 U	445 NJ	No
Total chlordane	µg/kg	600	5,000	964,000	24 NT	700 UT	No
Sum DDE	µg/kg	32	267	51,400	**600 T**	2,530 NJT	**Yes**
Total DDx	µg/kg	227	1,890	365,000	760 T	16,000 NJT	No
Dieldrin	µg/kg	66	550	106,000	14 UT	356 J	No
alpha-Endosulfan	µg/kg	10,000	83,300	16,100,000	20 U	99 U	No
beta-Endosulfan	µg/kg	10,000	83,300	16,100,000	15 UT	235 NJ	No
Total Endosulfan	µg/kg	10,000	83,300	16,100,000	20 UT	270 T	No
Endosulfan sulfate	µg/kg	10,000	83,300	16,100,000	12 UT	240 T	No
Endrin	µg/kg	12	100	19,300	31 UT	200 U	No
Endrin aldehyde	µg/kg	12	100	19,300	9.8 U	200 U	No
Endrin ketone	µg/kg	12	100	19,300	9.8 U	200 U	No
alpha-HCH	µg/kg	1,600	13,300	2,570,000	9.8 U	99 U	No
beta-HCH	µg/kg	1,600	13,300	2,570,000	9.8 U	99 U	No
delta-HCH	µg/kg	1,600	13,300	2,570,000	9.8 U	99 U	No
gamma-HCH	µg/kg	1,600	13,300	2,570,000	9.8 U	430	No
Heptachlor	µg/kg	100	833	161,000	13 UT	99 U	No
Heptachlor epoxide	µg/kg	100	833	161,000	9.8 U	99 U	No
Methoxychlor	µg/kg	34,600	288,000	55,600,000	17 JT	990 U	No
cis-Nonachlor	µg/kg	600	5,000	964,000	17 U	700 U	No
trans-Nonachlor	µg/kg	600	5,000	964,000	14 U	226 NJ	No
Oxychlordane	µg/kg	600	5,000	964,000	20 UT	130 U	No

[a] The maximum concentration is the higher of either the maximum detect or maximum RL.

BEHP – bis(ethylhexyl) phthalate

COI – chemical of interest

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

J – estimated concentration

N – presumptive evidence of a compound

NOAEL – no-observed-adverse-effect level

PAH – polycyclic aromatic hydrocarbon

SVOC – semivolatile organic compound

T – value calculated or selected from multiple results

TRV – toxicity reference value

TSC – threshold sediment concentration

TTC – threshold tissue concentration

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

U – not detected at given concentration

Table 4-30. Comparison of Maximum Osprey Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concen-tration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Metals							
Aluminum	mg/kg	157	746	142,000	154	47,400	No
Arsenic	mg/kg	2.24	10.6	2,030	0.39	75.6	No
Cadmium	mg/kg	1.47	6.98	1,330	0.2 T	46.2	No
Chromium	mg/kg	2.66	12.6	2,410	2.77 T	774	No
Copper	mg/kg	4.05	19.2	3,660	1.92 T	2,830	No
Lead	mg/kg	1.63	7.74	1,470	**1,100 JT**	**13,400 T**	**Yes**
Mercury	mg/kg	0.0064	0.0304	5.79	**0.494**	**65.2 T**	**Yes**
Nickel	mg/kg	77.4	368	70,000	1.37 J	594	No
Selenium	mg/kg	0.29	1.38	262	1.2 T	20	No
Thallium	mg/kg	0.48	2.28	434	0.0085	27	No
Zinc	mg/kg	66.1	314	59,800	113 T	2,850	No
Butyltins							
Butyltin ion	µg/kg	6,800	32,300	6,150,000	27 T	740 J	No
Dibutyltin ion	µg/kg	6,800	32,300	6,150,000	5.1 JT	2,700	No
Tributyltin ion	µg/kg	6,800	32,300	6,150,000	8.6 T	47,000	No
PAHs							
Benzo(a)pyrene	µg/kg	280	1,330	253,000	33	**340,000**	**Yes**
Total HPAHs	µg/kg	40,000	190,000	36,200,000	200 T	4,300,000 T	No
Total LPAHs	µg/kg	40,000	190,000	36,200,000	360 T	2,900,000 T	No
Total PAHs	µg/kg	40,000	190,000	36,200,000	520 T	7,300,000 T	No
Phthalates							
BEHP	µg/kg	1,100	5,230	995,000	**87,000 JT**	440,000 J	**Yes**
Dibutyl phthalate	µg/kg	110	523	99,500	**660 U**	3,790 J	**Yes**
Diethyl phthalate	µg/kg	1,100	5,230	995,000	1,600 U	2,150 UJ	No
Di-n-octyl phthalate	µg/kg	1,100	5,230	995,000	2,100 T	15,400 JT	No
SVOCs							
Hexachlorobenzene	µg/kg	240	1,140	217,000	33 UT	1,200 U	No
Hexachlorobutadiene	µg/kg	1,700	8,080	1,540,000	9.8 UJ	280 U	No

Table 4-30. Comparison of Maximum Osprey Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concen-tration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
PCBs							
Total PCBs	µg/kg	290	1,380	262,000	**25,100 JT**	30,800 JT	**Yes**
Dioxins/Furans							
Dioxin/furan TEQ	pg/g	14	66.5	12,700	**232 T**	**35,300 T**	**Yes**
PCB TEQ – birds	pg/g	14	66.5	12,700	**196 T**	5,610 T	**Yes**
Total TEQ	pg/g	14	66.5	12,700	**262 T**	**35,400 T**	**Yes**
Pesticides							
Aldrin	µg/kg	8	38	7,240	13 UT	691 J	No
cis-Chlordane	µg/kg	600	2,850	543,000	27	203 J	No
trans-Chlordane	µg/kg	600	2,850	543,000	25	445 NJ	No
Total chlordane	µg/kg	600	2,850	543,000	73 T	700 UT	No
delta-HCH	µg/kg	1,600	7,600	1,450,000	9.8 U	99 U	No
Sum DDE	µg/kg	32	152	29,000	**600 T**	2,530 NJT	**Yes**
Total DDx	µg/kg	227	1,080	205,000	**1,460 T**	16,000 NJT	**Yes**
Dieldrin	µg/kg	66	314	59,700	20 UT	356 J	No
alpha-Endosulfan	µg/kg	10,000	47,500	9,050,000	20 U	99 U	No
beta-Endosulfan	µg/kg	10,000	47,500	9,050,000	20 UT	235 NJ	No
Total endosulfan	µg/kg	10,000	47,500	9,050,000	28 JT	270 T	No
Endosulfan sulfate	µg/kg	10,000	47,500	9,050,000	20 UT	240 T	No
Endrin	µg/kg	12	57	10,900	31 UT	200 U	No
Endrin aldehyde	µg/kg	12	57	10,900	20 UT	200 U	No
Endrin ketone	µg/kg	12	57	10,900	20 UT	200 U	No
alpha-HCH	µg/kg	1,600	7,600	1,450,000	9.8 U	99 U	No
beta-HCH	µg/kg	1,600	7,600	1,450,000	9.8 U	99 U	No
gamma-HCH	µg/kg	1,600	7,600	1,450,000	9.8 U	430	No
Heptachlor	µg/kg	100	475	90,500	13 UT	99 U	No
Heptachlor epoxide	µg/kg	100	475	90,500	9.8 U	99 U	No
Methoxychlor	µg/kg	34,600	164,000	31,300,000	20 UT	990 U	No
Oxychlordane	µg/kg	600	2,850	543,000	32 UT	130 U	No
cis-Nonachlor	µg/kg	600	2,850	543,000	17 U	700 U	No
trans-Nonachlor	µg/kg	600	2,850	543,000	15	226 NJ	No

[a] The maximum concentration is the higher of either the maximum detect or maximum RL.

BEHP – bis(ethylhexyl) phthalate

COI – chemical of interest

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

J – estimated concentration

N – presumptive evidence of a compound

NOAEL – no-observed-adverse-effect level

PAH – polycyclic aromatic hydrocarbon

SVOC – semivolatile organic compound

T – value calculated or selected from multiple results

TRV – toxicity reference value

TSC – threshold sediment concentration

TTC – threshold tissue concentration

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

U – not detected at given concentration

Table 4-31. Comparison of Maximum Mink Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Metals							
Aluminum	mg/kg	34	206	8,680	203	**47,400**	**Yes**
Antimony	mg/kg	0.059	0.358	15.1	**5.9 JT**	**32.1**	**Yes**
Arsenic	mg/kg	1.04	6.31	265	0.5 J	75.6	No
Cadmium	mg/kg	0.77	4.67	197	0.2 T	46.2	No
Chromium	mg/kg	5.66	34.3	1,440	2.77 T	774	No
Copper	mg/kg	5.6	34	1,430	20.2 T	**2,830**	**Yes**
Lead	mg/kg	4.7	28.5	1,200	**1,100 JT**	**13,400 T**	**Yes**
Mercury	mg/kg	0.02	0.121	5.11	**0.494**	**65.2 T**	**Yes**
Nickel	mg/kg	8.43	51.1	2,150	1.37 J	594	No
Selenium	mg/kg	0.143	0.867	36.5	**1.2 T**	20	**Yes**
Thallium	mg/kg	0.74	4.49	189	0.0167	27	No
Zinc	mg/kg	160	970	40,800	113 T	2,850	No
Butyltins							
Butyltin ion	µg/kg	400	2,430	102,000	27 T	740 J	No
Dibutyltin ion	µg/kg	3,800	23,000	970,000	330	2,700	No
Tributyltin ion	µg/kg	400	2,430	102,000	8.6 T	47,000	No
PAHs							
1-Methylnaphthalene	µg/kg	150,000	909,000	38,300,000	67	4,100	No
2-Methylnaphthalene	µg/kg	54,000	327,000	13,800,000	73 UT	53,000	No
Benzo(a)pyrene	µg/kg	2,000	12,100	511,000	37 UT	340,000	No
Dibenzothiophene	µg/kg	47,000	285,000	12,000,000	21 JT	11,000	No
Total HPAHs	µg/kg	615	3,730	157,000	520 JT	**4,300,000 T**	**Yes**
Total LPAHs	µg/kg	65600	398,000	16,700,000	510 T	2,900,000 T	No
Phthalates							
BEHP	µg/kg	44,000	267,000	11,200,000	87,000 JT	440,000 J	No
Butylbenzyl phthalate	µg/kg	831,000	5,040,000	212,000,000	3,700 U	2,800	No
Dibutyl phthalate	µg/kg	16,000	97,000	4,080,000	660 U	3,790 J	No
Diethyl phthalate	µg/kg	1,860,000	11,300,000	475,000,000	1,600 U	2,150 UJ	No

Table 4-31. Comparison of Maximum Mink Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Di-n-octyl phthalate	µg/kg	7,500,000	45,500,000	1,910,000,000	2,100 T	15,400 JT	No
SVOCs							
Benzoic acid	µg/kg	50,000	303,000	12,800,000	9,400 UJ	53,000 U	No
Hexachlorobenzene	µg/kg	26	158	6,640	33 UT	1,200 U	No
Hexachlorobutadiene	µg/kg	2,000	12,100	511,000	33 UT	280 U	No
Hexachloroethane	µg/kg	100,000	606,000	25,500,000	120 U	1,500 J	No
Phenols							
Pentachlorophenol	µg/kg	4,000	24,300	1,020,000	420 U	8,410 J	No
Phenol	µg/kg	60,000	364,000	15,300,000	660 U	2,150 UJ	No
PCBs							
Total PCBs	µg/kg	7.4	44.9	1,890	**25,100 JT**	**30,800 JT**	**Yes**
Dioxins/Furans							
PCB TEQ	pg/g	0.22	1.33	56.2	**111 T**	**239 T**	**Yes**
Dioxin/furan TEQ	pg/g	0.22	1.33	56.2	**51.9 T**	**14,100 T**	**Yes**
Total TEQ	pg/g	0.22	1.33	56.2	**117 T**	**14,100 T**	**Yes**
Pesticides							
Aldrin	µg/kg	830	5,030	212,000	13 UT	691 J	No
cis-Chlordane	µg/kg	180	1,090	45,900	27	203 J	No
trans-Chlordane	µg/kg	180	1,090	45,900	25	445 NJ	No
Total Chlordane	µg/kg	180	1,090	45,900	73 T	700 UT	No
Total DDx	µg/kg	147	891	37,500	**3,100 T**	16,000 NJT	**Yes**
Dieldrin	µg/kg	180	1,090	45,900	24 JT	356 J	No
alpha-Endosulfan	µg/kg	840	5,090	214,000	20 U	99 U	No
beta-Endosulfan	µg/kg	840	5,090	214,000	20 UT	235 NJ	No
Total Endosulfan	µg/kg	840	5,090	214,000	28 JT	270 T	No
Endosulfan sulfate	µg/kg	840	5,090	214,000	20 UT	240 T	No
Endrin	µg/kg	180	1,090	45,900	31 UT	200 U	No
Endrin aldehyde	µg/kg	180	1,090	45,900	20 UT	200 U	No
Endrin ketone	µg/kg	180	1,090	45,900	20 UT	200 U	No
alpha-HCH	µg/kg	6,100	37,000	1,560,000	9.8 U	99 U	No
beta-HCH	µg/kg	5,700	34,600	1,460,000	9.8 U	99 U	No

Table 4-31. Comparison of Maximum Mink Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
delta-HCH	µg/kg	6,100	37,000	1,560,000	9.8 U	99 U	No
gamma-HCH	µg/kg	6,100	37,000	1,560,000	9.8 U	430	No
Heptachlor	µg/kg	1,000	6,060	255,000	13 UT	99 U	No
Heptachlor epoxide	µg/kg	1,000	6,060	255,000	9.8 U	99 U	No
Methoxychlor	µg/kg	17,000	103,000	4,340,000	20 UT	990 U	No
cis-Nonachlor	µg/kg	180	1,090	45,900	17 U	700 U	No
trans-Nonachlor	µg/kg	2,500	15,200	638,000	19 UT	226 NJ	No
Oxychlordane	µg/kg	180	1,090	45,900	32 UT	130 U	No

[a] The maximum concentration is the higher of either the maximum detect or maximum RL.

BEHP – bis(ethylhexyl) phthalate
COI – chemical of interest
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
J – estimated concentration
N – presumptive evidence of a compound
NOAEL – no-observed-adverse-effect level
PAH – polycyclic aromatic hydrocarbon
SVOC – semivolatile organic compound
T – value calculated or selected from multiple results
TRV – toxicity reference value
TSC – threshold sediment concentration
TTC – threshold tissue concentration
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
U – not detected at given concentration

Table 4-32. Comparison of Maximum River Otter Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Metals							
Aluminum	mg/kg	34	344	55,700	211	47,400	**Yes**[b]
Antimony	mg/kg	0.059	0.598	96.7	**5.9 JT**	32.1	**Yes**
Arsenic	mg/kg	1.04	10.5	1,700	1.25	75.6	No
Cadmium	mg/kg	0.77	7.8	1,260	0.218	46.2	No
Chromium	mg/kg	5.66	57.3	9,270	2.77 T	774	No
Copper	mg/kg	5.6	56.7	9,170	20.2 T	2,830	No
Lead	mg/kg	4.7	47.6	7,700	**1,100 JT**	**13,400 T**	**Yes**
Mercury	mg/kg	0.02	0.203	32.8	0.166 JT	**65.2 T**	**Yes**
Nickel	mg/kg	8.43	85.4	13,800	1.37 J	594	No
Selenium	mg/kg	0.143	1.45	234	1.2 T	20	No
Thallium	mg/kg	0.74	7.5	1,210	0.0167	27	No
Zinc	mg/kg	160	1,620	262,000	113 T	2,850	No
Butyltins							
Butyltin ion	µg/kg	400	4,050	655,000	97	740 J	No
Dibutyltin ion	µg/kg	3,800	38,500	6,230,000	560	2,700	No
Tributyltin ion	µg/kg	400	4,050	655,000	680	47,000	No
PAHs							
1-Methylnaphthalene	µg/kg	150,000	1,520,000	246,000,000	67	4,100	No
2-Methylnaphthalene	µg/kg	54,000	547,000	88,500,000	73 UT	53,000	No
Benzo(a)pyrene	µg/kg	2,000	20,300	3,280,000	490	340,000	No
Dibenzothiophene	µg/kg	47,000	476,000	77,000,000	21 JT	11,000	No
Total HPAHs	µg/kg	615	6,230	1,010,000	4,400 T	**4,300,000 T**	**Yes**
Total LPAHs	µg/kg	65,600	665,000	107,000,000	540 T	2,900,000 T	No
Phthalates							
BEHP	µg/kg	44,000	446,000	72,100,000	87,000 JT	440,000 J	No
Butylbenzyl phthalate	µg/kg	831,000	8,420,000	1,360,000,000	660 U	2,800	No
Dibutyl phthalate	µg/kg	16,000	162,000	26,200,000	1,300	3,790 J	No

Table 4-32. Comparison of Maximum River Otter Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Diethyl phthalate	µg/kg	1,860,000	18,800,000	3,050,000,000	1,600 U	2,150 UJ	No
Dimethyl phthalate	µg/kg	44,000	446,000	72,100,000	330 U	2,150 UJ	No
Di-n-octyl phthalate	µg/kg	7,500,000	76,000,000	12,300,000,000	2,100 T	15,400 JT	No
SVOCs							
Benzoic acid	µg/kg	50,000	507,000	81,900,000	9,400 UJ	53,000 U	No
Hexachlorobenzene	µg/kg	26	263	42,600	33 UT	1,200 U	No
Hexachlorobutadiene	µg/kg	2,000	20,300	3,280,000	33 UT	280 U	No
Phenols							
Pentachlorophenol	µg/kg	4,000	40,500	6,550,000	190 UT	8,410 J	No
Phenol	µg/kg	60,000	608,000	98,300,000	2,600 T	2,150 UJ	No
PCBs							
Total PCBs	µg/kg	7.4	75	12,100	**25,100 JT**	**30,800 JT**	**Yes**
Dioxins/Furans							
PCB TEQ	pg/g	0.22	2.23	360	**111 T**	239 T	**Yes**
Dioxin/furan TEQ	pg/g	0.22	2.23	360	**115 T**	**14,100 T**	**Yes**
Total TEQ	pg/g	0.22	2.23	360	**120 T**	**14,100 T**	**Yes**
Pesticides							
Aldrin	µg/kg	830	8,410	1,360,000	13 UT	691 J	No
cis-Chlordane	µg/kg	180	1,820	295,000	20 U	203 J	No
trans-Chlordane	µg/kg	180	1,820	295,000	9.6 U	445 NJ	No
Total Chlordane	µg/kg	180	1,820	295,000	32 UT	700 UT	No
Total DDx	µg/kg	147	1,490	241,000	**3,100 T**	16,000 NJT	**Yes**
Dieldrin	µg/kg	180	1,820	295,000	24 JT	356 J	No
alpha-Endosulfan	µg/kg	840	8,510	1,380,000	20 U	99 U	No
beta-Endosulfan	µg/kg	840	8,510	1,380,000	20 UT	235 NJ	No
Endosulfan sulfate	µg/kg	840	8,510	1,380,000	20 UT	240 T	No
Total Endosulfan	µg/kg	840	8,510	1,380,000	28 JT	270 T	No
Endrin	µg/kg	180	1,820	295,000	31 UT	200 U	No
Endrin aldehyde	µg/kg	180	1,820	295,000	20 UT	200 U	No

Table 4-32. Comparison of Maximum River Otter Prey Tissue and Sediment Concentrations to Threshold Concentrations

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Concentrationa		Maximum Concentration > TTC or TSC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Endrin ketone	µg/kg	180	1,820	295,000	20 UT	200 U	No
alpha-HCH	µg/kg	6,100	61,800	9,990,000	9.6 U	99 U	No
beta-HCH	µg/kg	5,700	57,800	9,340,000	9.6 U	99 U	No
delta-HCH	µg/kg	6,100	61,800	9,990,000	9.6 U	99 U	No
gamma-HCH	µg/kg	6,100	61,800	9,990,000	9.6 UT	430	No
Heptachlor	µg/kg	1,000	10,100	1,640,000	13 UT	99 U	No
Heptachlor epoxide	µg/kg	1,000	10,100	1,640,000	9.6 U	99 U	No
Methoxychlor	µg/kg	17,000	172,000	27,900,000	20 UT	990 U	No
cis-Nonachlor	µg/kg	180	1,820	295,000	17 U	700 U	No
trans-Nonachlor	µg/kg	2,500	25,300	4,100,000	11 UT	226 NJ	No
Oxychlordane	µg/kg	180	1,820	295,000	32 UT	130 U	No

[a] The maximum concentration is the higher of either the maximum detect or maximum RL.

[b] Retained as a COPC because the sum of tissue and sediment concentration exceedances compared to TTCs and TSCs is greater than 1.0

BEHP – bis(ethylhexyl) phthalate
COI – chemical of interest
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
J – estimated concentration
N – presumptive evidence of a compound
NOAEL – no-observed-adverse-effect level
PAH – polycyclic aromatic hydrocarbon
SVOC – semivolatile organic compound
T – value calculated or selected from multiple results
TRV – toxicity reference value
TSC – threshold sediment concentration
TTC – threshold tissue concentration
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
U – not detected at given concentration

Table 4-33. Results of Refined Dietary Screen for Spotted Sandpiper

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration TTC (ww)	Threshold Concentration TSC (dw)	Maximum Detection Tissue (ww)	Maximum Detection Sediment (dw)	BERA COPC?
Metals							
Aluminum	mg/kg	157	134	4,920	**539**	**47,400**	**Yes**
Arsenic	mg/kg	2.24	1.91	70.2	**3.04**	**75.6**	**Yes**
Cadmium	mg/kg	1.47	1.26	46.1	0.254	**46.2**	**Yes**
Chromium	mg/kg	2.66	2.27	83.3	1.05 T	**774**	**Yes**
Copper	mg/kg	4.05	3.46	127	**20.2 T**	**2,830**	**Yes**
Lead	mg/kg	1.63	1.39	51.1	0.847 T	**13,400 T**	**Yes**
Mercury	mg/kg	0.0064	0.00547	0.201	**0.0263 J**	**65.2 T**	**Yes**
Selenium	mg/kg	0.29	0.248	9.09	**0.37**	**20**	**Yes**
Thallium	mg/kg	0.48	0.41	15	0.002 J	**27**	**Yes**
Zinc	mg/kg	66.1	56.5	2,070	54	**2,850**	**Yes**
PAHs							
Benzo(a)pyrene	µg/kg	280	239	8,770	**3,000**	**340,000**	**Yes**
Total HPAHs	µg/kg	40,000	34,200	1,250,000	**45,000 T**	**4,300,000 T**	**Yes**
Total LPAHs	µg/kg	40,000	34,200	1,250,000	3,800 T	**2,900,000 T**	**Yes**
Total PAHs	µg/kg	40,000	34,200	1,250,000	**48,000 T**	**7,300,000 T**	**Yes**
Phthalates							
BEHP	µg/kg	1,100	940	34,500	**8,600**	**440,000 J**	**Yes**
Dibutyl phthalate	µg/kg	110	94	3,450	**1,300**	**3,790 J**	**Yes**
PCBs							
Total PCBs	µg/kg	290	248	9,090	**9,900 JT**	**30,800 JT**	**Yes**
Dioxins/Furans							
Dioxin/furan TEQ	pg/g	14	12	439	**2,500 T**	**35,300 T**	**Yes**
PCB TEQ	pg/g	14	12	439	**1,890 T**	**5,610 T**	**Yes**
Total TEQ	pg/g	14	12	439	**3,370 T**	**35,400 T**	**Yes**
Pesticides							
Aldrin	µg/kg	8	6.84	251	**110**	**691 J**	**Yes**
Sum DDE	µg/kg	32	27.3	1,000	**495 T**	**2,530 NJT**	**Yes**
Total DDx	µg/kg	227	194	7,110	**3,110 T**	**16,000 NJT**	**Yes**

BEHP –bis(ethylhexyl) phthalate
BERA – baseline ecological risk assessment
COI – chemical of interest
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
NOAEL – no-observed-adverse-effect level
PAH – polycyclic aromatic hydrocarbon
T – value calculated or selected from multiple results
TRV – toxicity reference value
TSC – threshold sediment concentration
TTC – threshold tissue concentration

J – estimated concentration

N – presumptive evidence of a compound

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

Table 4-34. Results of Refined Dietary Screen for Hooded Merganser

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration		Maximum Detection		BERA COPC?
			TTC (ww)	TSC (dw)	Tissue (ww)	Sediment (dw)	
Metal							
Aluminum	mg/kg	157	424	77,100	203	47,400	**Yes**
Copper	mg/kg	4.05	10.9	1,990	**20.2 T**	**2,830**	**Yes**
Lead	mg/kg	1.63	4.4	800	**1,100 JT**	**13,400 T**	**Yes**
Mercury	mg/kg	0.0064	0.0173	3.14	**0.166 JT**	**65.2 T**	**Yes**
Selenium	mg/kg	0.29	0.783	142	**1.2 T**	20	**Yes**
PAHs							
Benzo(a)pyrene	µg/kg	280	756	137,000	490	**340,000**	**Yes**
Phthalates							
BEHP	µg/kg	1,100	2,970	540,000	**87,000 JT**	440,000 J	**Yes**
Dibutyl phthalate	µg/kg	110	297	54,000	**1,300**	3,790 J	**Yes**
PCBs							
Total PCBs	µg/kg	290	783	142,000	**8,770 JT**	30,800 JT	**Yes**
Dioxins/Furans							
Dioxin/furans TEQ	pg/g	14	37.8	6,870	**234 T**	**35,300 T**	**Yes**
PCB TEQ	pg/g	14	37.8	6,870	**196 T**	5,610 T	**Yes**
Total TEQ	pg/g	14	37.8	6,870	**304 T**	**35,400 T**	**Yes**
Pesticides							
Sum DDE	µg/kg	32	86.4	15,700	**660 T**	2,530 NJT	**Yes**
Total DDx	µg/kg	227	613	111,000	**3,100 T**	16,000 NJT	**Yes**

BEHP –bis(ethylhexyl) phthalate

BERA – baseline ecological risk assessment

COI – chemical of interest

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

J – estimated concentration

N – presumptive evidence of a compound

NOAEL – no-observed-adverse-effect level

PAH – polycyclic aromatic hydrocarbon

T – value calculated or selected from multiple results

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

TRV – toxicity reference value

TSC – threshold sediment concentration

TTC – threshold tissue concentration

Table 4-35. Results of Refined Dietary Screen for Bald Eagle

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration TTC (ww)	Threshold Concentration TSC (dw)	Maximum Detection Tissue (ww)	Maximum Detection Sediment (dw)	BERA COPC?
Metals							
Aluminum	mg/kg	157	424	77,100	203	47,400	**Yes**[a]
Lead	mg/kg	1.63	13.6	2,620	10.6	**13,400 T**	**Yes**
Mercury	mg/kg	0.0064	0.0533	10.3	**0.494**	**65.2 T**	**Yes**
Phthalates							
BEHP	µg/kg	1,100	9,170	1,770,000	**87,000 JT**	440,000 J	**Yes**
PCBs							
Total PCBs	µg/kg	290	2,420	466,000	**25,100 JT**	30,800 JT	**Yes**
Dioxins/Furans							
Dioxin/furans TEQ	pg/g	14	117	22,500	**232 T**	**35,300 T**	**Yes**
PCB TEQ	pg/g	14	117	22,500	**196 T**	5,610 T	**Yes**
Total TEQ	pg/g	14	117	22,500	**262 T**	**35,400 T**	**Yes**
Pesticides							
Sum DDE	µg/kg	32	267	51,400	**600 T**	2,530 NJT	**Yes**

[a] Retained as a COPC because the sum of tissue and sediment concentration exceedances compared to TTCs and TSCs is greater than 1.0

BEHP –bis(ethylhexyl) phthalate
BERA – baseline ecological risk assessment
COI – chemical of interest
COPC – chemical of potential concern
DDE – dichlorodiphenyldichloroethylene
J – estimated concentration
N – presumptive evidence of a compound
NOAEL – no-observed-adverse-effect level
PAH – polycyclic aromatic hydrocarbon
T – value calculated or selected from multiple results
TRV – toxicity reference value
TSC – threshold sediment concentration
TTC – threshold tissue concentration

Table 4-36. Results of Refined Dietary Screen for Osprey

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration TTC (ww)	Threshold Concentration TSC (dw)	Maximum Detection Tissue (ww)	Maximum Detection Sediment (dw)	BERA COPC?
Metals							
Lead	mg/kg	1.63	7.74	1,470	**1,100 JT**	**13,400 T**	**Yes**
Mercury	mg/kg	0.0064	0.0304	5.79	**0.494**	**65.2 T**	**Yes**
PAHs							
Benzo(a)pyrene	µg/kg	280	1,330	253,000	1.3 T	**340,000**	**Yes**
Phthalates							
BEHP	µg/kg	1,100	5,230	995,000	**87,000 JT**	440,000 J	**Yes**
Dibutyl phthalate	µg/kg	110	523	99,500	37 T	3,790 J	No
PCBs							
Total PCBs	µg/kg	290	1,380	262,000	**25,100 JT**	30,800 JT	**Yes**
Dioxins/Furans							
Dioxin/furans TEQ	pg/g	14	66.5	12,700	**232 T**	**35,300 T**	**Yes**
PCB TEQ	pg/g	14	66.5	12,700	**196 T**	5,610 T	**Yes**
Total TEQ	pg/g	14	66.5	12,700	**262 T**	**35,400 T**	**Yes**
Pesticides							
Sum DDE	µg/kg	32	152	29,000	**600 T**	2,530 NJT	**Yes**
Total DDx	µg/kg	227	1,080	205,000	**1,460 T**	16,000 NJT	**Yes**

BEHP –bis(ethylhexyl) phthalate
BERA – baseline ecological risk assessment
COI – chemical of interest
COPC – chemical of potential concern
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
J – estimated concentration
N – presumptive evidence of a compound
NOAEL – no-observed-adverse-effect level
PAH – polycyclic aromatic hydrocarbon
T – value calculated or selected from multiple results
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
TRV – toxicity reference value
TSC – threshold sediment concentration
TTC – threshold tissue concentration

Table 4-37. Results of Refined Dietary Screen for Mink

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration TTC (ww)	Threshold Concentration TSC (dw)	Maximum Detection Tissue (ww)	Maximum Detection Sediment (dw)	BERA COPC?
Metals							
Aluminum	mg/kg	34	206	8,680	203	**47,400**	**Yes**
Antimony	mg/kg	0.059	0.358	15.1	**5.9 JT**	**32.1**	**Yes**
Copper	mg/kg	5.6	34	1,430	20.2 T	**2,830**	**Yes**
Lead	mg/kg	4.7	28.5	1,200	**1,100 JT**	**13,400 T**	**Yes**
Mercury	mg/kg	0.02	0.121	5.11	**0.494**	**65.2 T**	**Yes**
Selenium	mg/kg	0.143	0.867	36.5	**1.2 T**	20	**Yes**
PAHs							
Total HPAHs	µg/kg	615	3,730	157,000	520 JT	**4,300,000 T**	**Yes**
PCBs							
Total PCBs	µg/kg	7.4	44.9	1,890	**25,100 JT**	**30,800 JT**	**Yes**
Dioxins/Furans							
Dioxin/furan TEQ	pg/g	0.22	1.33	56.2	**51.9 T**	**14,100 T**	**Yes**
PCB TEQ	pg/g	0.22	1.33	56.2	**111 T**	**239 T**	**Yes**
Total TEQ	pg/g	0.22	1.33	56.2	**117 T**	**14,100 T**	**Yes**
Pesticides							
Total DDx	µg/kg	147	891	37,500	**3,100 T**	16,000 NJT	**Yes**

BEHP –bis(ethylhexyl) phthalate
BERA – baseline ecological risk assessment
COI – chemical of interest
COPC – chemical of potential concern
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
HPAH – high-molecular-weight polycyclic aromatic hydrocarbon
J – estimated concentration
N – presumptive evidence of a compound
NOAEL – no-observed-adverse-effect level
T – value calculated or selected from multiple results
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
TRV – toxicity reference value
TSC – threshold sediment concentration
TTC – threshold tissue concentration

Table 4-38. Results of Refined Dietary Screen for River Otter

COI	Unit	NOAEL TRV (kg/day)	Threshold Concentration TTC (ww)	Threshold Concentration TSC (dw)	Maximum Detect Tissue (ww)	Maximum Detect Sediment (dw)	BERA COPC?
Metals							
Aluminum	mg/kg	34	344	55,700	211	47,400	**Yes**[a]
Antimony	mg/kg	0.059	0.598	96.7	**5.9 JT**	32.1	**Yes**
Lead	mg/kg	4.7	47.6	7,700	**1,100 JT**	**13,400 T**	**Yes**
Mercury	mg/kg	0.02	0.203	32.8	0.166 JT	**65.2 T**	**Yes**
PAHs							
Total HPAHs	µg/kg	615	6,230	1,010,000	4,400 T	**4,300,000 T**	**Yes**
PCBs							
Total PCBs	µg/kg	7.4	75	12,100	**25,100 JT**	**30,800 JT**	**Yes**
Dioxins/Furans							
Dioxin/furan TEQ	pg/g	0.22	2.23	360	**115 T**	**14,100 T**	**Yes**
PCB TEQ	pg/g	0.22	2.23	360	**111 T**	239 T	**Yes**
Total TEQ	pg/g	0.22	2.23	360	**120 T**	**14,100 T**	**Yes**
Pesticides							
Total DDx	µg/kg	147	1,490	241,000	**3,100 T**	16,000 NJT	**Yes**

[a] Retained as a COPC because the sum of tissue and sediment concentration exceedances compared to TTCs and TSCs is > 1.0.

COI – chemical of interest
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
J – estimated concentration
NOAEL – no-observed-adverse-effect level
PAH – polycyclic aromatic hydrocarbon
T – value calculated or selected from multiple results
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
TRV – toxicity reference value
TSC – threshold sediment concentration
TTC – threshold tissue concentration

Table 4-39. Wildlife Dietary COPCs

	Birds				Mammals	
COPC	**Spotted sandpiper**	**Hooded merganser**	**Bald Eagle**	**Osprey**	**Mink**	**River Otter**
Metals						
Aluminum	X	X			X	X
Antimony					X	X
Arsenic	X					
Cadmium	X					
Chromium	X					
Copper	X	X			X	
Lead	X	X	X	X	X	X
Mercury	X	X	X	X	X	X
Selenium	X				X	
Thallium	X					
Zinc	X					
PAHs						
Benzo(a)pyrene[a]	X	X		X		
Total HPAHs	X				X	X
Total LPAHs	X					
Total PAHs	X					
Phthalates						
BEHP	X	X	X	X		
Dibutyl phthalate	X	X				
PCBs						
Total PCBs	X	X	X	X	X	X
PCB TEQ	X	X	X	X	X	X
Dioxins/Furans						
Dioxin/furan TEQ	X	X	X	X	X	X
Total TEQ	X	X	X	X	X	X
Pesticides						
Aldrin	X					
Sum DDE	X	X	X	X		
Total DDx	X	X		X	X	X

[a] Individual PAHs (other than benzo[a]pyrene) will not be assessed in the BERA because the TRV for benzo(a)pyrene was used to screen these chemicals. The use of benzo(a)pyrene as a surrogate is not acceptable for use in the BERA.

COI – chemical of interest

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

T – value calculated or selected from multiple results

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

TRV – toxicity reference value

J – estimated concentration
NOAEL – no-observed-adverse-effect level
PAH – polycyclic aromatic hydrocarbon
TSC – threshold sediment concentration
TTC – threshold tissue concentration

Table 4-40. Bird Egg Screening-Level Thresholds

COI	Unit (ww)	Egg-Residue Threshold	Test Species	Source
Metals				
Mercury	mg/kg	0.50	bald eagle	Wiemeyer et al. (1984)
PCBs				
Total PCBs	µg/kg	410	chicken	Scott et al. (1975)
Dioxins/Furans				
Dioxin/furan TEQ	ng/kg	7.42	chicken	Henshel et al. (1993)
PCB TEQ	ng/kg	7.42	chicken	Henshel et al. (1993)
Total TEQ	ng/kg	7.42	chicken	Henshel et al. (1993)
Pesticides				
4,4′-DDE	µg/kg	1,300	bald eagle	Wiemeyer et al. (1984)

COI – chemical of interest
DDE – dichlorodiphenyldichloroethylene
PCB – polychlorinated biphyenyl
TEQ – toxicity equivalent
ww – wet weight

Table 4-41. Selected BMFs Used to Estimate Bird Egg Tissue Residues

COI	BMF	Bird Species	Location	Source
Metals				
Mercury	3.0	bald eagle	Lower Columbia River	Buck (2004)
PCBs				
Total PCBs	8.4	osprey	Willamette River	Henny et al. (2008)
Dioxins/Furans				
Dioxin/furan TEQ	10[a]	osprey	Willamette River	Henny et al. (2003)
PCB TEQ	10[a]	osprey	Willamette River	Henny et al. (2003)
Total TEQ	10[a]	osprey	Willamette River	Henny et al. (2003)
Pesticides				
4,4′-DDE	79	osprey	Willamette River	Henny et al. (2008)

[a] BMF based on 2,3,7,8-TCDD.

BMF – biomagnification factor
COI – chemical of interest
DDE – dichlorodiphenyldichloroethylene
PCB – polychlorinated biphenyl
TEQ – toxic equivalent
TCDD – tetrachlorodibenzo-*p*-dioxin

Table 4-42. Comparison of Maximum Bald Eagle and Osprey Prey Tissue Concentration to Bird Egg Threshold Concentrations

COI	Unit (ww)	NOAEL TRV	BMF	TTC	Maximum Prey Tissue Concentration[a]	Maximum Concentration > TTC?
Metals						
Mercury	mg/kg	0.50	3.0	0.17	**0.494**	**Yes**
PCBs						
Total PCBs	µg/kg	410	8.3	49.4	**25,100 JT**	**Yes**
Dioxins/Furans						
Dioxin/furan TEQ	ng/kg	7.42	10	0.742	**232 T**	**Yes**
PCB TEQ	ng/kg	7.42	10	0.742	**196 T**	**Yes**
Total TEQ	ng/kg	7.42	10	0.742	**262 T**	**Yes**
Pesticides						
4,4′-DDE	µg/kg	1,300	79	16.5	**545 T**	**Yes**

BMF – biomagnification factor
COI – chemical of interest
DDE – dichlorodiphenyldichloroethylene
J – estimated concentration
PCB – polychlorinated biphenyl
T – value calculated or selected from multiple results
TEQ – toxic equivalent
TRV – toxicity reference value
TTC – threshold tissue concentration
ww – wet weight

Table 4-43. Results of Refined Bird Egg Screen

COI	Unit (ww)	NOAEL TRV	BMF	TTC	Maximum Detected Prey Tissue[a]	BERA COPC?
Metals						
Mercury	mg/kg	0.50	3.0	0.17	**0.494**	**Yes**
PCBs						
Total PCBs	µg/kg	410	8.3	49.4	**25,100 JT**	**Yes**
Dioxins/Furans						
Dioxin/furan TEQ	ng/kg	7.42	10	0.742	**232 T**	**Yes**
PCB TEQ	ng/kg	7.42	10	0.742	**196 T**	**Yes**
Total TEQ	ng/kg	7.42	10	0.742	**262 T**	**Yes**
Pesticides						
4,4′-DDE	µg/kg	1,300	79	16.5	**545 T**	**Yes**

BERA – baseline ecological risk assessment
BMF – biomagnification factor
COI – chemical of interest
DDE – dichlorodiphenyldichloroethylene
J – estimated concentration
NOAEL – no-observed-adverse-effect level
PCB – polychlorinated biphenyl
T – value calculated or selected from multiple results
TEQ – toxic equivalent
TRV – toxicity reference value
TTC – threshold tissue concentration
ww – wet weight

Table 5-1. Surface Water COIs

COI	
Metals	
Aluminum	Lead
Antimony	Mercury
Arsenic	Nickel
Cadmium	Selenium
Chromium	Silver
Chromium (hexavalent)	Thallium
Copper	Zinc
Butyltins	
Butyltin ion	Tributyltin ion
Dibutyltin ion	
PAHs	
2-Methylnaphthalene	Benzo(k)fluoranthene
Acenaphthene	Chrysene
Acenaphthylene	Dibenzo(a,h)anthracene
Anthracene	Fluoranthene
Benzo(a)anthracene	Fluorene
Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene
Benzo(b)fluoranthene	Naphthalene
Benzo(g,h,i)perylene	Phenanthrene
Phthalates	
Bis (2-ethylhexly) phthalate	Diethyl phthalate
Butylbenzyl phthalate	Dimethyl phthalate
Dibutyl phthalate	Di-n-octyl phthalate
SVOCs	
1,4-Dichlorobenzene	Dibenzofuran
4-Chloroaniline	Hexachlorobenzene
Aniline	Hexachlorobutadiene
Benzoic acid	Isophorone
Carbazole	
Phenols	
4-Chloro-3-methylphenol	Phenol
PCBs	
Aroclor 1248	Aroclor 1260
Aroclor 1254	Total PCBs
Dioxins/Furans	
1,2,3,4,6,7,8-Heptachlorodibenzofuran	1,2,3,7,8,9-Hexachlorodibenzo-*p*-dioxin

Table 5-1. Surface Water COIs

COI	
1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin	1,2,3,7,8-Pentachlorodibenzofuran
1,2,3,4,7,8,9-Heptachlorodibenzofuran	1,2,3,7,8-Pentachlorodibenzo-*p*-dioxin
1,2,3,4,7,8-Hexachlorodibenzofuran	2,3,4,6,7,8-Hexachlorodibenzofuran
1,2,3,4,7,8-Hexachlorodibenzo-*p*-dioxin	2,3,4,7,8-Pentachlorodibenzofuran
1,2,3,6,7,8-Hexachlorodibenzofuran	2,3,7,8-Tetrachlorodibenzofuran
1,2,3,6,7,8-Hexachlorodibenzo-*p*-dioxin	2,3,7,8-Tetrachlorodibenzo-*p*-dioxin
1,2,3,7,8,9-Hexachlorodibenzofuran	
Pesticides	
2,4′-DDD	Endosulfan sulfate
4,4′-DDD	Endrin
2,4′-DDE	Endrin aldehyde
4,4′-DDE	Endrin ketone
2,4′-DDT	alpha-Hexachlorocylohexane
4,4′-DDT	beta-Hexachlorocylohexane
Total DDx	delta-Hexachlorocyclohexane
Aldrin	gamma-Hexachlorocyclohexane
cis-Chlordane	Heptachlor
trans-Chlordane	Heptachlor epoxide
Total chlordane	Methoxychlor
Dieldrin	cis-Nonachlor
alpha-Endosulfan	trans-Nonachlor
beta-Endosulfan	Oxychlordane
Herbicides	
2,4-D	Dalapon
2,4-DB	MCPP
VOCs	
1,1-Dichloroethene	Ethylbenzene
1,2,4-Trimethylbenzene	Toluene
1,3,5-Trimethylbenzene	m,p,-Xylene
Benzene	o-Xylene
Sec-butylbenzene	Total xylenes
cis-1,2-Dichloroethene	Trichloroethene
trans-1,2-Dichloroethene	Vinyl chloride
Other chemicals	
Perchlorate	

COI – chemical of interest

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane
PCB – polychlorinated biphenyl
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
SVOC – semivolatile organic compound
VOC – volatile organic compound

Table 5-2. Water TRVs for Surface Water COIs

COI[a]	Unit	Chronic TRV	Source
Metals			
Aluminum	µg/L	87[a]	AWQC
Antimony	µg/L	30[a]	Tier II
Arsenic	µg/L	150[b]	AWQC
Cadmium	µg/L	0.09[b]	AWQC
Chromium	µg/L	23.8[b]	AWQC
Chromium (hexavalent)	µg/L	11[c]	AWQC
Copper	µg/L	2.74[b]	AWQC
Lead	µg/L	0.54[b]	AWQC
Mercury	µg/L	0.77[b]	AWQC
Nickel	µg/L	16.1[b]	AWQC
Selenium	µg/L	5[a]	AWQC
Silver	µg/L	0.1[b]	ODEQ
Thallium	µg/L	40[a]	ODEQ
Zinc	µg/L	36.5[b]	AWQC
Butyltins			
Butyltin ion	µg/L	0.072	AWQC
Dibutyltin ion	µg/L	0.072	AWQC
Tributyltin ion	µg/L	0.072	AWQC
PAHs			
2-Methylnaphthalene	µg/L	2.1	Tier II
Acenaphthene	µg/L	23	Tier II
Acenaphthylene	µg/L	306.9	EPA (2003)[d]
Anthracene	µg/L	0.73	Tier II
Benzo(a)anthracene	µg/L	0.027	Tier II
Benzo(a)pyrene	µg/L	0.014	Tier II
Benzo(b)fluoranthene	µg/L	0.6774	EPA (2003)[d]
Benzo(g,h,i)perylene	µg/L	0.4391	EPA (2003)[d]
Benzo(k)fluoranthene	µg/L	0.6415	EPA (2003)[d]
Chrysene	µg/L	2.042	EPA (2003)[d]

Table 5-2. Water TRVs for Surface Water COIs

COI[a]	Unit	Chronic TRV	Source
Dibenzo(a,h)anthracene	µg/L	0.2825	EPA (2003)[d]
Fluoranthene	µg/L	6.16	Tier II
Fluorene	µg/L	3.9	Tier II
Indeno(1,2,3-cd)pyrene	µg/L	0.275	EPA (2003)[d]
Naphthalene	µg/L	12	Tier II
Phenanthrene	µg/L	6.3	Tier II
Pyrene	µg/L	10.11	EPA (2003)[d]
Phthalates			
Bis(2-ethylhexyl) phthalate	µg/L	3	Tier II
Butylbenzyl phthalate	µg/L	3[e]	Tier II
Dibutyl phthalate	µg/L	3[e]	Tier II
Diethyl phthalate	µg/L	3[e]	Tier II
Dimethyl phthalate	µg/L	3[e]	Tier II
Di-n-octyl phthalate	µg/L	3[e]	Tier II
VOCs			
1,1-Dichloroethene	µg/L	25	Tier II
1,2,4-Trimethylbenzene	µg/L	7.3[f]	Tier II
1,3,5-Trimethylbenzene	µg/L	7.3[f]	Tier II
Benzene	µg/L	130	Tier II
Sec-butylbenzene	µg/L	7.3[f]	Tier II
cis-1,2-Dichloroethene	µg/L	590	Tier II
trans-1,2-Dichloroethene	µg/L	590	Tier II
Ethylbenzene	µg/L	7.3	Tier II
Trichloroethene	µg/L	47	Tier II
Toluene	µg/L	9.8	Tier II
Vinyl chloride	µg/L	23,400[h]	Brown et al. (1977)
m,p-Xylene	µg/L	66.67	EPA (2006c)
o-Xylene	µg/L	13[g]	Tier II
Total Xylenes	µg/L	13	Tier II
SVOCs			
1,4-Dichlorobenzene	µg/L	15	Tier II
Benzoic acid	µg/L	42	Tier II
Carbazole	µg/L	112[h]	Brooke (1991)
Dibenzofuran	µg/L	3.7	Tier II
Hexachlorobenzene	µg/L	3.68	MacDonald Environmental (1999)

Table 5-2. Water TRVs for Surface Water COIs

COI[a]	Unit	Chronic TRV	Source
Hexachlorobutadiene	µg/L	9.3	ODEQ
Isophorone	µg/L	130	MacDonald Environmental (1999)
Phenols			
4-Chloro-3-methylphenol[j]	µg/L	1.8	MacDonald Environmental (1999)
Phenol	µg/L	110	Tier II
PCBs			
Aroclor 1248	µg/L	0.081	Tier II
Aroclor 1254	µg/L	0.033	Tier II
Aroclor 1260	µg/L	94	Tier II
Total PCBs	µg/L	0.014	Tier II
Dioxins and Furans			
2,3,7,8-TCDD	pg/L	100	EPA (1984)
Pesticides			
2,4′-DDD	µg/L	0.001[i]	EPA (2006d)
2,4′-DDE	µg/L	0.001[i]	EPA (2006d)
2,4′-DDT	µg/L	0.001[i]	EPA (2006d)
4,4′-DDD	µg/L	0.001[i]	EPA (2006d)
4,4′-DDE	µg/L	0.001[i]	EPA (2006d)
4,4′-DDT	µg/L	0.001	EPA (2006d)
Total DDx	µg/L	0.001[i]	EPA (2006d)
Aldrin	µg/L	0.3	MacDonald Environmental (1999)
cis-Chlordane	µg/L	0.0043[j]	EPA (2006d)
trans-Chlordane	µg/L	0.0043[j]	EPA (2006d)
Total Chlordane	µg/L	0.0043	EPA (2006d)
Dieldrin	µg/L	0.056	AWQC
alpha-Endosulfan	µg/L	0.056	AWQC
beta-Endosulfan	µg/L	0.056	AWQC
Endosulfan sulfate	µg/L	0.056	AWQC
Endrin	µg/L	0.036	AWQC
Endrin aldehyde	µg/L	0.036[k]	AWQC
Endrin ketone	µg/L	0.036[k]	AWQC
alpha-HCH	µg/L	0.08[j]	ODEQ
beta-HCH	µg/L	0.08[j]	ODEQ
delta-HCH	µg/L	0.08[j]	ODEQ

Table 5-2. Water TRVs for Surface Water COIs

COI[a]	Unit	Chronic TRV	Source
gamma-HCH	µg/L	0.08	ODEQ
Heptachlor	µg/L	0.0038	EPA (2006d)
Heptachlor epoxide	µg/L	0.0038	EPA (2006d)
Methoxychlor	µg/L	0.03	AWQC
Oxychlordane	µg/L	0.0043[j]	EPA (2006d)
cis-Nonachlor	µg/L	0.0043[j]	EPA (2006d)
trans-Nonachlor	µg/L	0.0043[j]	EPA (2006d)
Herbicides			
2,4-D	µg/L	4	MacDonald Environmental (1999)
Dalapon	µg/L	1,325[h]	EPA (2008c)
Other chemicals			
Perchlorate	µg/L	9,300	Dean et al. (2004) per EPA (2008c)

[a] TRV based on total criteria; TRV was compared to total concentration.

[b] TRV based on dissolved criteria; TRV was compared to dissolved concentration.

[c] TRV based on dissolved criteria; however, TRV was compared to total hexavalent chromium concentration because no dissolved concentrations were available.

[c] TRV based on PAH mixtures.

[d] Chronic TRV based on criteria for bis(2-ethylhexyl) phthalate.

[e] Chronic TRV based on criteria for ethylbenzene.

[f] Chronic TRV based on criteria for xylene.

[g] An acute to chronic ratio of 8.3 was used to calculate a chronic screening value from an acute screening value when no chronic data were available per agreement with EPA (EPA 2008b).

[h] Chronic TRV based on criteria for 4,4′-DDT.

[i] Chronic TRV based on criteria for gamma-hexachlorocyclohexane.

[j] Chronic TRV based on criteria for chlordane.

[k] Chronic TRV based on criteria for endrin.

COI chemical of interest

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

TRV – ecological screening level

HCH – hexachlorocyclohexane

PAH – polycyclic aromatic hydrocarbon

PCB – polychlorinated biphenyl

SVOC – semivolatile organic compound

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

VOC – volatile organic compound

Table 5-3. Surface Water COIs With No Chronic TRVs

COIs	
SVOCs	
4-Chloroaniline	Aniline
Herbicides	
2,4-DB	MCPP
Dioxins/Furans	
1,2,3,4,6,7,8-Heptachlorodibenzofuran	1,2,3,7,8,9-Hexachlorodibenzofuran
1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin	1,2,3,7,8,9-Hexachlorodibenzo-*p*-dioxin
1,2,3,4,7,8,9-Heptachlorodibenzofuran	1,2,3,7,8-Pentachlorodibenzofuran
1,2,3,4,7,8-Hexachlorodibenzofuran	1,2,3,7,8-Pentachlorodibenzo-*p*-dioxin
1,2,3,4,7,8-Hexachlorodibenzo-*p*-dioxin	2,3,4,6,7,8-Hexachlorodibenzofuran
1,2,3,6,7,8-Hexachlorodibenzofuran	2,3,4,7,8-Pentachlorodibenzofuran
1,2,3,6,7,8-Hexachlorodibenzo-*p*-dioxin	2,3,7,8-Tetrachlorodibenzofuran

COI – chemical of interest
TRV – ecological screening level
MCPP – methylchlorophenoxypropionic acid
SVOC – semivolatile organic compound

Table 5-4. Comparison of Maximum Surface Water Concentrations to Chronic TRVs

COI	Unit	Maximum Concentration[a]	Chronic TRV	Max COI > TRV?
Metals				
Aluminum	µg/L	**1,860**	87	**Yes**
Antimony	µg/L	0.125 T	30	No
Arsenic	µg/L	0.64	150	No
Cadmium	µg/L	0.05	0.09	No
Chromium	µg/L	0.8	23.8	No
Chromium (hexavalent)	µg/L	1.1 JT	11	No
Copper	µg/L	2.39 J	2.74	No
Lead	µg/L	0.179	0.54	No
Mercury	µg/L	0.08 U	0.77	No
Nickel	µg/L	1.58	16.1	No
Selenium	µg/L	0.9 J	5	No
Silver	µg/L	0.072 U	0.1	No
Thallium	µg/L	0.032 JT	40	No
Zinc	µg/L	**41.9**	36.5	**Yes**
Butyltins				
Butyltin ion	µg/L	**0.085**	0.072	**Yes**
Dibutyltin ion	µg/L	0.054 U	0.072	No
Tributyltin ion	µg/L	0.014 U	0.072	No
PAHs				
2-Methylnaphthalene	µg/L	0.62	2.1	No
Acenaphthene	µg/L	0.21	23	No
Acenaphthylene	µg/L	0.043	306.9	No
Anthracene	µg/L	0.48	0.73	No
Benzo(a)anthracene	µg/L	**0.27**	0.027	**Yes**
Benzo(a)pyrene	µg/L	**0.19**	0.014	**Yes**
Benzo(b)fluoranthene	µg/L	0.13	0.6774	No
Benzo(b+j)fluoranthene	µg/L		0.6415	No
Benzo(g,h,i)perylene	µg/L	0.14	0.4391	No
Benzo(k)fluoranthene	µg/L	0.13	0.6415	No
Chrysene	µg/L	0.37	2.042	No
Dibenzo(a,h)anthracene	µg/L	0.024	0.2825	No
Fluoranthene	µg/L	0.81	6.16	No
Fluorene	µg/L	0.31	3.9	No

Table 5-4. Comparison of Maximum Surface Water Concentrations to Chronic TRVs

COI	Unit	Maximum Concentration[a]	Chronic TRV	Max COI > TRV?
Indeno(1,2,3-cd)pyrene	µg/L	0.12	0.275	No
Naphthalene	µg/L	**605**	12	**Yes**
Phenanthrene	µg/L	2.2	6.3	No
Pyrene	µg/L	1.3	10.11	No
Phthalates				
Bis(2-ethylhexyl) phthalate	µg/L	**6.8 J**	3	**Yes**
Butylbenzyl phthalate	µg/L	0.32	3	No
Dibutyl phthalate	µg/L	0.32 UJ	3	No
Diethyl phthalate	µg/L	0.26 J	3	No
Dimethyl phthalate	µg/L	0.015 U	3	No
Di-n-octyl phthalate	µg/L	0.036 U	3	No
VOCs				
1,1-Dichloroethene	µg/L	0.51	25	No
1,2,4-Trimethylbenzene	µg/L	2.92	7.3	No
1,3,5-Trimethylbenzene	µg/L	0.44	7.3	No
Benzene	µg/L	31.4	130	No
Sec-butylbenzene	µg/L	0.55	7.3	No
cis-1,2-Dichloroethene	µg/L	279	590	No
trans-1,2-Dichloroethene	µg/L	1.46	590	No
Ethylbenzene	µg/L	**11.4**	7.3	**Yes**
Trichloroethene	µg/L	**194**	47	**Yes**
Toluene	µg/L	4.12	9.8	No
Vinyl chloride	µg/L	73.2	23,400	No
m,p-Xylene	µg/L	3.93	66.67	No
o-Xylene	µg/L	1.97	13	No
Total Xylenes	µg/L	5.90 T	13	No
SVOCs				
1,4-Dichlorobenzene	µg/L	0.3 U	15	No
Benzoic acid	µg/L	3.1 J	42	No
Carbazole	µg/L	0.16 J	112	No
Dibenzofuran	µg/L	0.046	3.7	No
Hexachlorobenzene	µg/L	0.017 U	3.68	No
Hexachlorobutadiene	µg/L	1 U	9.3	No
Isophorone	µg/L	0.018 J	130	No
Phenols				

Table 5-4. Comparison of Maximum Surface Water Concentrations to Chronic TRVs

COI	Unit	Maximum Concentration[a]	Chronic TRV	Max COI > TRV?
4-Chloro-3-methylphenol	µg/L	0.68 U	1.8	No
Phenol	µg/L	0.38 J	110	No
PCBs				
Aroclor 1248	µg/L	0.00705 J	0.081	No
Aroclor 1254	µg/L	0.00657	0.033	No
Aroclor 1260	µg/L	0.013	94	No
Total PCBs	µg/L	**0.017 T**	0.014	**Yes**
Dioxins and Furans				
2,3,7,8-TCDD	pg/L	0.26	100	No
Pesticides				
2,4′-DDD	µg/L	**0.00206**	0.001	**Yes**
2,4′-DDE	µg/L	**0.0013 U**	0.001	**Yes**
2,4′-DDT	µg/L	**0.0187 NJ**	0.001	**Yes**
4,4′-DDD	µg/L	**0.00325**	0.001	**Yes**
4,4′-DDE	µg/L	**0.0007 U**	0.001	**Yes**
4,4′-DDT	µg/L	**0.0047 NJ**	0.001	**Yes**
Total DDx	µg/L	0.020 NJT	0.001	**Yes**
Aldrin	µg/L	0.0058 U	0.3	No
cis-Chlordane	µg/L	0.00104 J	0.0043	No
trans-Chlordane	µg/L	0.0016 J	0.0043	No
Total Chlordane	µg/L	0.00293 JT	0.0043	No
Dieldrin	µg/L	0.0012 J	0.056	No
alpha-Endosulfan	µg/L	0.000569	0.056	No
beta-Endosulfan	µg/L	0.00054	0.056	No
Endosulfan sulfate	µg/L	0.00079 U	0.056	No
Endrin	µg/L	0.00099 U	0.036	No
Endrin aldehyde	µg/L	0.00098 NJ	0.036	No
Endrin ketone	µg/L	0.000538 UJ	0.036	No
alpha-HCH	µg/L	0.00056 U	0.08	No
beta-HCH	µg/L	0.0029 U	0.08	No
delta-HCH	µg/L	0.00167 NJ	0.08	No
gamma-HCH	µg/L	0.0019	0.08	No
Heptachlor	µg/L	0.0023 U	0.0038	No
Heptachlor epoxide	µg/L	0.000538 UJ	0.0038	No
Methoxychlor	µg/L	0.0111	0.03	No

Table 5-4. Comparison of Maximum Surface Water Concentrations to Chronic TRVs

COI	Unit	Maximum Concentration[a]	Chronic TRV	Max COI > TRV?
cis-Nonachlor	µg/L	0.00058 U	0.0043	No
trans-Nonachlor	µg/L	0.000538 UJ	0.0043	No
Oxychlordane	µg/L	0.0024 U	0.0043	No
Herbicides				
2,4-D	µg/L	0.31 NJ	4	No
Dalapon	µg/L	0.76 U	1,325	No
Perchlorate				
Perchlorate	µg/L	15.7 T	9,300	No

[a] The maximum concentration is the higher of either the maximum detect or maximum RL.

COI – chemical of interest

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

HCH – hexachlorocyclohexane

J – estimated concentration

N – presumptive evidence of a compound

NA – not analyzed

PAH – polycyclic aromatic hydrocarbon

PCB – polychlorinated biphenyl

SVOC – semivolatile organic compound

T – value calculated or selected from multiple results

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

TPH – total petroleum hydrocarbons

TRV – ecological screening level

U – not detected at given concentration

VOC – volatile organic compound

Bold indicates that maximum concentration is greater than chronic TRV.

Table 5-5. Results of Refined Surface Water Screen

	Comparison of Maximum Detect to SL TRV			Conditions for Exclusion from COPC List			
COI	**Chronic TRV**	**Max Detect**	**Does Max Detect Exceed SL TRV?**	**Is Detection Frequency < 5%? (DF %)**	**Are detection limits < Chronic SL? (No. of Exceedances)**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Metals (µg/L)							
Aluminum (total)	87	**1,860**	Yes	No (100)	Yes	No	**Yes**
Zinc (dissolved)	36.5	**41.9**	Yes	No (44)	Yes	No	**Yes**
Butyltins (µg/L)							
Butyltin ion	0.072	**0.085**	Yes	No (8)	Yes	No	**Yes**
PAHs (µg/L)							
Benzo(a)anthracene	0.027	**0.27**	Yes	No (36)	Yes	No	**Yes**
Benzo(a)pyrene	0.014	**0.19**	Yes	No (31)	Yes	No	**Yes**
Naphthalene	12	**605**	Yes	No (15)	Yes	No	**Yes**
Phthalates (µg/L)							
BEHP	3	**6.8 J**	Yes	No (13)	No (2)	No	**Yes**
PCBs (µg/L)							
Total PCBs	0.014	**0.017 T**	Yes	No (11)	Yes	No	**Yes**
Pesticides (µg/L)							
2,4′-DDD	0.001	**0.00206**	Yes	No (51)	Yes	No	**Yes**
2,4′-DDE	0.001	**0.0000901**	No	NA	NA	NA	**No**
2,4′-DDT	0.001	**0.0187 NJ**	Yes	No (49)	No (1)	No	**Yes**
4,4′-DDD	0.001	**0.00325**	Yes	No (56)	No (2)	No	**Yes**
4,4′-DDT	0.001	**0.0047 NJ**	Yes	No (60)	No (4)	No	**Yes**
Total DDx	0.001	**0.020 NJT**	Yes	No (68)	No (4)	No	**Yes**

Table 5-5. Results of Refined Surface Water Screen

	Comparison of Maximum Detect to SL TRV			Conditions for Exclusion from COPC List			
COI	**Chronic TRV**	**Max Detect**	**Does Max Detect Exceed SL TRV?**	**Is Detection Frequency < 5%? (DF %)**	**Are detection limits < Chronic SL? (No. of Exceedances)**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
VOCs (µg/L)							
Ethylbenzene	7.3	**11.4**	Yes	No (35)	Yes	No	**Yes**
Trichloroethene	47	**194**	Yes	No (9)	Yes	No	**Yes**

DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
J – estimated concentration
N – tentative identification
NA – not analyzed
PAH – polycyclic aromatic hydrocarbon
PCB – polychlorinated biphenyl
SVOC – semivolatile organic compound
TPH – total petroleum hydrocarbons
TRV – ecological screening level
T – value calculated or selected from multiple results
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
VOC – volatile organic compound

Table 5-6. Surface Water COPCs

COPCs	
Metals	
Aluminum[a]	Zinc[b]
Butyltins	
Butyltin ion	
PAHs	
Benzo(a)anthracene	Naphthalene
Benzo(a)pyrene	
Phthalates	
Bis(2-ethylhexyl) phthalate	
PCBs	
Total PCBs	
Pesticides	
2,4′-DDD	4,4′-DDT
2,4′-DDT	Total DDx
4,4′-DDD	
VOCs	
Ethylbenzene	Trichloroethene

[a] Criteria based on total concentration.

[b] Criteria based on dissolved concentration.

COPC – chemical of potential concern

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethanePAH – polycyclic aromatic hydrocarbon

PCB – polychlorinated biphenyl

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

VOC – volatile organic compound

Table 6-1. Transition Zone Water COIs

COI	
Metals	
Aluminum	Magnesium
Antimony	Manganese
Arsenic	Mercury
Barium	Nickel
Beryllium	Potassium
Cadmium	Selenium
Calcium	Silver
Chromium	Sodium
Cobalt	Thallium
Copper	Titanium
Iron	Vanadium
Lead	Zinc
PAHs	
2-Methylnaphthalene	Chrysene
Acenaphthene	Dibenzo(a,h)anthracene
Acenaphthylene	Fluoranthene
Anthracene	Fluorene
Benzo(a)anthracene	Indeno(1,2,3-cd)pyrene
Benzo(a)pyrene	Naphthalene
Benzo(b)fluoranthene	Phenanthrene
Benzo(g,h,i)perylene	Pyrene
Benzo(k)fluoranthene	
VOCs	
1,1,1-Trichloroethane	Chloroform
1,1,2-Trichloroethane	Chloromethane
1,1-Dichloroethane	cis-1,2-Dichloroethene
1,1-Dichloroethene	trans-1,2-Dichloroethene
1,2,4-Trimethylbenzene	Ethylbenzene
1,2-Dichloroethane	Isopropylbenzene
1,2-Dichloropropane	Methyl isobutyl ketone
1,3,5-Trimethylbenzene	Methyl tert-butyl ether
1-Methyl-4-isopropylbenzene	Methylene bromide
Acetone	Methylene chloride
Acrolein	Methylethyl ketone
Benzene	n-Propylbenzene
Bromochloromethane	Styrene
Bromodichloromethane	Tetrachloroethene
n-Butylbenzene	Toluene
Sec-butylbenzene	Trichloroethene

Table 6-1. Transition Zone Water COIs

COI	
tert-Butylbenzene	Vinyl chloride
Carbon disulfide	m,p-Xylene
Chlorobenzene	o-Xylene
Chloroethane	Total Xylenes
SVOCs	
1,2-Dichlorobenzene	1,4-Dichlorobenzene
1,3-Dichlorobenzene	Dibenzofuran
Dioxins and Furans	
1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin	1,2,3,7,8-Pentachlorodibenzofuran
1,2,3,4,7,8,9-Heptachlorodibenzofuran	2,3,4,7,8-Pentachlorodibenzofuran
1,2,3,4,7,8-Hexachlorodibenzofuran	2,3,7,8-Tetrachlorodibenzofuran
1,2,3,6,7,8-Hexachlorodibenzofuran	
Pesticides	
2,4′-DDD	4,4′-DDE
2,4′-DDE	4,4′-DDT
2,4′-DDT	Total DDx
4,4′-DDD	
Herbicides	
2,4-D	Dichloroprop
Dalapon	Silvex
TPH	
Gasoline-range hydrocarbons	Total diesel-residual hydrocarbons
Residual-range hydrocarbons	Total petroleum hydrocarbons
Diesel-range hydrocarbons	
Other Chemicals	
Perchlorate	Cyanide

DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
PAH – polycyclic aromatic hydrocarbon
VOC – volatile organic compound
SVOC – semivolatile organic compound
TCDD – tetrachlorodibenzo-*p*-dioxin
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
TPH – total petroleum hydrocarbons

Table 6-2. Water TRVs for TZW COIs

COI	Unit	Chronic TRV	Source
Metals			
Aluminum	µg/L	87[a]	AWQC
Antimony	µg/L	30[a]	Tier II
Arsenic	µg/L	150[b]	AWQC
Barium	µg/L	4[a]	Tier II
Beryllium	µg/L	0.66[a]	Tier II
Cadmium	µg/L	0.09[b]	AWQC
Chromium	µg/L	23.8[b]	AWQC
Cobalt	µg/L	23	Tier II
Copper	µg/L	2.74[b]	AWQC
Iron	µg/L	1,000[a]	AWQC
Lead	µg/L	0.54[b]	AWQC
Magnesium	µg/L	82,000[a]	AWQC
Manganese	µg/L	120[a]	Tier II
Mercury	µg/L	0.77[b]	Tier II
Nickel	µg/L	16.1[b]	AWQC
Potassium	µg/L	53,000[a]	Tier II
Selenium	µg/L	5[a]	AWQC
Silver	µg/L	0.1[b]	ODEQ
Sodium	µg/L	680,000[a]	AWQC
Thallium	µg/L	40[a]	ODEQ
Vanadium	µg/L	20[a]	Tier II
Zinc	µg/L	36.5[b]	AWQC
PAHs			
2-Methylnaphthalene	µg/L	2.1	Tier II
Acenaphthene	µg/L	23	Tier II
Acenaphthylene	µg/L	306.9	EPA (2003)[c]
Anthracene	µg/L	0.73	Tier II
Benzo(a)anthracene	µg/L	0.027	Tier II
Benzo(a)pyrene	µg/L	0.014	Tier II

Table 6-2. Water TRVs for TZW COIs

COI	Unit	Chronic TRV	Source
Benzo(b)fluoranthene	µg/L	0.6774	EPA (2003)[c]
Benzo(g,h,i)perylene	µg/L	0.4391	EPA (2003)[c]
Benzo(k)fluoranthene	µg/L	0.6415	EPA (2003)[c]
Chrysene	µg/L	2.042	EPA (2003)[c]
Dibenzo(a,h)anthracene	µg/L	0.2825	EPA (2003)[c]
Fluoranthene	µg/L	6.16	Tier II
Fluorene	µg/L	3.9	Tier II
Indeno(1,2,3-cd)pyrene	µg/L	0.275	EPA (2003)[c]
Naphthalene	µg/L	12	Tier II
Phenanthrene	µg/L	6.3	Tier II
Pyrene	µg/L	10.11	EPA (2003)[c]
VOCs			
1,1,1-Trichloroethane	µg/L	11	Tier II
1,1,2-Trichloroethane	µg/L	9,400	ODEQ
1,1-Dichloroethane	µg/L	47	Tier II
1,1-Dichloroethene	µg/L	25	Tier II
1,2,4-Trimethylbenzene	µg/L	7.3[e]	Tier II
1,2-Dichloroethane	µg/L	910	Tier II
1,2-Dichloropropane	µg/L	5,700	ODEQ
1,3,5-Trimethylbenzene	µg/L	7.3[e]	Tier II
1-Methyl-4-isopropylbenzene	µg/L	9.8[f]	Tier II
Acetone	µg/L	1,500	Tier II
Acrolein	µg/L	3.0[l]	AWQC (GLEC 2008)
Benzene	µg/L	130	Tier II
Bromochloromethane	µg/L	1,325[g]	ODEQ
Bromodichloromethane	µg/L	1,325[g]	ODEQ
n-Butylbenzene	µg/L	7.3[e]	Tier II
Sec-Butylbenzene	µg/L	7.3[e]	Tier II
tert-Butylbenzene	µg/L	7.3[e]	Tier II
Carbon disulfide	µg/L	0.92	Tier II
Chlorobenzene	µg/L	64	ODEQ

Table 6-2. Water TRVs for TZW COIs

COI	Unit	Chronic TRV	Source
Chloroethane	µg/L	47[h]	Tier II
Chloroform	µg/L	28	Tier II
Chloromethane	µg/L	1,325[g]	ODEQ
cis-1,2-Dichloroethene	µg/L	590	Tier II
trans-1,2-Dichloroethene	µg/L	590	Tier II
Ethylbenzene	µg/L	7.3	Tier II
Isopropylbenzene	µg/L	7.3[e]	Tier II
Methyl isobutyl ketone	µg/L	170	Tier II
Methyl tert-butyl ether	µg/L	10,000	CCME (2005)
Methylene bromide	µg/L	11	MacDonald Environmental (1999)
Methylene chloride	µg/L	2,200	Tier II
Methylethyl ketone	µg/L	14,000	Tier II
n-Propylbenzene	µg/L	7.3[e]	Tier II
Styrene	µg/L	4	MacDonald Environmental (1999)
Tetrachloroethene	µg/L	840	ODEQ
Toluene	µg/L	9.8	Tier II
Trichloroethene	µg/L	47	Tier II
Vinyl chloride	µg/L	23,373[g]	Brown (1977)
m,p-Xylene	µg/L	66.67	EPA (2006c)
o-Xylene	µg/L	13[i]	Tier II
Total Xylenes	µg/L	13[i]	Tier II
SVOCs			
1,2-Dichlorobenzene	µg/L	14	Tier II
1,3-Dichlorobenzene	µg/L	71	Tier II
1,4-Dichlorobenzene	µg/L	15	Tier II
Dibenzofuran	µg/L	3.7	Tier II
Pesticides			
2,4′-DDD	µg/L	0.001[j]	EPA (2006d)
2,4′-DDE	µg/L	0.001[j]	EPA (2006d)
2,4′-DDT	µg/L	0.001[j]	EPA (2006d)
4,4′-DDD	µg/L	0.001[j]	EPA (2006d)

Table 6-2. Water TRVs for TZW COIs

COI	Unit	Chronic TRV	Source
4,4′-DDE	µg/L	0.001[j]	EPA (2006d)
4,4′-DDT	µg/L	0.001	EPA (2006d)
Total DDx	µg/L	0.001[j]	EPA (2006d)
Herbicides			
2,4-D	µg/L	4	MacDonald Environmental (1999)
Dalapon	µg/L	1,325[g]	EPA (2008c)
Dichloroprop	µg/L	60[g]	EPA (EPA 2000)
Silvex	µg/L	30.1[g]	EPA (EPA 2006a)
TPH			
Gasoline-range hydrocarbons	µg/L	NV[k]	NA
Aliphatic hydrocarbons C4-C6	µg/L	128[k]	EPA (2008a)
Aliphatic hydrocarbons C6-C8	µg/L	54[k]	EPA (2008a)
Aliphatic hydrocarbons C8-C10	µg/L	9.5[k]	EPA (2008a)
Aliphatic hydrocarbons C10-C12	µg/L	2.6[k]	EPA (2008a)
Aromatic hydrocarbons C8-C10	µg/L	212[k]	EPA (2008a)
Other Chemicals			
Cyanide	µg/L	0.0052	AWQC
Perchlorate	µg/L	9,300[g]	Dean et al. (2004) per EPA (2008c)

[a] Chronic TRV based on total criteria; chronic TRV was be compared to total concentration measured in Study Area.

[b] Chronic TRV based on dissolved criteria; chronic TRV was be compared to dissolved concentration measured in Study Area.

[c] TRV based on PAH mixtures

[d] Chronic TRV based on criteria for bis(2-ethylhexyl) phthalate.

[e] Chronic TRV based on criteria for ethylbenzene.

[f] Chronic TRV based on criteria for toluene.

[g] An acute to chronic ratio of 8.3 was used to calculate a chronic screening value from an acute screening value when no chronic data were available per agreement with EPA (EPA 2008b).

[h] Chronic TRV based on criteria for 1,1-dichloroethane.

[i] Chronic TRV based on criteria for xylene.

[j] Chronic TRV based on criteria for 4,4′-DDT.

[k] EPA provided TRVs for five of the chemical groups that are blended to form gasoline (EPA 2008a). Average fractions of these components in gasoline were used to convert the total gasoline-range hydrocarbon concentration into gasoline fraction concentrations for comparison with the TRVs. Any one gasoline fraction exceeding its TRV was grounds for identifying gasoline as a COPC.

[l] Based on draft ambient aquatic life water quality criteria published in October 2008 (GLEC 2008).

COI – chemical of interest

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)
TRV – ecological screening level for water
NA – not available
NV – no value
PAH – polycyclic aromatic hydrocarbon
PCB – polychlorinated biphenyl
SVOC – semivolatile organic compound
TPH – total petroleum hydrocarbons
TZW – transition zone water
VOC – volatile organic compound

Table 6-3. TZW COIs Without Screening-Level Benchmarks

COIs	
Metals	
Calcium	Titanium
Dioxins/Furans	
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	1,2,3,7,8-Pentachlorodibenzofuran
1,2,3,4,7,8,9-Heptachlorodibenzofuran	2,3,4,7,8-Pentachlorodibenzofuran
1,2,3,4,7,8-Hexachlorodibenzofuran	2,3,7,8-Tetrachlorodibenzofuran
1,2,3,6,7,8-Hexachlorodibenzofuran	
TPH	
Residual-range hydrocarbons	Total diesel-residual hydrocarbons
Diesel-range hydrocarbons	Total petroleum hydrocarbons

COI – chemical of interest
TPH – total petroleum hydrocarbons
TZW – transition zone water

Table 6-4. Comparison of Maximum Transition Zone Water Concentrations to TRVs

COI	Maximum Concentration	Chronic SL	Max Conc > Chronic TRV?
Metals (µg/L)			
Aluminum (total)	41,000	87	**Yes**
Antimony (total)	25.2	30	No
Arsenic (dissolved)	76.8	150	No
Barium (total)	4,390	4	**Yes**
Beryllium (total)	1.34	0.66	**Yes**
Cadmium (dissolved)	0.52	0.09	**Yes**
Chromium (dissolved)	8.91	23.8	No
Cobalt (total)	82	23	**Yes**
Copper (dissolved)	3.63	2.74	**Yes**
Iron (total)	252,000	1,000	**Yes**
Lead (dissolved)	1.61	0.54	**Yes**
Magnesium (total)	578,000	82,000	**Yes**
Manganese (total)	66,200 T	120	**Yes**
Mercury (dissolved)	0.36	0.77	No
Nickel (dissolved)	25.5	16.1	**Yes**
Potassium (total)	197,000 JT	53,000	**Yes**
Selenium (total)	20 U	5	**Yes**
Silver (dissolved)	0.049 U	0.1	No
Sodium (total)	37,490,000	680,000	**Yes**
Thallium (total)	0.655	40	No
Vanadium (total)	379	20	**Yes**
Zinc (dissolved)	526	36.5	**Yes**
PAHs (µg/L)			
2-Methylnaphthalene	84	2.1	**Yes**
Acenaphthene	399	23	**Yes**
Acenaphthylene	6.72	306.9	No
Anthracene	63.8	0.73	**Yes**
Benzo(a)anthracene	32.3	0.027	**Yes**
Benzo(a)pyrene	37.8	0.014	**Yes**
Benzo(b)fluoranthene	33.3	0.6774	**Yes**

Table 6-4. Comparison of Maximum Transition Zone Water Concentrations to TRVs

COI	Maximum Concentration	Chronic SL	Max Conc > Chronic TRV?
Benzo(g,h,i)perylene	28.8	0.4391	**Yes**
Benzo(k)fluoranthene	9	0.6415	**Yes**
Chrysene	34.5	2.042	**Yes**
Dibenzo(a,h)anthracene	3.71	0.2825	**Yes**
Fluoranthene	106	6.16	**Yes**
Fluorene	108	3.9	**Yes**
Indeno(1,2,3-cd)pyrene	16.9	0.275	**Yes**
Naphthalene	13,700	12	**Yes**
Phenanthrene	362	6.3	**Yes**
Pyrene	148	10.11	**Yes**
SVOCs (µg/L)			
1,2-Dichlorobenzene	640	14	**Yes**
1,3-Dichlorobenzene	23	71	No
1,4-Dichlorobenzene	240	15	**Yes**
Dibenzofuran	8	3.7	**Yes**
Pesticides (µg/L)			
2,4′-DDD	1.1 J	0.001	**Yes**
2,4′-DDT	0.15 U	0.001	**Yes**
4,4′-DDD	1.3	0.001	**Yes**
4,4′-DDE	0.93 U	0.001	**Yes**
4,4′-DDT	1.8	0.001	**Yes**
Total DDx	3.1 JT	0.001	**Yes**
Herbicides (µg/L)			
2,4-D	0.97 J	4	No
Dalapon	2.4	1,325	No
Dichloroprop	3.2 U	60.2	No
Silvex	22	30.1	No
VOCs (µg/L)			
1,1,1-Trichloroethane	5.8 U	11	No
1,1,2-Trichloroethane	7.65	9,400	No
1,1-Dichloroethane	27	47	No

Table 6-4. Comparison of Maximum Transition Zone Water Concentrations to TRVs

COI	Maximum Concentration	Chronic SL	Max Conc > Chronic TRV?
1,1-Dichloroethene	40.5	25	**Yes**
1,2,4-Trimethylbenzene	69.9	7.3	**Yes**
1,2-Dichloroethane	5.7 U	910	No
1,2-Dichloropropane	7 U	5,700	No
1,3,5-Trimethylbenzene	21.6	7.3	**Yes**
1-Methyl-4-isopropylbenzene	3.98	9.8	No
Acetone	34 J	1,500	No
Acrolein	1.8 J	3.0	No
Benzene	3,840	130	**Yes**
Bromochloromethane	8.2 U	1,325	No
Bromodichloromethane	5.5 U	1,325	No
n-Butylbenzene	0.48	7.3	No
Sec-butylbenzene	7.06	7.3	No
tert-Butylbenzene	0.4	7.3	No
Carbon disulfide	800	0.92	**Yes**
Chlorobenzene	12,000	64	**Yes**
Chloroethane	160	47	**Yes**
Chloroform	580	28	**Yes**
Chloromethane	11	1,325	No
cis-1,2-Dichloroethene	67,000	590	**Yes**
trans-1,2-Dichloroethene	117	590	No
Ethylbenzene	416	7.3	**Yes**
Isopropylbenzene	14.5	7.3	**Yes**
Methyl isobutyl ketone	20 U	170	No
Methyl tert-butyl ether	9.9 U	10,000	No
Methylene bromide	6 U	11	No
Methylene chloride	79 U	2,200	No
Methylethyl ketone	12 J	14,000	No
n-Propylbenzene	3.95	7.3	No
Styrene	4.8 U	4	**Yes**
Tetrachloroethene	50	840	No
Toluene	178	9.8	**Yes**

Table 6-4. Comparison of Maximum Transition Zone Water Concentrations to TRVs

COI	Maximum Concentration	Chronic SL	Max Conc > Chronic TRV?
Trichloroethene	88,500	47	**Yes**
Vinyl chloride	4,300	23,400	No
m,p-Xylene	293	66.67	**Yes**
o-Xylene	150	13	**Yes**
Total Xylenes	440 T	13	**Yes**
TPH (µg/L)			
Gasoline-range hydrocarbons	4,000 J	NV[b]	**Yes**
Aliphatic hydrocarbons C4-C6	1,436[c]	128[b]	**Yes**
Aliphatic hydrocarbons C6-C8	944[c]	54[b]	**Yes**
Aliphatic hydrocarbons C8-C10	232[c]	9.5[b]	**Yes**
Aliphatic hydrocarbons C10-C12	8.0[c]	2.6[b]	**Yes**
Aromatic hydrocarbons C8-C10	568[c]	212[b]	**Yes**
Other Chemicals			
Cyanide (mg/L)	23.1 J	0.0052	**Yes**
Perchlorate (µg/L)	177,000	9,300	**Yes**

[a] The maximum concentration is the higher of either the maximum detect or maximum RL.

[b] EPA provided TRVs for five of the chemical groups that are blended to form gasoline (EPA 2008a). Average fractions of these components in gasoline were used to convert the total gasoline-range hydrocarbon concentration into gasoline fraction concentrations for comparison with the TRVs. Average fractions were derived from the literature (Fagerlund and Niemi 2003). Any one gasoline fraction exceeding its TRV was grounds for identifying gasoline as a COPC.

[c] The following factions were used to convert the total gasoline-range hydrocarbon concentration into gasoline fraction concentrations: aliphatic hydorcarbons C4-C6 = 0.359; aliphatic hydorcarbons C6-C8 = 0.236, aliphatic hydorcarbons C8-C10 = 0.058, aliphatic hydorcarbons C10-C12; = 0.002; aromatic hydorcarbons C8-C10 = 0.142)

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

NV – no value

PAH – polycyclic aromatic hydrocarbon

PCB – polychlorinated biphenyl

SVOC – semivolatile organic compound

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

TPH – total petroleum hydrocarbons

TRV – toxicity reference value

VOC – volatile organic compound

Table 6-5. Results of Refined Transition Zone Water Screen

	Comparison of Max Detect to Chronic SL			Conditions for Exclusion from COPC List			
COI	**Chronic TRV**	**Max Detect**	**Does Max Detect Exceed TRV?**	**Is detection frequency <5%? (DF)**	**Are detection limits < SL TRV? (No. of exceeds)**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Metals (µg/L)							
Aluminum (total)	87	41,000	Yes	No (80)	No (15)	No	**Yes**
Barium (total)	4	4,390	Yes	No (100)	Yes	No	**Yes**
Beryllium (total)	0.66	1.34	Yes	No (56)	Yes	No	**Yes**
Cadmium (dissolved)	0.09	0.52	Yes	No (65)	No (4)	No	**Yes**
Cobalt (total)	23	82	Yes	No (62)	Yes	No	**Yes**
Copper (dissolved)	2.74	3.63	Yes	No (20)	Yes	No	**Yes**
Iron (total)	1,000	252,000	Yes	No (100)	Yes	No	**Yes**
Lead (dissolved)	0.54	1.61	Yes	No (36)	Yes	No	**Yes**
Magnesium (total)	82,000	578,000	Yes	No (100)	Yes	No	**Yes**
Manganese (total)	120	66,200 T	Yes	No (100)	Yes	No	**Yes**
Nickel (dissolved)	16.1	25.5	Yes	No (96)	No (1)	No	**Yes**
Potassium (total)	53,000	197,000 JT	Yes	No (91)	Yes	No	**Yes**
Selenium (total)	5	4.6	No	NA	NA	NA	No
Sodium (total)	680,000	37,490,000	Yes	No (98)	Yes	No	**Yes**
Vanadium (total)	20	379	Yes	No (69)	Yes	No	**Yes**
Zinc (dissolved)	36.5	526	Yes	No (55)	Yes	No	**Yes**
PAHs (µg/L)							
2-Methylnaphthalene	2.1	84	Yes	No (30)	Yes	No	**Yes**
Acenaphthene	23	399	Yes	No (94)	Yes	No	**Yes**
Anthracene	0.73	63.8	Yes	No (74)	Yes	No	**Yes**
Benzo(a)anthracene	0.027	32.3	Yes	No (43)	No (12)	No	**Yes**
Benzo(a)pyrene	0.014	37.8	Yes	No (37)	No (10)	No	**Yes**

Table 6-5. Results of Refined Transition Zone Water Screen

	Comparison of Max Detect to Chronic SL			Conditions for Exclusion from COPC List			
COI	**Chronic TRV**	**Max Detect**	**Does Max Detect Exceed TRV?**	**Is detection frequency <5%? (DF)**	**Are detection limits < SL TRV? (No. of exceeds)**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
Benzo(b)fluoranthene	0.6774	33.3	Yes	No (30)	Yes	No	**Yes**
Benzo(g,h,i)perylene	0.4391	28.8	Yes	No (39)	Yes	No	**Yes**
Benzo(k)fluoranthene	0.6415	9	Yes	No (26)	Yes	No	**Yes**
Chrysene	2.042	34.5	Yes	No (45)	Yes	No	**Yes**
Dibenzo(a,h)anthracene	0.2825	3.71	Yes	No (28)	Yes	No	**Yes**
Fluoranthene	6.16	106	Yes	No (66)	Yes	No	**Yes**
Fluorene	3.9	108	Yes	No (80)	Yes	No	**Yes**
IndeNo(1,2,3-cd)pyrene	0.275	16.9	Yes	No (38)	Yes	No	**Yes**
Naphthalene	12	13,700	Yes	No (44)	No (1)	No	**Yes**
Phenanthrene	6.3	362	Yes	No (69)	Yes	No	**Yes**
Pyrene	10.11	148	Yes	No (71)	Yes	No	**Yes**
SVOCs (µg/L)							
1,2-Dichlorobenzene	14	640	Yes	No (11)	Yes	No	**Yes**
1,4-Dichlorobenzene	15	240	Yes	No (10)	Yes	No	**Yes**
Dibenzofuran	3.7	8	Yes	No (57)	Yes	No	**Yes**
Pesticides (µg/L)							
2,4′-DDD	0.001	1.1 J	Yes	No (71)	No (4)	No	**Yes**
2,4′-DDT	0.001	0.093 J	Yes	No (21)	No (9)	No	**Yes**
4,4′-DDD	0.001	1.3	Yes	No (43)	No (8)	No	**Yes**
4,4′-DDE	0.001	0.12 J	Yes	No (21)	No (11)	No	**Yes**
4,4′-DDT	0.001	1.8	Yes	No (21)	No (11)	No	**Yes**
Total DDx	0.001	3.1 JT	Yes	No (71)	No (4)	No	**Yes**

Table 6-5. Results of Refined Transition Zone Water Screen

	Comparison of Max Detect to Chronic SL			Conditions for Exclusion from COPC List			
COI	**Chronic TRV**	**Max Detect**	**Does Max Detect Exceed TRV?**	**Is detection frequency <5%? (DF)**	**Are detection limits < SL TRV? (No. of exceeds)**	**Are Both Conditions for Exclusion Met?**	**BERA COPC?**
VOCs (µg/L)							
1,1-Dichloroethene	25	40.5	Yes	No (9)	Yes	No	**Yes**
1,2,4-Trimethylbenzene	7.3	69.9	Yes	No (41)	Yes	No	**Yes**
1,3,5-Trimethylbenzene	7.3	21.6	Yes	No (39)	Yes	No	**Yes**
Benzene	130	3,840	Yes	No (43)	Yes	No	**Yes**
Carbon disulfide	0.92	800	Yes	No (6)	No (41)	No	**Yes**
Chlorobenzene	64	12,000	Yes	No (26)	Yes	No	**Yes**
Chloroethane	47	160	Yes	No (6)	Yes	No	**Yes**
Chloroform	28	580	Yes	No (7)	No (2)	No	**Yes**
cis-1,2-Dichloroethene	590	67,000	Yes	No (32)	Yes	No	**Yes**
Ethylbenzene	7.3	416	Yes	No (30)	Yes	No	**Yes**
Isopropylbenzene	7.3	14.5	Yes	No (24)	Yes	No	**Yes**
Styrene	4	1.71	No	NA	NA	NA	No
Toluene	9.8	178	Yes	No (49)	Yes	No	**Yes**
Trichloroethene	47	88,500	Yes	No (15)	Yes	No	**Yes**
m,p-Xylene	66.67	293	Yes	No (33)	Yes	No	**Yes**
o-Xylene	13	150	Yes	No (39)	Yes	No	**Yes**
Total Xylenes	13	440 T	Yes	No (43)	Yes	No	**Yes**
TPH (µg/L)							
Gasoline-range hydrocarbons	NV[a]	4,000 J	Yes	NE	NE	NE	**Yes**
Other Chemicals							
Cyanide (mg/L)	0.0052	23.1 J	Yes	No (94)	No (2)	No	**Yes**
Perchlorate (µg/L)	9,300	177,000	Yes	No (52)	No (1)	No	**Yes**

[a] EPA provided TRVs for five of the chemical groups that are blended to form gasoline (EPA 2008a). Average fractions of these components in gasoline were used to convert the total gasoline-range hydrocarbon concentration into gasoline fraction concentrations for comparison with the TRVs. Any one gasoline fraction exceeding its TRV was grounds for identifying gasoline as a COPC.

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

DF – detection frequency

NA – not analyzed

NE – not evaluated

NV – no value

PAH – polycyclic aromatic hydrocarbon

PCB – polychlorinated biphenyl

SVOC – semivolatile organic compound

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

TPH – total petroleum hydrocarbons

TRV – ecological screening level

VOC – volatile organic compound

Table 6-6. TZW COPCs

COPCs	
Metals	
Aluminum[a]	Magnesium[a]
Barium[a]	Manganese[a]
Beryllium[a]	Nickel[b]
Cadmium[b]	Potassium[a]
Cobalt[a]	
Copper[b]	Sodium[a]
Iron[a]	Vanadium[a]
Lead[b]	Zinc[b]
PAHs	
2-Methylnaphthalene	Chrysene
Acenaphthene	Dibenzo(a,h)anthracene
Anthracene	Fluoranthene
Benzo(a)anthracene	Fluorene
Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene
Benzo(b)fluoranthene	Naphthalene
Benzo(g,h,i)perylene	Phenanthrene
Benzo(k)fluoranthene	Pyrene
SVOCs	
1,2-Dichlorobenzene	Dibenzofuran
1,4-Dichlorobenzene	
Pesticides	
2,4′-DDD	4,4′-DDE
2,4′-DDT	4,4′-DDT
4,4′-DDD	Total DDx
VOCs	
1,1-Dichloroethene	Ethylbenzene
1,2,4-Trimethylbenzene	Isopropylbenzene
1,3,5-Trimethylbenzene	
Benzene	Toluene
Carbon disulfide	Trichloroethene
Chlorobenzene	m,p-Xylene
Chloroethane	o-Xylene
Chloroform	Total xylenes
cis-1,2-Dichloroethene	

Table 6-6. TZW COPCs

COPCs	
TPH	
Gasoline-range hydrocarbons	
Other chemicals	
Cyanide	Perchlorate

[a] Criteria based on total concentration

[b] Criteria based on dissolved concentration

COPC – chemical of potential concern

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

PAH – polycyclic aromatic hydrocarbon

SVOC – semivolatile organic compound

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

TPH – total petroleum hydrocarbons

TZW – transition zone water

VOC – volatile organic compound

Table 7-1. Comparison of Maximum Background Surface Sediment Concentrations to SQGs

Analyte	Unit	Maximum Detected Concentration	SQG	Is Maximum Concentration > SQG?
Metals				
Antimony	mg/kg	0.77 J	64	No
Arsenic	mg/kg	5.29	5.9	No
Cadmium	mg/kg	0.3	0.596	No
Chromium	mg/kg	38.1	37.3	**Yes**
Copper	mg/kg	47.2	31.6	**Yes**
Lead	mg/kg	31.6 J	35	No
Manganese	mg/kg	1,260	1,100	**Yes**
Mercury	mg/kg	0.069 J	0.174	No
Nickel	mg/kg	29	18	**Yes**
Selenium	mg/kg	0.54 J	5	No
Silver	mg/kg	0.68 J	6.1	No
Zinc	mg/kg	165	121	**Yes**
PAHs				
2-Methylnaphthalene	mg/kg OC	0.45	38	No
Acenaphthene	mg/kg OC	0.45	16	No
Acenaphthylene	mg/kg OC	0.45	66	No
Anthracene	µg/kg	13	57.2	No
	mg/kg OC	1.3	220	No
Benzo(a)anthracene	µg/kg	51	31.7	**Yes**
	mg/kg OC	5.1	110	No
Benzo(a)pyrene	µg/kg	53	31.9	**Yes**
	mg/kg OC	5.3	99	No
Benzo(g,h,i)perylene	mg/kg OC	3.2	31	No
Benzo(k)fluoranthene	µg/kg	23	13,000	No
Chrysene	µg/kg	65	57.1	**Yes**
	mg/kg OC	6.5	110	No
Dibenzo(a,h)anthracene	µg/kg	22	33	No
	mg/kg OC	2.2	12	No
Fluoranthene	µg/kg	75	111	No
	mg/kg OC	7.5	160	No
Fluorene	µg/kg	28	77.4	No
	mg/kg OC	2.8	23	No
Indeno(1,2,3-cd)pyrene	mg/kg OC	3.4	34	No
Naphthalene	µg/kg	9.9	176	No
	mg/kg OC	0.99	99	No
Phenanthrene	µg/kg	71	41.9	**Yes**
	mg/kg OC	7.1	100	No

Table 7-1. Comparison of Maximum Background Surface Sediment Concentrations to SQGs

Analyte	Unit	Maximum Detected Concentration	SQG	Is Maximum Concentration > SQG?
Pyrene	µg/kg	75	53	**Yes**
	mg/kg OC	7.5	1,000	No
Total benzofluoranthenes	mg/kg OC	9.5 T	230	No
Total HPAHs	mg/kg OC	45 T	960	No
Total LPAHs	mg/kg OC	9.6 A	370	No
Total PAHs	µg/kg	460 JT	1,610	No
Phthalates				
BEHP	mg/kg OC	210	47	**Yes**
Butylbenzyl phthalate	mg/kg OC	4.5	4.9	No
Dibutyl phthalate	mg/kg OC	36	220	No
Diethyl phthalate	mg/kg OC	4.5	61	No
Dimethyl phthalate	mg/kg OC	4.5	53	No
Di-n-octyl phthalate	mg/kg OC	8.3	58	No
SVOCs				
1,2,4-Trichlorobenzene	mg/kg OC	2.5	0.81	**Yes**
1,2-Dichlorobenzene	mg/kg OC	2.5	2.3	**Yes**
1,4-Dichlorobenzene	mg/kg OC	2.5	3.1	No
Benzoic acid	µg/kg	180 J	650	No
Benzyl alcohol	µg/kg	45	57	No
Carbazole	µg/kg	45	1,600	No
Dibenzofuran	mg/kg OC	4.5	15	No
Hexachlorobenzene	mg/kg OC	4.5	0.38	**Yes**
Hexachlorobutadiene	mg/kg OC	4.5	3.9	**Yes**
Hexachlorocyclopentadiene	µg/kg	45	400	No
n-Nitrosodiphenylamine	mg/kg OC	4.5	11	No
Phenols				
2,4-Dimethylphenol	µg/kg	45	29	**Yes**
2-Methylphenol	µg/kg	140	63	**Yes**
4-Methylphenol	µg/kg	130	670	No
Pentachlorophenol	µg/kg	12	360	No
Phenol	µg/kg	45	420	No
PCBs				
Aroclor 1016	µg/kg	15	530	No
Aroclor 1248	µg/kg	4.82 J	1,500	No
Aroclor 1254	µg/kg	26	300	No
Aroclor 1260	µg/kg	11 J	200	No
Total PCBs	µg/kg	53 NJT	34.1	**Yes**[a]
	mg/kg OC	5.3 NJT	12	No

Table 7-1. Comparison of Maximum Background Surface Sediment Concentrations to SQGs

Analyte	Unit	Maximum Detected Concentration	SQG	Is Maximum Concentration > SQG?
Dioxins/Furans				
2,3,7,8-TCDD	pg/g	1.15	9	No
Pesticides				
4,4'-DDD	µg/kg	1.4 J	3.54	No
4,4'-DDE	µg/kg	2.3 NJ	1.42	**Yes**[a]
Aldrin	µg/kg	0.55	40	No
Dieldrin	µg/kg	0.39	1.9	No
gamma-Hexachlorocyclohexane	µg/kg	0.32 NJ	0.94	No
Heptachlor	µg/kg	0.5 NJ	10	No
Heptachlor epoxide	µg/kg	0.14 NJ	0.6	No
Sum DDD	µg/kg	1.6 JT	4.88	No
Sum DDE	µg/kg	2.45 T	3.16	No
Sum DDT	µg/kg	3 JT	4.16	No
Total Chlordane	µg/kg	1.18 NJT	3.24	No
Total DDx	µg/kg	6.7 JT	5.28	**Yes**
Petroleum				
Diesel-range hydrocarbons	mg/kg	69 J	90.6	No
	mg/kg OC	6,900 J	9,063	No
Residual-range hydrocarbons	mg/kg	420 J	1,175	No
	mg/kg OC	42,000 J	117,476	No

[a] Maximum detected concentration based on N-qualified concentration. Maximum detected concentration that is not N-qualified is < SQG.

BEHP – bis(2-ethylhexyl) phthalate

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

HPAH – high-molecular-weight polycyclic aromatic hydrocarbon

J – estimated concentration

N – presumptive evidence of a compound

OC – organic carbon

LPAH – low-molecular-weight polycyclic aromatic hydrocarbon

PAH – polycyclic aromatic hydrocarbon

PCB – polychlorinated biphenyl

SQG – sediment quality guideline

SVOC – semivolatile organic compound

T – value calculated or selected from multiple results

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

TCDD – tetrachlorodibenzo-*p*-dioxin

TPH – total petroleum hydrocarbons

U – not detected at given concentration

VOC – volatile organic compound

Table 7-2. Comparison of Maximum Background Surface Water Concentrations to Chronic SLs

Analyte	Unit	Maximum Detected Concentration	Chronic SL	Is Maximum Concentration > Chronic SL?
Metals				
Aluminum	µg/L	1,860	1,020[a]	**Yes**
Antimony	µg/L	0.06	30[a]	No
Arsenic	µg/L	0.44	150[b]	No
Cadmium	µg/L	0.03	0.09[b]	No
Chromium	µg/L	0.83	23.8[b]	No
Copper	µg/L	2.39 J	2.74[b]	No
Lead	µg/L	0.041	0.54[b]	No
Mercury	µg/L	0.02 J	0.77[b]	No
Nickel	µg/L	1.01 J	16.1[b]	No
Selenium	µg/L	0.7 J	5[a]	No
Zinc	µg/L	2.2	36.5[b]	No
Butyltins				
Butyltin ion	µg/L	0.085	0.072	**Yes**
Dibutyltin ion	µg/L	0.001 J	0.072	No
Tributyltin ion	µg/L	0.011 J	0.072	No
PAHs				
2-Methylnaphthalene	µg/L	0.0241	2.1	No
Acenaphthene	µg/L	0.0013 J	23	No
Acenaphthylene	µg/L	0.0091 J	306.9	No
Anthracene	µg/L	0.00085	0.73	No
Benzo(a)anthracene	µg/L	0.01 J	0.027	No
Benzo(a)pyrene	µg/L	0.0012 J	0.014	No
Benzo(b)fluoranthene	µg/L	0.0015 J	0.6774	No
Benzo(g,h,i)perylene	µg/L	0.01 J	0.4391	No
Chrysene	µg/L	0.00229 J	2.042	No
Dibenzo(a,h)anthracene	µg/L	0.000122 J	0.2825	No
Fluoranthene	µg/L	0.01 J	6.16	No
Fluorene	µg/L	0.00135 J	3.9	No
Indeno(1,2,3-cd)pyrene	µg/L	0.0086 J	0.275	No
Naphthalene	µg/L	0.0345	12	No
Phenanthrene	µg/L	0.00286	6.3	No
Pyrene	µg/L	0.0092 J	10.11	No
Phthalates				
BEHP	µg/L	2.1 J	3	No
Butylbenzyl phthalate	µg/L	0.033 J	3	No

Table 7-2. Comparison of Maximum Background Surface Water Concentrations to Chronic SLs

Analyte	Unit	Maximum Detected Concentration	Chronic SL	Is Maximum Concentration > Chronic SL?
Dibutyl phthalate	µg/L	0.00178 J	3	No
Diethyl phthalate	µg/L	0.056 J	3	No
Di-n-octyl phthalate	µg/L	0.016 J	3	No
SVOCs				
Benzoic acid	µg/L	1.8 J	42	No
Carbazole	µg/L	0.014 J	112	No
Hexachlorobenzene	µg/L	0.000073	3.68	No
Hexachlorobutadiene	µg/L	0.00000361 J	9.3	No
Isophorone	µg/L	0.013 J	130	No
Phenols				
4-Chloro-3-methylphenol	µg/L	0.041 J	1.8	No
Phenol	µg/L	0.067 J	110	No
PCBs				
Total PCBs	pg/L	0.000951 JT	0.014	No
Dioxins/Furans				
2,3,7,8-TCDD	pg/L	0.007 J	100	No
Pesticides				
2,4'-DDD	µg/L	0.000025 J	0.001	No
2,4'-DDE	µg/L	0.00000586 J	0.001	No
2,4'-DDT	µg/L	0.0000516 J	0.001	No
4,4'-DDD	µg/L	0.0000978 J	0.001	No
4,4'-DDE	µg/L	0.000198	0.001	No
4,4'-DDT	µg/L	0.000322	0.001	No
Aldrin	µg/L	0.00000389 J	0.3	No
alpha-Endosulfan	µg/L	0.0000588	0.056	No
alpha-Hexachlorocyclohexane	µg/L	0.000082 J	0.08	No
beta-Endosulfan	µg/L	0.0000508	0.056	No
beta-Hexachlorocyclohexane	µg/L	0.00000938 J	0.08	No
cis-Chlordane	µg/L	0.0000306 J	0.0043	No
cis-Nonachlor	µg/L	0.00000927 J	0.0043	No
delta-Hexachlorocyclohexane	µg/L	0.0000015 J	0.08	No
Dieldrin	µg/L	0.00035	0.056	No
Endosulfan sulfate	µg/L	0.000564 J	0.056	No
Endrin	µg/L	0.00000169 J	0.036	No
Endrin ketone	µg/L	0.00000331 J	0.036	No
gamma-Hexachlorocyclohexane	µg/L	0.000036 J	0.08	No

Table 7-2. Comparison of Maximum Background Surface Water Concentrations to Chronic SLs

Analyte	Unit	Maximum Detected Concentration	Chronic SL	Is Maximum Concentration > Chronic SL?
Heptachlor	µg/L	0.00000102 J	0.0038	No
Heptachlor epoxide	µg/L	0.000025 J	0.0038	No
Methoxychlor	µg/L	0.0000156 J	0.03	No
Oxychlordane	µg/L	0.00000432 J	0.0043	No
Total chlordane	µg/L	0.0000911 JT	0.0043	No
Total DDx	µg/L	0.00062 JT	0.001	No
trans-Chlordane	µg/L	0.0000243 J	0.0043	No
trans-Nonachlor	µg/L	0.0000226 J	0.0043	No
Herbicides				
2,4-D	µg/L	0.12 J	4	No

[a] Chronic TRV based on total criteria; chronic TRV was compared to total concentration measured in Study Area.

[b] Chronic TRV based on dissolved criteria; chronic TRV was compared to dissolved concentration measured in Study Area.

BEHP – bis(2-ethylhexyl) phthalate

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

J – estimated concentration

PAH – polycyclic aromatic hydrocarbon

PCB – polychlorinated biphenyl

SL –screening level

SVOC – semivolatile organic compound

T – value calculated or selected from multiple results

TCDD – tetrachlorodibenzo-*p*-dioxin

Total DDx – sum of all six DDT isomers (2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT)

U – not detected at given concentration

8.0 REFERENCES

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