MD-304

ECOLOGICAL RISK ASSESSMENT
MARTIN STATE AIRPORT
Middle River, Maryland

LOCKHEED MARTIN

Tetra Tech
Environmental Engineers & Scientists
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Ecological Risk Assessment
Martin State Airport
Middle River, Maryland

October 2004

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SECTION 1
INTRODUCTION

This report presents the purpose, methods, and results of Step 1, Step 2, and an initial Step 3 Ecological Risk Assessment (ERA) for the southeast portion of Martin State Airport (MSA). Step 1 and 2 of an ERA are preliminary, initial screening processes designed to estimate the likelihood of ecological risk, and to provide a basis for determining the necessity of the more thorough Step 3 ERA. The Step 3 ERA process involves a more refined food web exposure analysis to more realistically characterize risk to ecological receptors. The decision to proceed to any additional ERA Steps is made as a part of the risk management decisions, specifically using Scientific Management Decision Points (SMDP) built into the U.S. Environmental Protection Agency (EPA) ERA Process (EPA 1997).

1.1 OBJECTIVES

The approach used in the Step 1 and 2 risk screening was discussed in the Final Technical Memorandum for the Ecological Risk Assessment Martin State Airport (referred to a "Tech Memo") (Tetra Tech, 2004). This ERA incorporates the latest available guidance and concepts on ERA, including:

- *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (EPA 1997)
- *Guidelines for Ecological Risk Assessment* (EPA 1998)
- *Issuance of Final Guidance: Ecological Risk Assessment and Risk Management Principles for Superfund Sites* (EPA 1999a)

The overall objectives of the ecological risk screening approach are to characterize the ecological habitat, identify the ecological receptors of concern (ROC) and constituents of potential concern (COPC) in each applicable media (i.e., water, soil, and sediment), and to assess potential risks to the environment. This approach allows the Maryland Department of Environment (MDE) to make informed decisions regarding environmental protection and regulatory compliance.

The screening level assessment comprises the first two steps of an eight-step process of ERA at Superfund sites, or sites otherwise required to follow the CERCLA process. The MSA Site has been treated as an environmental baseline survey site, and has had CERCLA guidance applied. The screening level process, as applied to this site, consists of three steps:

1. Problem Formulation and Ecological Effects Evaluation;
2. Exposure Estimate and Risk Calculation.
3. SMDP to determine whether data are sufficient to make a risk decision or to go to Step 3.

The screening level assessment approach corresponds to Steps 1 and 2 in Figure 1. Additionally, this risk assessment documents a more refined food web assessment for terrestrial and aquatic receptors at the MSA Site, as the initial steps for Step 3 as shown in Figure 1.

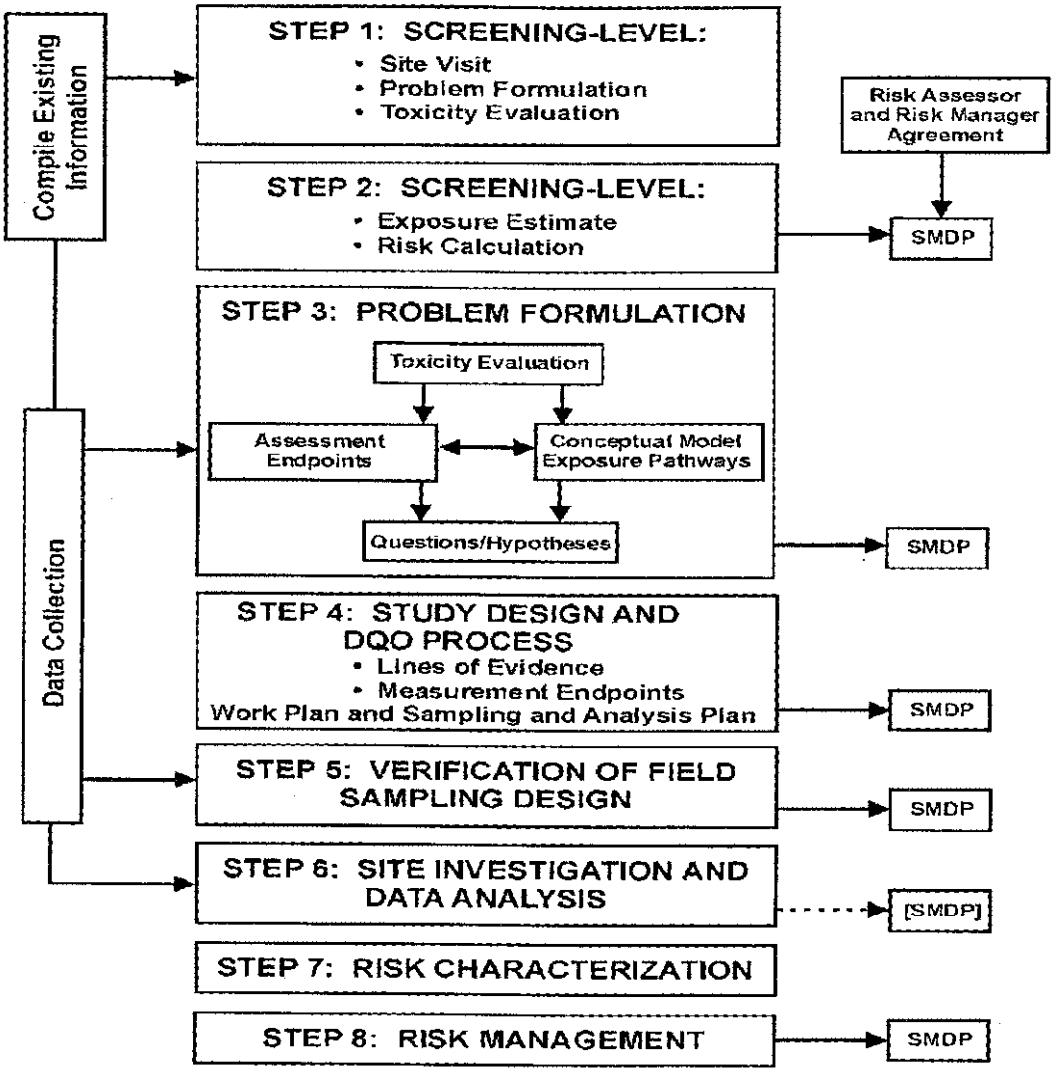

Figure 1. The EPA Eight-Step Ecological Risk Assessment Process for Superfund

SECTION 2
PROBLEM FORMULATION AND ECOLOGICAL EFFECTS EVALUATION

The problem formulation represents the scoping stage of all ERAs. In this step, existing information is examined, the site visited, ROCs identified, a conceptual model for the site is developed in order to identify potential exposure pathways, and preliminary assessment and measurement endpoints are identified. Ultimately, the problem formulation generates one or more questions, speculations, or hypotheses regarding current or future human-induced changes to the environment. These questions are answered or hypotheses tested by collecting information during the analysis phase. The ecological significance of the results is evaluated during risk characterization step.

Details of the problem formulation are discussed in the Tech Memo submitted by Tetra Tech and approved by MDE.

2.1 ENVIRONMENTAL SETTING

Tetra Tech's final report for the data gap investigation and modeling (Tetra Tech, 2004) summarized existing knowledge of the site and much of its current setting. A site visit by Tetra Tech ecologists on November 25, 2003 was also used to gather additional, pertinent information for this ERA.

Plant species at MSA can be divided into four distinct habitats including field habitat, forest stand, wetland-pond margin and riparian forest. Field habitat consists of open areas with no canopy or woody plants. All of the Taxiway Tango area consists of open short grass fields between the runways and directly adjacent to the runway area. Forest stands consisting of habitat with large canopy trees and a sparse layer of herbaceous understory, make up the majority of habitat associated with the MSA site, particularly near the Drum area and the area surrounding the two ponds. The forest is mixed deciduous with white oak (*Quercus alba*) and sweetgum (*Liguidambar styraciflua*) as the dominant canopy species. Other species observed include tulip poplar (*Liriodendron tulipifera*), black cherry (*Prunus sylvatica*), and red maple (*Acer rubrum*). The understory of the forest stand consists of several smaller trees such as flowering dogwood (*Cornus florida*), American holly (*Ilex opaca*), ironwood (*Carpinus caroliniana*) and various herbaceous species. Riparian forest differs from the other forest stands by having a dominance of black cherry trees with some pines, dogwood, and staghorn sumac. Most of the trees are younger than those in the more upland forest habitat with thicker understory vegetation. This habitat is present in the southeastern part of the site along Frog Mortar Creek.

Two small ponds and Frog Mortar Creek, adjacent to the eastern edge of the property, constitute the aquatic habitats at MSA. The ponds are associated with adjacent wetland habitat consisting of the emergent plant *Phragmites* as well as sedges and some willow trees. No submerged aquatic vegetation was observed during our site visit, however, plants have the potential to occur as these ponds are apparently fed by surface water (small stream originating to the north of the MSA site of concern) and perhaps by surficial groundwater as well. These ponds have an approximate maximum depth of five feet.

Frog Mortar Creek is a freshwater tidal waterbody that is one of the many upper inlets associated with the Chesapeake Bay. Frog Mortar Creek is surrounded by urban and commercial land uses and has several boat docks located across the creek from MSA. No boating piers were observed in Frog Mortar Creek adjacent to MSA property.

Given the variety of forest, field, and aquatic habitats available, many bird species are likely to occur at MSA including geese, ducks (wading, diving, and wood ducks), herons, finches, sparrows, robins, warblers, hawks, kingfishers, and woodpeckers. Mammals such as deer, fox, moles, shrews, rabbits, woodchucks, squirrels, and raccoons are also likely to occur at this site, given the proximity to a water body such as Frog Mortar Creek, the site's relative lack of human activity, and the range of habitats available. Turtles were observed in one of the ponds during our site visit and it is likely that amphibians such as frogs are present as well. Reptiles likely to occur at this site include snakes (i.e. black snakes).

2.2 RECEPTORS OF CONCERN

Ecological ROCs are species or guilds of species that are important to the ecology of the site and that may be susceptible to chemical constituents released at the site. Five criteria were used to evaluate potential ecological ROCs for this ERA:

- Presence – known or expected to occur onsite
- Susceptibility – exposure pathway is likely complete and of sufficient duration/magnitude
- Representative – of the food web and/or guild
- Data Availability – sufficient and appropriate type of toxicity and exposure information
- Societal Importance – species merits public attention

The following sections summarize the ROCs selected for this ERA and the rationale for selecting them.

2.2.1 Threatened or Endangered Species

Current information suggests that threatened or endangered species do not occur at this site and so are not applicable to this ERA (personal communication with MDNR, 2004).

2.2.2 Non-Threatened or Endangered Species

Terrestrial vegetation is an ecological receptor at the MSA Site because of its critical role as the primary producer for the site. As indicated in the Technical Memorandum, several plant species occur on the site that could provide food for herbivores and omnivores, thereby providing a mechanism to transfer soil contaminants to higher trophic levels.

Soil invertebrates such as earthworms, are another ROC because they influence soil turnover, mineralization, humidification, soil porosity, aeration, water infiltration, and soil-water retention, and they provide food for higher trophic levels (birds, mammals). Because of their close association with soil (and any contaminants that may be present) and ecological importance in the maintenance of soil fertility, earthworms and other soil invertebrates are considered ecological receptors of concern at the MSA Site.

The habitat, as well as our site inspection of the MSA Site, indicates that many birds inhabit the area such as cardinals, starlings, and woodpeckers (Table 1). Three birds were selected as ROCs representing birds. The red-tailed hawk is representative of raptors found in the area and the mourning dove and American robin are representative of passerine and other plant and invertebrate feeding birds in the area.

Numerous small and medium sized mammals may use the MSA Site as habitat. The MSA Site represents good habitat for small mammals. Consequently, the short-tailed shrew, meadow vole, and white-footed mouse were selected as mammalian receptors of concern. The red fox was also selected as an ROC due to its potential use of the site and its role as a tertiary consumer.

Aquatic habitats are present along Frog Mortar Creek, to the east of the site as well as the two ponds. Receptors of concern identified as representative of this type of environment included the raccoon (representative of omnivorous mammals), mallard duck (representative of omnivorous birds), the

belted kingfisher and great blue heron (representative of piscivores). In addition, aquatic invertebrates and fish that live in both the water column and sediment have been designated as aquatic ROCs.

2.3 ECOLOGICAL RISK CONCEPTUAL SITE MODEL

The Conceptual Site Model (CSM) is an end product of the problem formulation step. It contains a description of the physical and ecological characteristics of the site, potential exposure scenarios, ROC, and assessment and measurement endpoints. Figure 2 contains the CSM for the MSA Site as previously submitted in Tetra Tech's Technical Memorandum for the Ecological Risk Assessment.

2.4 ASSESSMENT AND MEASUREMENT ENDPOINTS

USEPA (1998) guidance stresses the importance of ecologically significant endpoints. The selection of assessment endpoints is based on the fundamental knowledge of the local ecology. Based on the ROCs observed during the site visit, existing habitat, and the above observations, the following ecological assessment endpoints are defined:

1. Protection of aquatic organisms that live in the water column in the ponds and the Creek adjacent to the site by determining that COPCs in these media do not have adverse effects on survival, growth, and reproduction.

2. Protection of benthic organisms that live in the sediment in the ponds and Creek adjacent to the site by determining that COPCs in these media do not have adverse effects on survival, growth, and reproduction.

3. Protection of birds, represented by the omnivorous aquatic mallard duck, the carnivorous great blue heron, and the piscivorous belted kingfisher, by determining that ingestion of COPCs in food items and sediment does not have unacceptable adverse impacts on survival, growth, and reproduction of higher trophic levels.

4. Protection of mammals, represented by the omnivorous raccoon by determining that ingestion of COPC in food items and sediment does not have unacceptable adverse impacts on survival, growth, and reproduction of higher trophic levels.

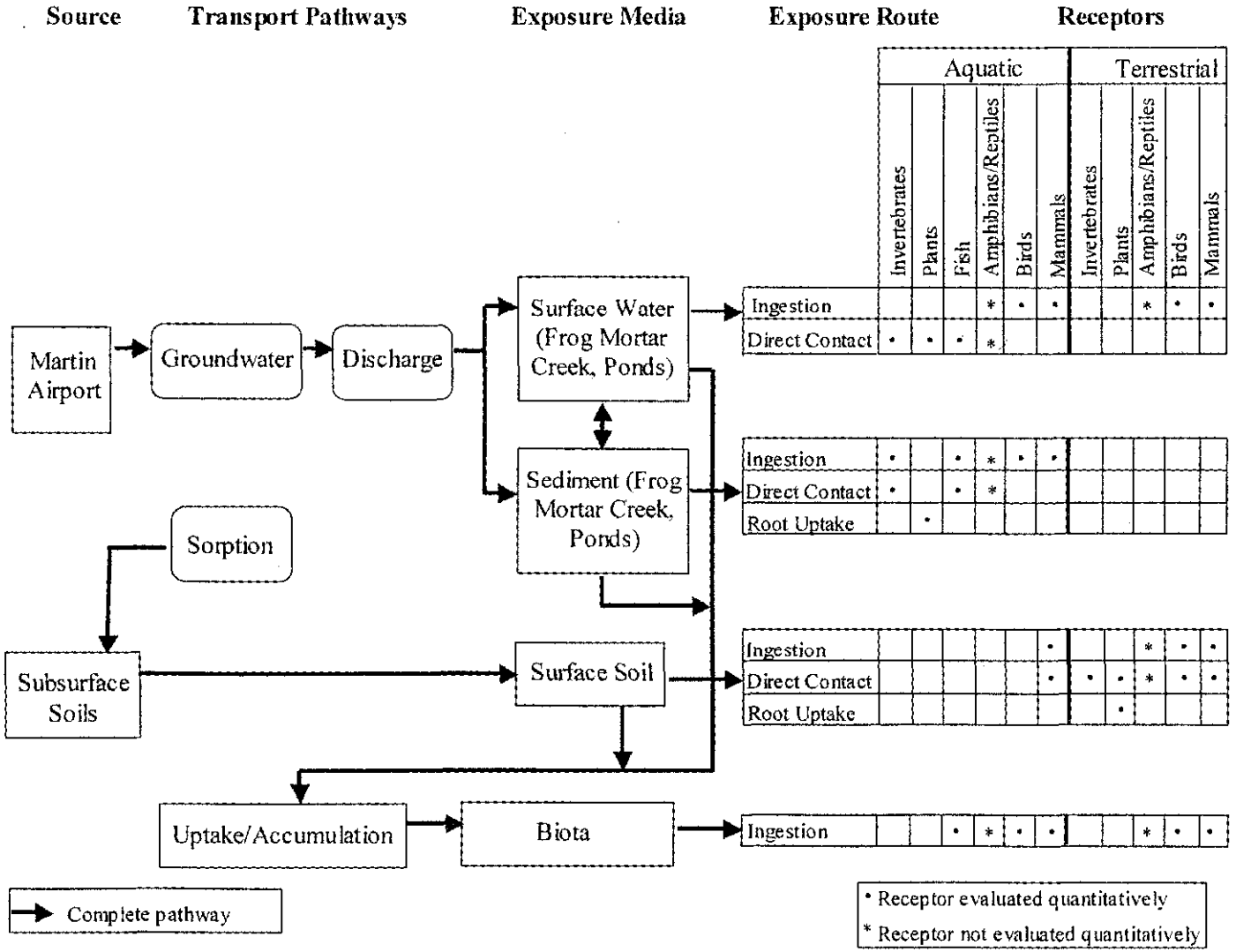

Figure MSA-2. Conceptual Site Model for Martin State Airport.

5. Protection of terrestrial organisms that live in the soil, by determining that COPCs in the soil do not have adverse effects on survival, growth, and reproduction.

6. Protection of birds, represented by the invertivore/omnivore American robin, the herbivorous morning dove, and the carnivorous red-tailed hawk, by determining that ingestion of COPCs in food items and soil does not have unacceptable adverse impacts on survival, growth, and reproduction of higher trophic levels.

7. Protection of mammals, represented by the herbivore, meadow vole; the omnivore, white-footed mouse; the invertivore, short-tailed shrew; and the carnivore, red fox, by determining that ingestion of COPC in food items and soil does not have unacceptable adverse impacts on survival, growth, and reproduction of higher trophic levels.

Measurement endpoints are measurable ecological characteristics that are related to the assessment endpoints (USEPA, 1998). Because it is difficult to "measure" assessment endpoints, measurement endpoints were chosen that permit inference regarding the above-described assessment endpoints. Measurement endpoints selected for this risk assessment include (Table 2):

- Media Chemistry for Surface Water—The measurement of chemical constituent concentrations in surface water provides the means, when compared to water quality criteria, for drawing inferences regarding the protection of aquatic organisms that live in the water column. Two surface water samples were collected in Frog Mortar Creek, in areas close to the site that the model predicts have the highest groundwater contributions. These samples were analyzed for the same chemicals as in groundwater: total and dissolved metals, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs). In addition, one surface water sample was collected from each of the two ponds on the site and analyzed for the same constituents.

- Media Chemistry for Sediment—The measurement of chemical constituent concentrations in sediment provides the means, when compared to appropriate sediment screening values, to assess the protection of benthic organisms that live in the sediment. Two sediment samples were collected and analyzed from Frog Mortar Creek in the same locations as the surface water samples. Sediment samples from the two ponds were previously collected and analyzed in 2000 and the data validated. These data were used in the ERA to evaluate the sediment pathway.

- Media Chemistry for Soil—The measurement of chemical constituent concentrations in soil provides the means, when compared to appropriate soil screening values, to assess the protection of benthic organisms that live in the soil. Extensive soil data are available from the past three years to evaluate risks due to the soil pathway. Soil concentrations measured in the top 1 foot were used in analyses because this is the soil horizon to which terrestrial receptors (invertebrates, mammals, and birds) are primarily exposed.

SECTION 3
COPC SCREEN

Soil, groundwater, and sediment data previously collected have been validated and were used in analysis. Surface water data for Frog Mortar Creek were collected on July 7, 2004, because previously available data for this Creek were more than 7 years old. Two surface water samples were collected within 50 feet of the MSA shoreline as indicated in Figure 3. These locations were selected based on extensive groundwater sampling and modeling which indicated the direction of the plume to the Creek. Sediment samples for the two ponds were also collected on July 7, 2004 and analyzed for the same suite of data as for the groundwater samples. These data and the Creek water data were validated prior to analysis. In accordance with EPA ERA guidance, the average of field duplicates was used as the concentration for those particular samples when they occurred, and one-half the detection limit was used as the value of samples determined to contain analyte concentrations below detectable levels for statistical purposes.

The screening process that identifies COPCs is environmentally conservative so as not to eliminate analytes that could pose potential ecological risk. Using conservative assumptions and appropriate screening values during the COPC screening process minimizes this potential. Analytes remaining after the screening process are COPCs.

3.1 SURFACE SOIL COPC IDENTIFICATION

Widely accepted and comprehensive toxicity reference values (TRVs) for surface soils are limited. While many sources have identified "safe" soil contaminant levels from a human health perspective, only a few have developed soil TRVs with protection of ecological receptors as a goal. These sources include:

- USEPA Region 3 BTAG screening levels (USEPA 1995). However, many of these values are based on background concentrations rather than on toxicological data.
- USEPA Region 4 screening values (USEPA 1999b).
- Scientific literature, including Efroymson et al. (1997a, 1997b), MHSPE (1994), and USEPA (2000a).

TRVs are most widely available for terrestrial plants and soil invertebrates (earthworms). Soil TRVs used in this study are summarized in Table 3.

Eleven metals (beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc) were identified as COPCs in surface soil because, the maximum concentrations of these analytes exceeded the respective soil screening values (Table 4). For the same reason, 14 SVOCs and two VOCs were retained as COPCs in surface soil. One metal, four pesticides, 26 SVOCs, and 31 VOCs were retained as COPCs because of the absence of screening values. One metal, 14 SVOCs, and three VOCs were retained because one-half the maximum reporting limit was greater than the screening toxicity value.

3.2 SURFACE WATER COPC IDENTIFICATION

Water bodies on or near Martin State Airport are freshwater. Sources of surface water TRVs for freshwater include:

- Federal Ambient Water Quality Criteria (USEPA 1994; 1999b).
- Maryland Water Quality Standards/Criteria.
- USEPA Ecotox Thresholds (USEPA 1996).
- USEPA Region 3 BTAG screening levels (USEPA 1995).
- USEPA Region 4 screening values (USEPA 1999b).
- Scientific literature, such as the Aquatic Information Retrieval (AQUIRE) database and Suter and Tsao (1996), and literature compilations, such as Buchman (1999).

For metals, both unfiltered (total) and filtered (dissolved) concentrations were included in the TRV comparison. For chemicals known to bioaccumulate in aquatic food webs, TRVs were based on the final chronic value (rather than the final residue value) as per USEPA (1996b) and Suter and Tsao (1996). The use of final chronic values is intended to protect ecological receptors from direct exposure to chemicals in surface water, rather than from exposure via food webs. Potential risks to upper trophic-level receptors from food web exposures (tissue residues) were evaluated separately (see Section 4.0). Surface water TRVs used in this study are summarized in Table 5.

Two metals exceeded screening values for water (dissolved and total copper and dissolved zinc) (Table 6). Three additional metals (total and dissolved cadmium; total and dissolved lead; and total and dissolved silver), and eleven SVOCs were identified as COPCs because one-half the maximum reporting limit was greater than toxicity reference value. Another 21 SVOCs and 21 VOCs were identified as COPCs because they lack approved toxicity reference values.

3.3 SEDIMENT COPC IDENTIFICATION

Sources of sediment TRVs include:

- USEPA Region 3 BTAG screening levels (USEPA 1995). However, these values are primarily Effects Range-Low (ER-L) values (Long and Morgan 1990; Long et al. 1995) and Apparent Effects Thresholds (AETs) from various literature sources. ER-L values were derived for marine and estuarine systems, but surface waters on and near the airport are freshwater. These values have often been used to assess freshwater systems, but only in the absence of appropriate freshwater screening levels. Certain AET values may have been derived from freshwater studies, but because the AET represents the sediment contaminant concentration above which statistically significant biological effects are expected to occur, they may be overprotective.
- USEPA Region 4 screening values (USEPA 1999b).
- Ontario freshwater sediment screening guidelines (Persaud et al. 1993).
- USEPA Ecotox Thresholds (USEPA 1996).
- Sediment values developed as part of ongoing Great Lakes sediment research (e.g., Smith et al. 1996; Ingersoll et al. 1996).
- Scientific literature and literature compilations (e.g., Buchman,1999]).

These TRVs are typically based on studies that correlate chemical concentrations in sediment with some measure of benthic community impairment; this approach is known as the Screening Level Concentration approach. Because these TRVs do not consider site-specific bioavailability, and correlate effects to each individual chemical without accounting for the possible effects of other chemicals in the sediment, their use tends to result in a very conservative estimate of risk. Sediment TRVs used in this study are summarized in Table 7.

Eight metals (cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc) were identified as COPCs in sediment due to concentrations exceeding the respective screening value (Table 8). For the same reason, twelve SVOCs, were retained as COPCs in sediment. In addition, two metals, 30 SVOCs, five pesticides, and 53 VOCs were retained as COPCs based on the absence of screening values. One metal, fifteen SVOCs, and six VOCs were identified as COPCs because one-half the maximum reporting limit was in excess of the screening value.

3.4 SUMMARY OF ECOLOGICAL COPCS

A summary of ecological COPCs for all matrices identified at the MSA Site at the end of Step 1 of the ERA is shown in Table 9.

SECTION 4
STEP 2 ECOLOGICAL RISK ASSESSMENT

A Step 2 Risk Assessment intentionally uses conservative exposure assumptions designed to retain and properly evaluate all contaminants that might pose a risk to ROCs. Exposure assessment is a key component of risk quantitation evaluated in Step 2, linking contaminants to receptors through complete pathways. Exposure refers to the degree of contact between ecological receptors at a site and the COPC. COPCs that are bioaccumulative are examined in upper trophic level receptor food webs where indirect contact (dietary exposure) is the most relevant exposure pathway. All COPCs are evaluated for direct contact by receptors such as terrestrial plants, soil invertebrates, aquatic water column communities, and benthic invertebrates.

4.1 DIRECT EXPOSURE OF PLANTS AND INVERTEBRATES TO SURFACE SOIL

Based on the CSM in Figure 2, terrestrial receptors at the site are potentially exposed to COPCs in surface soil, either through direct contact, or via dietary food web. In either pathway, the starting point for the evaluation of terrestrial receptors is the maximum concentration in the surface soil.

A relevant pathway for terrestrial plant communities is the chronic exposure to surface soil contaminants that may exhibit detrimental effects on plant survival and growth. For non-bioaccumulative COPCs, maximum soil concentrations were compared with no effect levels for terrestrial plants. An Ecological Quotient (EQ) was calculated for terrestrial plants assuming that COPCs are 100 percent bioavailable for uptake by the plants.

EQ = Maximum Soil Concentration / No Effect Level for Plants

Similarly, a relevant pathway for terrestrial invertebrate communities is chronic exposure to soil contaminants that may exhibit detrimental effects on survival and growth. Therefore, an EQ was calculated for terrestrial soil invertebrates by comparing maximum soil concentration to threshold levels and assuming 100% bioavailability of COPCs.

EQ = Maximum Soil Concentration / Soil Invertebrate Threshold Level

4.2 INDIRECT EXPOSURE OF HIGHER TROPHIC LEVELS TO COPCS (FOOD WEB ANALYSES)

4.2.1 Terrestrial Food Web

The relevant pathway for terrestrial mammalian and avian ROCs is chronic exposure to surface soil contaminants via dietary uptake. The ROCs occupy different feeding guilds, but have diets that contain potential vectors for site-related soil contaminants. For this step of the ERA, a given mammal or bird is assumed to ingest only the most contaminated food item in its diet. Incidental soil ingestion was also included in this assessment. This step assumes that the concentration of each COPC present in dietary items is presented in dietary items on a dry-weight basis, but consumption is estimated by use of wet-weight concentrations, which conservatively estimate dietary doses.

No site-specific vegetation, invertebrate, or mammal concentrations of COPCs were available. Therefore, for those contaminants that bioaccumulate, a maximum bioaccumulation factor (BAF) or bioconcentration factor (BCF) (animal or plant, respectively) was applied to the maximum soil concentration to determine dietary exposures to a given ROC.

The BAF is used as follows:

$$[X]_{earthworm} = [X]_{soil} \times BAF$$

where:

$[X]_{earthworm}$ = the concentration of chemical X in earthworm (dry weight),
BAF = the bioaccumulation factor,
and $[X]_{soil}$ = the concentration of chemical X in soil (dry weight).

The BCF is used as follows:

$$[X]_{plant} = [X]_{soil} \times BCF$$

where:

$[X]_{plant}$ = the concentration of chemical X in plant (dry weight),
BCF = the bioconcentration factor,
and $[X]_{soil}$ = the concentration of chemical X in soil (dry weight).

Terrestrial BAFs/BCFs are summarized in Table 10.

Dietary exposures for higher trophic level terrestrial ROCs were estimated as body-weight-

normalized daily doses for comparison to a body-weight-normalized daily dose TRV. The daily dose for a given receptor to a given COPC is given by multiplying the food ingestion rate by the most contaminated food item. The habitat usage factor is equal to 1.0 (ROCs are assumed to be exposed to MSA soil for their entire life span in this step). Separate doses are presented for soil, water and food ingestion contributions, and these are summed to produce the total dose for each ROC.

4.2.2 Aquatic Food Web

Bioaccumulation factors for aquatic invertebrates, plants, and fish used for the determination of exposure by the raccoon, mallard duck, belted kingfisher, and great blue heron are shown in Table 11. In the absence of aquatic invertebrate BAFs, a BAF =1.0 was used.

Fish BAFs were used to estimate the concentration of COPCs in sediment that is transferred to fish living in that system. The equation used to make this estimate is:

$$[X]_{fish} = [x]_{sediment} \times BAF_{sediment}$$

where:

$[X]_{fish}$ = the concentration of chemical X in fish,
$[X]_{sediment}$ = the concentration of chemical X in the sediment,
BAF = the bioaccumulation factor.

The bioconcentration factor (BCF) is used to approximate the chemical concentrations found in prey items (fish) living in water at certain chemical concentration. The equation used to estimate this concentration is:

$$[X]_{fish} = [x]_{surface\ water} \times BCF_{surface\ water}$$

where:

$[X]_{fish}$ = the concentration of chemical X in fish (wet weight),
BCF = the bioaccumulation factor,
and $[X]_{surface\ water}$ = the concentration of chemical X in the surface water.

Most BAFs are less than 1.0, indicating that expected concentrations in organisms are smaller than those found in soil or sediment. Most fish BCF's are much higher than 1.0 due to the ease with which many contaminants from surface water can move across the gill membranes. Higher trophic-level organisms that subsist on fish such as the belted kingfisher are exposed indirectly to the contaminants in the sediment and surface water via the food source. Fish, as a food source, can be exposed to the surface water contaminants directly and the sediment contaminants indirectly (via dietary uptake of benthic macroinvertebrates). A caution here, however, is that many bioaccumulative contaminants (organic compounds, especially) are fairly hydrophobic (insoluble in water) and are only present in low concentrations in water. For many of these contaminants, the food chain pathway (sediments – plants and macroinvertebrates – fish – birds and mammals) is the major route by which they occur in receptors.

4.2.3 Terrestrial and Aquatic Upper Trophic Level Dosage

The total dose to upper trophic level organisms is:

$$Dose_{total} = Dose_{food} + Dose_{soil/sediment} + Dose_{water}$$

where:

$Dose_{total}$	=	Total daily dose of COPC received by receptor; mg COPC/kg-body wt./day
$Dose_{food}$	=	Daily dose of COPC received by receptor; mg COPC/kg-body wt./day from most contaminated food item
$Dose_{soil/sediment}$	=	Daily dose of COPC received by receptor; mg COPC/kg-body wt./day from incidentally ingested soil/sediment
$Dose_{water}$	=	Daily dose of COPC received received by receptor; mg COPC/L/day from ingestion of water

The total dose from food is given by:

$$Dose_{food} = F_f \times U \times C_f$$

where:

F_f = Total daily feeding rate in kg food/kg-body weight of ROC/day (wet basis)

U = Habitat usage factor (fraction of habitat range represented by site) for receptor; assumed to be 1.0 for this food web

C_f = Concentration of COPC in food; calculated using the maximum dose as determined in each contaminated food item (mg COPC/kg food)

The total dose from incidental ingestion of soil/sediment is given by:

$$Dose_{soil/sediment} = F_s \times U \times C_s$$

where:

F_s = Total daily incidental soil/sediment feeding rate in kg soil or sediment/ kg-body weight of ROC/day (wet basis)

U = Habitat usage factor (fraction of habitat range represented by site) for receptor; assumed to be 1.0 for this food web

C_s = Concentration of COPC in soil/sediment; mg COPC/kg soil/sediment (dry basis)

The total daily soil/sediment feeding rate is given by:

$$F_S = F_f \times F_{soil/sediment}$$

where:

F_s = Total daily incidental soil/sediment feeding rate in kg soil/day (wet basis)

F_f = Total daily feeding rate in kg food/day (wet basis)

$F_{soil/sediment}$ = Fraction incidental soil/sediment ingestion as a proportion of food ingestion rate

Lastly, the total dose from water is given by:

$$Dose_{water} = F_w \times U \times C_w$$

when:

F_w = Total daily water ingestion rate in water/kg body weight of ROC/day

U = Habitat Usage Factor (fraction of habitat range represented by site) for receptor; assumed to be 1.0 for this food web.

F_w = Concentration of COPC in water; mg COPC/L water.

Information necessary for this calculation includes: organism body weight (BW), food ingestion rate (F_f), fraction incidental soil/sediment ingestion as a proportion of food ingestion rate ($F_{soil/sediment}$), and analyte concentrations of ingested materials. Ingested media include both abiotic (soil) and biotic (food item) materials. Information specifically relevant to the ecology of the ROC (i.e., body weights, food ingestion rates, and incidental soil ingestion rates) were obtained from published sources (Table 12).

Upper trophic level terrestrial receptors that utilize aquatic habitat, like the raccoon or kingfisher, are exposed by direct contact or through ingestion of food exposed to this sediment. As with soil, the starting point for the evaluation of aquatic receptors is the concentration of each COPC in the solid matrix, in this case sediment.

4.3 DIRECT EXPOSURE OF BENTHIC AND AQUATIC COMMUNITIES TO SEDIMENT AND SURFACE WATER

The relevant pathway for exposure of COPCs in the sediments to benthic communities and aquatic communities for surface water is chronic exposure to sediment and surface water contaminants that may exhibit a detrimental effect on survival and growth. Maximum sediment and surface water concentrations were compared to sediment and surface water toxicity reference values. It was assumed that the COPCs are 100% bioavailable to the organisms for uptake. As with terrestrial exposures, risk to organisms was based on a calculation of an EQ:

Ecological Quotient (EQ) = Maximum Sediment or Surface Water Concentration / Sediment or Surface Water Toxicity Reference Value

4.4 INDIRECT EXPOSURE OF MAMMALS AND BIRDS TO SEDIMENT AND SURFACE WATER

The relevant pathway through which mammalian and avian ROCs dependent on aquatic-derived food are exposed to sediment and surface water COPCs is through chronic exposure to sediment and surface water contaminants via dietary uptake. The ROCs occupy different feeding guilds, but have diets that contain potential vectors for site-related sediment and surface water contaminants. Similar

to the terrestrial food web analyses described above, the Step 2 aquatic risk assessment assumed that all ROCs consumed only the most contaminated food item. Incidental sediment and surface water ingestion also was included in this assessment.

In Step 2, bioaccumulative COPC concentrations in food organisms were calculated as the maximum sediment or surface water concentration multiplied by the maximum BAF/BCF for sediment and surface water. Similar to soil exposure values, all dietary concentrations are presented on a dry-weight basis, but dietary contaminants are assumed to be consumed at a much higher wet-weight basis.

Dietary exposures for ROCs were estimated as body-weight-normalized daily doses for comparison to a body-weight-normalized daily dose TRV. The daily dose for a given receptor to a given COPC is given by multiplying the total feeding rate by the most contaminated food item. The habitat usage factor is assumed to be equal to 1.0 (100 percent usage at MSA) for this food web. Separate doses are presented for sediment, surface water, and food contributions and then summed to produce the total dose for each ROC. The equations involved in this type of exposure are similar to those discussed for soil exposure (Section 4.2.1), although soil concentration is replaced with sediment or surface water concentrations.

Information specifically relevant to the ecology of the aquatic ROCs (i.e., body weights, food ingestion rates, and incidental sediment ingestion rates) is presented in Table 12. The primary source used for these exposure parameters was EPA (1993).

4.5 TOXICITY ASSESSMENT

Lower trophic level receptor species were evaluated based on those taxonomic groupings for which media-specific TRVs have been developed. As such, specific species of aquatic biota (e.g., fish and macroinvertebrates) were not chosen as receptor species because of the limited information available for specific species and because aquatic biota are dealt with on a community level via a comparison to surface water and sediment TRVs. Similarly, terrestrial plants and soil invertebrates (earthworms as standard surrogate) were evaluated having soil TRVs developed specifically for these groups.

Upper trophic level receptor exposures (via food webs) to chemicals present in surface soil, surface water, and/or sediment were determined by estimating the chemical concentrations in the most contaminated dietary component for each receptor as described in the previous section. Incidental ingestion of soil or sediment, and ingestion of drinking water, was included when calculating the

total exposure. Dietary intakes for each upper trophic level receptor were calculated as per the Technical Memorandum Section 5.3.

4.6 RISK CHARACTERIZATION FOR STEP 2

The risk characterization portion of the ERA used the information generated during the two previous parts of the ERA (problem formulation and analysis) to estimate potential risks to ecological receptors at the level of conservatism applied (screening or baseline). Also included is an evaluation of the uncertainties associated with the models, assumptions, and methods used in the ERA, and their potential effects on the conclusions of the assessment.

The main objective of risk characterization at the screening level (termed risk calculation) is to derive a list of COPCs. As part of this risk calculation, the exposure concentrations (abiotic media) or exposure doses (upper trophic level receptor species) are compared with the corresponding TRVs to derive risk estimates using the hazard quotient (HQ) method (Table 13 and 14). Consistent with the Technical Memorandum, HQs were calculated by dividing the chemical concentration in the medium being evaluated by the corresponding medium-specific TRV or by dividing the exposure dose by the corresponding ingestion-based TRV. HQs equaling or exceeding 1.0 indicate the potential for unacceptable risk, as the chemical concentration or dose (exposure) equals or exceeds the TRV (effect). However, TRVs and exposure estimates are derived using intentionally conservative assumptions at the screening level such that HQs greater than or equal to 1.0 do not necessarily indicate that risks are present or impacts are occurring. Rather, it identifies chemical-pathway-receptor combinations requiring further evaluation using more realistic exposure scenarios and assumptions. Following the same reasoning, HQs less than one indicate that risks are unlikely, enabling a conclusion of negligible risk to be reached with high confidence.

USEPA (1997) guidance specifies that a screening ecotoxicity value should be "equivalent to a documented or best conservatively estimated chronic No Observed Adverse Effect Level (NOAEL)." Since there is wide variation in the literature on NOAELs, risks were also calculated for conservatively estimated Lowest Observed Adverse Effect Levels (LOAELs) to provide some frame of reference for the results.

Sample et al. (1996) was used as the primary source for NOAEL and LOAEL TRVs for mammals and birds. When analyte/receptor combinations were not located in Sample et al. (1996), other scientific literature (i.e., ATSDR 1990, 1993a, 1993b, 1993c, 1994a, 1994b, 1995, 1996, 1997, 1998,

1999, Coulston and Kolbye 1994, USEPA 1995b, Eisler 1996, 1989, USEPA 1999c, Blus 1996, Hill et al. 1975, Wiemeyer 1996, TERRETOX 2002, Rigdon and Neal, 1963) were used to select alternative toxicity values.

COPCs that had HQs of NA (i.e., Not Available) do not have defined TRVs. These COPCs cannot be eliminated as a concern, although the risk they pose cannot be quantified. Such COPCs were considered an uncertainty in Step 2 and carried forward to Step 3 of the ERA process.

For Step 2, the potential hazards were characterized through comparisons of exposure (i.e., dosage) concentrations (using the maximum soil concentration of each COPC at the MSA Site multiplied by its 90th percentile BAF for the most contaminated food item) to the no observed adverse effect level (NOAEL) TRVs, listed in Table 13.

Summaries of the calculated EQ's, to soil invertebrates based on surface soil COPC concentrations, are presented in Table 15. Summaries of the calculated EQ's to the terrestrial plant receptors, based on surface soil COPC concentrations, are presented in Table 16.

4.7 TERRESTRIAL RECEPTOR RISK CHARACTERIZATION RESULTS

4.7.1 Avian Terrestrial Species

The risks from exposure of the mourning dove, American robin, and red-tailed hawk are presented in Appendix A and summarized in Table 17.

Mourning dove

Seven inorganic COPCs were determined to pose potential risks to the dove through dietary exposure. Highest HQ_N (Hazard Quotient based on no effect levels) values (> 10.0) were observed for chromium, lead, and zinc, while cadmium, copper, mercury, and selenium HQ_Ns were < 10.0. Only two organic compounds, fluoranthene and pyrene, resulted in HQ_N's > 1.0 (1.90 and 1.34, respectively). 4-Bromophenyl-phenylether, 4-Chlorophenyl-phenylether, and hexachloroethane were retained as COPCs in Step 2 because of the lack of NOAELs for the mourning dove.

American robin

Seven inorganic COPCs were determined to pose potential risks to the robin through dietary exposure (cadmium, chromium, copper, lead, mercury, selenium, and zinc). A pesticide, Toxaphene, and six semivolatile organic compounds (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysane, fluoranthene, and pyrene) also pose a risk as evidenced by HQ_Ns > 1.0. Three SVOCs, 4-Bromophenyl-phenylether, 4-Chlorophenyl-phenylether, and hexachloroethane, were moved to Step 3 due to the lack of NOAELs for the American robin.

Red-tailed hawk

Four inorganic COPCs were determined to be a potential risk to the red-tailed hawk through dietary exposure (cadmium, chromium, lead, and zinc). Because NOAEL values were not available for 4-Bromophenyl-phenylether, 4-Chlorophenyl-phenylether, and hexachloroethane, these COPCs were retained in Step 2.

4.7.2 Mammalian Terrestrial Species

Potential hazards to mammalian species were characterized through comparisons of exposure concentrations to the NOAEL TRVs, listed in Table 13. The risks to terrestrial mammals including the short-tailed shrew, meadow vole, red fox, and white-footed mouse are presented in Appendix A and summarized in Table 17.

Short-tailed Shrew

Six inorganic COPC were determined to pose potential risks to the shrew through dietary exposure (cadmium, chromium, copper, lead, selenium, and zinc), as well as seven SVOCs including: benzo(a)anthracene, benzo(a)phyrene, benzo(b)fluoranthane, benzo(k)fluoranthene, chrysene, indeno (1,2,3-cd) perylene, and pyrene. The SVOCs 4-Bromophenyl-phenylether and 4-Chlorophenyl-phenylether, were moved to Step 3 due to the lack of NOAELs for the short-tailed shrew.

Meadow Vole

Six inorganic COPCs were determined to pose potential risks to the vole through dietary exposure (cadmium, chromium, copper, lead, selenium, and zinc). Five SVOC, including benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and pyrene also pose a risk to the meadow

vole as evidenced by HQ_N's exceeding 1.0. The SVOCs, 4-Bromophenyl-phenylether and 4-Chlorophenyl-phenylether, were moved to Step 3 due to the lack of NOAELs for the meadow vole.

Red Fox

Six inorganic COPC were determined to pose potential risks to the red fox through dietary exposure (cadmium, chromium, copper, lead, selenium, and zinc). Eight SVOC's benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, and pyrene also pose potential risks to the red fox as evidenced by HQ_Ns exceeding 1.0. Due to lack of NOAEL values, 4-bromophenyl-phenylether and 4-chlorophenyl-phenylether were retained in Step 2.

White-footed mouse

Six metals (cadmium, chromium, copper, lead, selenium, and zinc) were determined to pose a potential risk. Additionally, nine SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)perylene, and pyrene) were calculated to be present at concentrations that could pose risks to the white-footed mouse. As with the other terrestrial mammal receptors, NOAEL values were not available for 4-bromophenyl-phenylether or 4-chlorophenyl-phenylether, therefore these COPCs were retained in Step 2.

4.8 STEP 2 AQUATIC RECEPTOR RISK CHARACTERIZATION RESULTS

Summaries of the direct exposure risks to benthic invertebrates and aquatic communities are reported in Tables 18 and 19, respectively. Nine metals (cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc), 21 semivolatile organic compounds, and seven volatile organic compounds were determined to have high enough concentrations in the sediment to have EQ_{max} values in excess of 1.0. In addition, EQ_{max} values could not be calculated for two metals, five pesticides, 33 semivolatile compounds, and 37 volatile compounds because no TRV was available.

Total and dissolved cadmium, copper, lead, silver, and dissolved zinc were present in the water column in sufficient concentrations to have EQ_{max} values above 1.0. Additionally, EQ_{max} values in excess of 1.0 were calculated for nine semivolatile compounds. There were 19 semivolatile compounds and volatile compounds for which no TRV values were available.

Details of the Step 2 aquatic food-web risks characterization are found in Appendix B and summarized in Table 20.

4.8.1 Avian Aquatic Species

Mallard

Seven inorganic COPCs pose a potential risk to the mallard due to HQs in excess of 1.0, (cadmium, chromium, copper, lead, mercury, selenium, and zinc). 4-Bromophenyl-phenylether, 4-Chlorophenyl-phenylether, hexachloroethane, hexachlorocyclopentadiene, 1,1,1,2-tetrachloroethene, and 1,1,2,2-tetrachloroethene were also moved to Step 3 due to the lack of NOAELs for the mallard.

Belted Kingfisher

Seven inorganics (total and dissolved cadmium, total chromium, total mercury, total selenium, and total and dissolved zinc), and thirteen SVOC were calculated as having a potential risk to the belted kingfisher as evidenced by HQ_Ns > 1.0. Four SVOCs (4-Bromophenyl-phenylether, 4-Chlorophenyl-phenylether, hexachloroethane, hexachlorocyclopentadiene) and two VOCs (1,1,1,2-tetrachloroethane, and 1,1,2,2-tetrachloroethane) were retained in Step 2 due to the lack of NOAELs for the belted kingfisher.

Great blue heron

Seven inorganics (total and dissolved cadmium, total chromium, total mercury, total selenium, and total and dissolved zinc), and thirteen SVOCs were determined to pose a risk to great blue heron. Additionally, because of the lack of NOAEL values available for hexachloroethene, hexachlorocyclopentadiene, 4-bromophenyl-phenylether, 4-chlorphenyl-phenylether, 1,1,1,2-tetrachloroethane, and 1,1,2,2-tetrachloroethane, these COPCs were retained in Step 2.

4.8.2 Mammalian Aquatic Species

Raccoon

Eleven inorganics (total and dissolved cadmium, copper, and zinc; total chromium, lead, mercury, nickel, selenium) and twelve SVOC posed a risk to the raccoon as evidenced by HQ_Ns > 1.0. 4-

Bromophenyl-phenylether and 4-Chlorophenyl-phenylether were lacking any toxicity information and were thus moved to Step 3 and labeled as uncertainties.

4.9 SUMMARY OF STEP 2 ECOLOGICAL RISK SCREENING

Table 21 summarizes the ecological COPC that remain after the Step 2 ecological risk screening. 4-Bromophenyl-phenylether, 4-Chlorophenyl-phenylether, hexachloroethane, hexachlorocyclopentadiene, 1,1,1,2-tetrachloroethane, and 1,1,2,2,-tetrachloroethane remain as COPCs for terrestrial and aquatic receptors because they exceeded Step 1 screening values and no toxicity threshold values are available for these chemicals. Consequently it is not possible to determine if the presence of these six chemicals in various media pose unacceptable risks. Other COPC/receptor combinations for which no toxicity values were available are noted as such in Table 21 and represent an uncertainty in the Step 2 ERA.

4.10 SCIENTIFIC MANAGEMENT DECISION POINT I

Results summarized in Table 21 indicate that several COPCs are present at Martin State Airport Study Site and that some of these pose potential risks to terrestrial and/or aquatic ROCs based on conservative exposure assumptions. A review of the site data that were used as the basis for calculating Step 2 risks suggests that there are sufficient contaminant data, and that data were of sufficient quality, to evaluate Step 2 risks to ROCs in the different media present at the site (surface soil, surface water, and sediment). Thus, there do not appear to be any important data gaps present at this stage of the ERA. Given the potential risks calculated in the Step 2 ERA, it appears appropriate and necessary to proceed to Step 3 of the ERA framework and further evaluate the potential for ecological risks of remaining COPCs at the MSA Site.

SECTION 5
STEP 3 RISK ASSESSMENT

5.1 COPCs AND ROCs IN THE STEP 3 ECOLOGICAL RISK ASSESSMENT

The Step 2 exposure assessment consisted of a conservative food web model and exposure assessment analysis. COPCs which had HQs less than 1.0 for all ROCs are considered to present acceptable risk to ecological resources and were not evaluated further in this section. COPCs for which no approved toxicity thresholds were available could, however, present potential risks to these COPC/ROC pairs and therefore, cannot be eliminated. Instead, risks in these cases are evaluated by examining in greater detail the spatial pattern and distribution of concentration values in a given media and then comparing these data to available effects data in the literature. Remaining COPCs that have TRVs were subjected to Step 3 Problem Formulation (EPA, 1997), in accordance with the approved Technical Memorandum. This refinement of the exposure assessment is summarized below. The risk calculations in the food-web models were revisited using refinements of exposure assumptions used in the Step 2 ERA, including more realistic ROC exposure assumptions and appropriate exposure concentrations.

The list of media/COPC/ROC combinations that were quantified in the following sections are summarized in Table 21.

5.2 STEP 3 EXPOSURE ASSESSMENTS

The purpose of the Step 2 exposure assessment is to quantify the degree of contact between ecological ROCs and COPCs identified at the site. The Step 3 exposure assessment allows for more realistic exposure assumptions than those found in the conservative Step 2 exposure assessment. The factors that make risk quantification more realistic are discussed below in a Step 3 exposure assessment

5.2.1 Use of Appropriate Exposure Concentrations

The Step 2 exposure assessment includes the assumption that ROCs are exposed to the maximum detected concentration found across the site. In Step 3, all exposures were estimated based on the arithmetic mean concentration in a given media at the MSA Site (Table 22 and 23), consistent with USEPA guidance (1997) and the Technical Memorandum (Tetra Tech, 2004).

5.2.2 Use of More Realistic ROC Exposure Assumptions

The Step 2 food web maximized exposure by using the smallest body weight for the highest food ingestion rates found in the literature and using the dry weight concentration of prey items. The Step 3 exposure assessment utilizes mean or median body weights and food consumption rates shown in Tables 24 for terrestrial and aquatic receptors consistent with the Technical Memorandum (Tetra Tech, 2004). The wet weight concentrations of prey items was also used in the food-web analysis.

5.2.3 Use of Appropriate Home Ranges

In the Step 2 ERA the home range of the individual receptors was assumed to be only as large as the study site. In Step 3, the appropriate Area Use Factor (AUF) is used in calculating the dosage to each receptor. This more realistic method is particularly relevant to higher trophic levels of birds and mammals (e.g., fox), which often require fairly large home ranges and are not expected to inhabit MSA property 100% of their life span.

5.3 TOXICITY ASSESSMENT

Toxicity values presented in Section 4.6 are used for both the Step 2 and 3 exposure assessments. However, while LOAEL toxicity values were presented in Section 4.6, they were not used to evaluate risk, consistent with the Step 2 screening risk assessment procedures. Step 3 evaluates risks based on both NOAEL and LOAEL to enable a more realistic assessment. HQ_N's are hazard quotients calculated based on NOAELs, while HQ_L's are hazard quotients calculated based on LOAELs. The comparison of site mean concentrations in Step 3 to NOAELs and LOAELs is important due to the fact that NOAELs and LOAELs are scientifically derived values that could be an order of magnitude different. Many times, the effects are observed at a certain concentration (LOAEL) and the NOAELs are extrapolated by decreasing the concentration by an order of magnitude. Therefore, actual risk is better characterized by using the LOAEL along with the NOAELs. Risks based on LOAEL can be placed into the context of risk management to determine if it is necessary to either remediate the site, obtain additional data, or if risks are acceptable to populations and communities of ecological receptors and no further action is necessary.

5.4 STEP 3 RISK CHARACTERIZATION RESULTS

5.4.1 Step 3 Risk From COPCs in Surface Soil

Terrestrial Plants and Soil Invertebrates

Effects on soil invertebrates were determined using the Ecological Quotient of the maximum soil concentrations (EQ_{max}) in Step 2 and mean (EQ_{mean}) soil concentration in Step 3 as compared with the soil TRV. Table 25 shows the results of the Step 3 ERA for soil invertebrates in surface soil. Three inorganics (chromium, copper, and mercury), had EQs in excess of 1.0, indicating that invertebrate populations at the MSA Site are potentially at risk from those chemicals. The risks from five inorganics, four pesticides, 48 SVOCs and 34 VOCs were unable to be determined because toxicological information surrounding their effects on soil invertebrates is not available.

Table 26 summarizes the results of the STEP 3 ERA for terrestrial plants in surface soil. Four inorganics (chromium, lead, selenium, and thallium) had EQs in excess of 1.0 indicating that plant populations at the MSA Site are potentially at risk from these chemicals. The risks from one inorganic, four pesticides, 48 SVOCs, and 36 VOCs were unable to be determined because toxicological information surrounding their effects on terrestrial plants is not available.

Terrestrial Mammals and Birds

Step 3 food web risks calculations are detailed in Appendix C and calculated HQs are presented in Table 27. Based on the Step 3 exposure assessment, chromium, lead, and selenium were found to present a potential risk to at least one receptor in surface soils (HQ_N's > 1.0). There was only one COPC, selenium, which had both HQ_N and HQ_L (Hazard Quotient based on lowest effect level) exceeding 1.0, and this was for the short-tailed shrew. Because HQ_Ls for chromium and lead were < 1.0, this suggests that risks associated with these metals to terrestrial fauna are within the bounds of acceptability (HQ_N > 1.0; and HQ_L < 1.0).

5.4.2 Step 3 Risk From COPCs in Sediment and Surface Water

Benthic Invertebrates

The relevant pathway for benthic communities is chronic exposure to sediment contaminants that may exhibit a detrimental effect on survival and growth. Risk to benthic organisms for the Step 3 ERA was based on a calculation of an Ecological Quotient:

Ecological Quotient = Mean Sediment Concentration / Sediment TRV

Consistent with the approved Technical Memorandum, mean sediment concentrations were used in Step 3 exposure assessment.

Table 28 shows EQ_{mean} for benthic invertebrates at the MSA Site. Seven of the nine inorganics identified in Step 2 as presenting a potential risk to benthic invertebrates (cadmium, chromium, copper, lead, nickel, selenium, and zinc) had EQ_{mean} greater than 1.0 in Step 3, therefore these seven inorganics all pose a risk to benthic invertebrates. Certain organic chemicals including twenty SVOCs and six VOCs also had EQ_{mean} in excess of 1.0, indicating possible risk to benthic invertebrates.

The risk from two inorganics, five pesticides, 33 SVOCs, and 37 VOCs were unable to be determined because toxicological information pertaining to their effects on benthic invertebrates is unavailable.

Aquatic Communities

The relevant pathway for aquatic communities is chronic exposure to surface water contaminants that may exhibit a detrimental effect on survival and growth. As with the benthic invertebrates, risk to aquatic organisms for the Step 3 ERA was based on a calculation of an Ecological Quotient:

Ecological Quotient = Mean Surface Water Concentration/Surface Water TRV

As with sediment, the use of mean surface water concentrations is appropriate in a Step 3 exposure assessment because the toxicity endpoints to which they are being compared are those that result from exposure to the aquatic organisms over a long period of time (weeks to months).

Table 29 shows EQ_{mean} for aquatic communities at the MSA Site. All nine of the inorganic chemicals (including the total and dissolved forms of: cadmium, copper, lead, silver; and dissolved zinc) identified in Step 2 also had EQ_{mean} greater than 1.0 indicating possible risk to aquatic communities. Nine SVOCs were also identified as posing a possible risk ($EQ_{mean} > 1.0$) to aquatic communities. The risks from 19 SVOCs and 19 VOCs were unable to be determined because toxicological information on their effects on aquatic communities is unavailable.

Aquatic Mammals and Birds

The risks for aquatic ROCs are detailed in Appendix D and are summarized in Table 30. No risks were associated with any COPC to the raccoon or mallard. Low risks were associated with total chromium and hexachlorobenzene to the great blue heron ($HQ_N = 3.62$ and 2.15, respectively; $HQ_L =$ 0.72 and 0.41, respectively). High risks ($HQ_N > 1.0$ and $HQ_L > 1.0$) were associated with total mercury to the belted kingfisher and great blue heron.

SECTION 6
UNCERTAINTY ASSOCIATED WITH THE STEP 3 ERA

Uncertainties are present in all risk assessments because of the limitations of the available data and the need to make certain assumptions and extrapolations based upon incomplete information. The uncertainty in this ERA is mainly attributable to factors presented in the following subsections.

6.1 REPORTING LIMITS

One half the maximum reporting limits for some analytes exceeded applicable TRVs in some media; these chemicals were identified as COPCs.

Twenty-two chemicals were identified in Step 1 because half the RL exceeded the TRV for sediment. Thirteen were deemed bioaccumulative and evaluated in Steps 2 and 3 food-web analyses of the ERA. Of these thirteen, two (selenium and hexachlorobenzene) resulted in HQ_L greater than 1.0 indicating possible risk to upper trophic level receptors. This uncertainty could be addressed by collecting a few additional sediment samples at targeted locations and using analytical methods having lower detection limits for these two chemicals.

Seventeen chemicals are identified in Step 1 as exceeding the TRV for surface water because half the RL was greater than the TRV. Of these 17 only 10 were deemed bioaccumulative and evaluated in Steps 2 and 3 food-web analyses of the ERA. Of these 10, seven resulted in Step 3 HQ_Ns and HQ_Ls greater than 1.0 indicating possible risk including total and dissolved cadmium, total and dissolved lead, total and dissolved silver, and hexachlorobenzene. Again, this uncertainty could be addressed through the collection of a few samples and analytical methods having lower detection limits.

Eighteen chemicals were identified as surface soil COPCs in Step 1 because one-half the RL exceeding the TRV. Of these eighteen only 7 were deemed bioaccumulative and evaluated in Steps 2 and 3 food-web analyses. Only one of the seven chemicals selenium, resulted in HQ_Ns in excess of 1 in Step 3. Therefore, analytical reporting limits were not a significant source of uncertainty for most soil ERA results.

6.2 SELECTION OF COPCS

Chemicals without available TRVs for a medium were retained as COPCs in the Step 3 portion of the assessment.

Ninety chemicals examined lacked a screening TRV for sediment in Step 1. Of these ninety, only seven were potentially bioaccumulative and analyzed in Step 2 and 3 food-web analyses. No sediment chemical, lacking a TRV exceeded an HQ_L of 1 in Step 3, although hexachloroethane, hexachlorocyclopantadiene, 4-Bromophenyl phenyl ether, 4-Chlorphenyl phenyl ether, 1,1,1,2-tetrachloroethane, and 1,1,2,2-tetrachloroethane NOAELs and LOAELs and uncertainty exists regarding those chemicals that were unable to be analyzed in Step 2 and 3 due to the lack of toxicological data.

Forty-one chemicals examined in surface water were moved to Step 2 due to the lack of surface water TRVs. Of these forty-one, only seven were potentially bioaccumulative and thus examined in Steps 2 and 3. No surface water chemical lacking a TRV exceeded an HQ_L of 1 in Step 3, although 4-Chlorphenyl phenyl ether was moved to Step 3 due to the lack of NOAELs and LOAELs. Uncertainty exists regarding 4-Chloropheny phenyl ether because it was unable to be analyzed in Step 2 and 3 due to the lack of toxicological data.

Sixty-two chemicals examined in surface soils were moved to Step 2 due to the lack of surface soil TRVs. Of these sixty-two, only seven were potentially bioaccumulative and thus examined in Step 2 and 3 food-web analyses. No surface soil COPC identified due to the lack of a TRV resulted in an HQ_L in excess of 1.0 in the Step 3 food-web analysis. Uncertainty exists regarding the three chemicals (4-Bromophenyl phenyl ether, 4-Chlorphenyl phenyl ether, hexachloroethane that were unable to be analyzed in Step 2 and 3 due to the lack of toxicological data.

6.3 EVALUATION OF SOILS

The quantitative evaluation of chemical concentrations in soils was generally restricted to surface soils from the 0 to 12 inch depth range, where the highest exposures for most ecological receptors would be expected to occur. Some ecological receptors may be exposed to deeper soils (e.g., down to two feet below the ground surface) at least periodically.

6.4 SEDIMENT TRVS

Most of the sediment TRVs used in the ERA do not consider site-specific bioavailability to ecological receptors and are typically based on correlational studies (termed the Screening-Level Concentration approach). These factors tend to make the resulting TRVs conservative and may overestimate potential risk.

6.5 INGESTION TRVS

Data on the toxicity of many chemicals to the receptor species were sparse or lacking, requiring the extrapolation of data from other wildlife species or from laboratory studies with non-wildlife species. This is a typical extrapolation for ERAs because so few wildlife species have been tested directly for most chemicals. The uncertainties associated with toxicity extrapolation were minimized through the selection of the most appropriate test species for which suitable toxicity data were available. The factors considered in selecting a test species to represent a receptor species included taxonomic relatedness, trophic level, foraging method, and similarity of diet.

6.6 CHEMICAL MIXTURES

Information on the ecotoxicological effects of chemical interactions is generally lacking, which required (as is standard for ERAs) that the chemicals be evaluated on a chemical-by-chemical basis in the comparison to TRVs. This could result in an underestimation of risk (if there are additive or synergistic effects among chemicals) or an overestimation of risks (if there are antagonistic effects among chemicals).

6.7 FOOD WEB EXPOSURE MODELING

Chemical concentrations in terrestrial and aquatic food items (plants, earthworms, small mammals, benthic invertebrates, and fish) were modeled from measured media concentrations and were not directly measured. The use of generic, literature-derived exposure models and bioaccumulation factors introduces some uncertainty into the resulting estimates. The values selected and methodology employed was intended to provide a conservative (Step 2) or more realistic (Step 3) estimate of potential food web exposure concentrations.

Another source of uncertainty is the use of default assumptions for exposure parameters such as BCFs and BAFs. Although BCFs or BAFs for many bioaccumulative chemicals were readily

available from the literature and were used in the ERA, the use of a default factor of 1.0 to estimate the concentration of some chemicals in receptor prey items is a source of uncertainty.

6.8 MEAN VERSUS MAXIMUM MEDIA CONCENTRATIONS

As is typical in an ERA, a finite number of samples of environmental media are used to develop the exposure estimates. The maximum measured concentration provides a conservative estimate for immobile biota or those with a limited home range. The most realistic exposure estimates for mobile species with relatively large home ranges and for species populations (even those that are immobile or have limited home ranges) are those based upon the mean chemical concentrations in each medium to which these receptors are exposed. This is reflected in the wildlife dietary exposure models contained in the Wildlife Exposure Factors Handbook (EPA 1993), which specify the use of average media concentrations. Given the mobility of the upper trophic level receptor species used in the ERA, the use of maximum chemical concentrations (rather than mean concentrations) to estimate the exposure via food webs is probably conservative in Step 1 and 2 of the SERA. This conservatism was reduced to more realistic levels in the Step 3 evaluation through the use of mean concentration values.

6.9 EXTRAPOLATION OF NOAELS FROM CALCULATED LOAELS

In cases where a NOAEL for a specific chemical was not available, but a LOAEL had been determined experimentally or where the NOAEL was from a subchronic study, the chronic NOAEL was estimated. EPA (1993) suggests the use of uncertainty factors of 1 to 10 for subchronic to chronic NOAEL and LOAEL estimation. Chronic NOAELs for both Step 3 terrestrial COPC lead and Aroclor 1260 were derived from calculated chronic LOAELs by using an uncertainty factor of 5.

6.10 BACKGROUND CONCENTRATIONS

Background concentrations of chemicals in the different media, independent of MSA, were not explicitly measured for this ERA. Furthermore, comparison of site concentrations with natural background concentrations goes beyond the traditional risk assessment itself. However, such information is useful for risk management decisions because risks may be determined mathematically (due to conservative factors in the ERA process, as summarized previously) but may be highly unlikely in the real world due to major differences in chemical bioavailability, fate processes, and other factors not taken into account in the ERA.

In the Step 3 ERA, risks were limited to piscivorous birds for mercury. Therefore, this section summarizes available information pertaining to background levels of mercury.

Mercury in Water

The concentrations of mercury and methylmercury in largemouth bass, some forage fish, and water column of several Maryland Reservoirs were measured between 2000 and 2002 by The Maryland Department of Natural Resources (MDNR 2003). The mean concentration of total mercury in Loch Raven, Liberty, and Pretty Boy reservoirs was 5.09 ng/L, 1.98 ng/L, and 3.95 ng/L, respectively. This ERA relied on total mercury and not the more bioavailable from methylmercury. Reporting limits used for mercury far exceeded these concentrations.

SECTION 7
ECOLOGICAL RISK SUMMARY

An ecological risk assessment was performed for surface soil, sediment, and surface water associated with the MSA Site. The results of the Step 1 and 2 ERA identified many potential COPCs to ecological receptors at the site, which supported a decision to conduct a more realistic exposure and risk characterization for the site, consistent with USEPA guidance (EPA 1997). Refinements included in the Step 3 ERA included the use of more realistic ROC exposure assumptions and more realistic feeding rates and body weights of receptors.

The Step 2 ERA identified a number of media/COPC/ROC combinations for which acceptable risks were found at the MSA Site. The Step 3 ERA focused on those media/COPC/ROC combinations for which potential risk was identified as a result of the Step 2 ERA and for which appropriate toxicity values were available in the toxicological literature (Table 13 and 14). The absence of appropriate toxicity values for some media/COPC/ROC combinations means that it is not possible to dismiss potential risk for those particular combinations.

Standard ERA practice (EPA 1997) places ecological risk into the context of assessment and measurement endpoints, where assessment endpoints are those characteristics of an environment that need to be protected and measurement endpoints provide distinct measures of this degree of protection. The results of the Step 3 ERA are shown in Table 32 in the context of the defined assessment and measurement endpoints. These results suggest the possibility of risk for some COPCs in certain media and for certain types of receptors. The results of the ERA are discussed below for surface soil at the MSA Site, and surface water and sediment from the ponds at the site and Frog Mortar Creek, adjacent to the MSA property.

7.1 SURFACE SOIL

Based on the initial screen in the Step 1 and 2 ERA (Section 3.0 and 4.0) approximately 122 metals and organic chemicals were identified as COPCs in surface soil at the MSA Site. Identification of a chemical as a COPC does not necessarily imply risk for ecological receptors, rather it is designed to conservatively identify constituents that have the potential for unacceptable risk to receptors.

The Step 3 ERA results for COPCs in surface soil are shown in Table 31. The identified ROCs for soils were terrestrial plants, soil invertebrates, mammals (meadow vole, short-tailed shrew, white-footed mouse, and red fox), and birds (American robin, mourning dove, and red-tailed hawk). The risks to terrestrial plants and invertebrates were defined relative to concentrations of COPCs in surface soil based on media -specific TRVs. As shown in Tables 25 and 26, there were many surface soil COPCs with potential risk to plant and invertebrate populations at the MSA Site. However, no obvious signs of plant or invertebrate stress were observed during the site visit. Given the lack of rare or endangered plant or invertebrate species at this site, risks to terrestrial plants and invertebrates from exposure to COPCs in surface soil at the MSA Site are likely to be minimal.

Acceptable food-web risk was found for the meadow vole, white-footed mouse, and the highest trophic level mammals and birds, the red fox and red-tailed hawk, as NOAEL HQs were all less than 1.0 for these receptors (Table 27). The remaining receptors examined, short-tailed shrew, mourning dove, and American robin, had NOAEL HQs < 1.0 for all COPCs in surface soil with the exception of chromium (mourning dove and American robin), lead (mourning dove), and selenium (short-tailed shrew). The LOAEL HQs for chromium, lead, and selenium were <1.0, however, suggesting that these chemicals have low risk potential at this site. Thus, all terrestrial ERA analyses indicate that dietary exposure of receptors to surface soil represent no risk to these fauna.

7.2 SURFACE WATER

Ecological receptors identified that may be exposed to COPC's in surface water include aquatic communities, mallard ducks, belted kingfishers, great blue heron and raccoons.

The risks to aquatic communities were defined relative to concentrations of COPCs in surface water based on media- specific TRVs. As shown in Table 29, there were many surface water COPCs with potential (EQ_{mean} > 1.0) risks to aquatic communities at the MSA Site as a result of the Step 3 ERA. The lack of rare or endangered animal species at the site, however, may decrease the significance of the calculated risks to aquatic communities from exposure to COPCs in surface water at the MSA Site.

Upper trophic level aquatic receptors were found to be at some potential risk due to mercury. Risks from mercury in water were potentially greatest for the kingfisher and great blue heron, both of which have a substantial percentage of fish in their diet. The raccoon and mallard were found to have no risks from any of the COPCs identified in Step 3 of the ERA.

Risks to piscivorous birds due to mercury in water may be an artifact of the data available. The reporting level for total mercury in water was 1.0 µg/L, a concentration that may be too high given the low toxicity threshold values for mercury and the high bioaccumulation factors used in food web analyses. Using one-half the reporting limit (0.5 µg/L) as mercury concentrations in this screening ERA was sufficient to result in HQs > 10 for piscivorous birds. These HQs were caused by the assumed bioconcentration of mercury by fish (a factor of > 44,000 as indicated in Table 11), not mercury derived from invertebrate food sources and sediment. The uncertainty stemming from the reporting limit can be addressed through some additional sampling and methods with lower detection limits. Furthermore, mercury analysis is especially prone to artifactural contamination from clothes, air, exhaust, and other non-sample sources. Therefore, it may be prudent to conduct some mercury analyses using EPA method 1631, which uses clean techniques and is a more sensitive method than that used thus far.

Mercury Bioavailability

The rate at which mercury is accumulated from aquatic systems is dependent upon many environmental factors including temperature, pH, and diet. A study by Paller and Bowers (2002) determined that species-specific bioaccumulation factors (BAFs) for fish in the Savannah River system varied spatially and temporally by a factor of three to eight. The overall average BAFs in that study ranged from 1.4×10^6 for sunfish to 3.7×10^6 for largemouth bass. In a study of mercury in Maryland Reservoirs, the BAFs for largemouth bass in reservoirs in the vicinity of current study site (Liberty, Prettyboy, and Loch Raven reservoirs) ranged from 2,043 to 6,623. Thus, the BAF will vary with both the species and the system.

A mercury bioaccumulation factor (BAF) of 44,672 was used in the current study to evaluate the risk of mercury concentrations in sediment and water to upper trophic level animals (e.g., great blue heron). The BAF used in the current study is a generic value that is not necessarily reflective of site-specific conditions and subject to considerable uncertainty. Site-specific studies would serve to yield more precise estimates of the potential for bioaccumulation of mercury in the study system. Use of the generic BAF in evaluating these data should be considered an uncertainty in the final assessment of risk from mercury in these systems.

7.3 SEDIMENT

Ecological receptors identified that may be exposed to these COPCs in sediment included benthic invertebrates, mallard ducks, great blue herons, belted kingfishers, raccoons, and muskrats.

The risks to benthic invertebrates were defined relative to concentrations of COPCs in sediment based on medium specific TRVs. Table 28 summarizes sediment COPCs with potential (EQ_{mean} > 1.0) risk to benthic invertebrates at the MSA Site.

Acceptable food-web risk was found for the raccoon and mallard, as all NOAEL HQs were < 1.0 for these receptors (Table 30).

The NOAEL HQ_S for all sediment COPCs except mercury, were < 1.0 for the belted kingfisher. The LOAEL HQ for mercury was also > 1.0. Thus the belted kingfisher may be at risk from mercury in the sediment at the MSA Site.

Risks to upper trophic level ROCs, due to sediment COPCs, varied with the type of receptor and dietary components. Plant eating or omnivorous receptors, such as the mallard and raccoon, were calculated as having less risks (lower HQs) and fewer risks (fewer COPCs causing risks) than the more fish eating receptors, kingfisher and heron.

The NOAEL HQ_S, for great blue heron for all COPCs, were less than 1.0 except chromium (HQ_N = 3.62), mercury (HQ_N = 38.49, and hexachlorobenzene (HQ_N = 2.15). The LOAEL HQs for all COPCs was less than 1.0 except mercury. Therefore, acceptable risk to the great blue heron exists for all COPCs at the MSA Site except mercury. As explained previously for the water matrix, total mercury measurements may have been influenced by artifactural contamination and high reporting limits. These results should be repeated using clean techniques and greater sensitivity if possible.

SECTION 8
SUMMARY AND CONCLUSIONS

In summary, terrestrial organisms (plants and invertebrates, short-tailed shrew, American robin, and mourning dove) are considered to be potentially at low risk from COPCs in surface soil. Acceptable risk was found for the meadow vole, white-footed mouse, red fox, and red-tailed hawk. Aquatic organisms (benthic invertebrates, aquatic communities, belted kingfisher, and great blue heron) are considered potentially at risk from COPCs in surface water and sediment. Acceptable surface water and sediment risks were found for the mallard. The risks associated with the terrestrial and aquatic food web analyses are limited by uncertainties described in Section 6.0. Table 32 summarizes the Step 3 SERA assessment and measurement endpoints and the results of each analysis.

The original conceptual site model, presented in Figure 2 in Section 2.3, summarized the conceptual pathways that receptors are exposed to contaminants through different media. Figure 3 is the conceptual site model after modification to show the risks that were present after the Step 3 ecological risk assessment was conducted (Table 32).

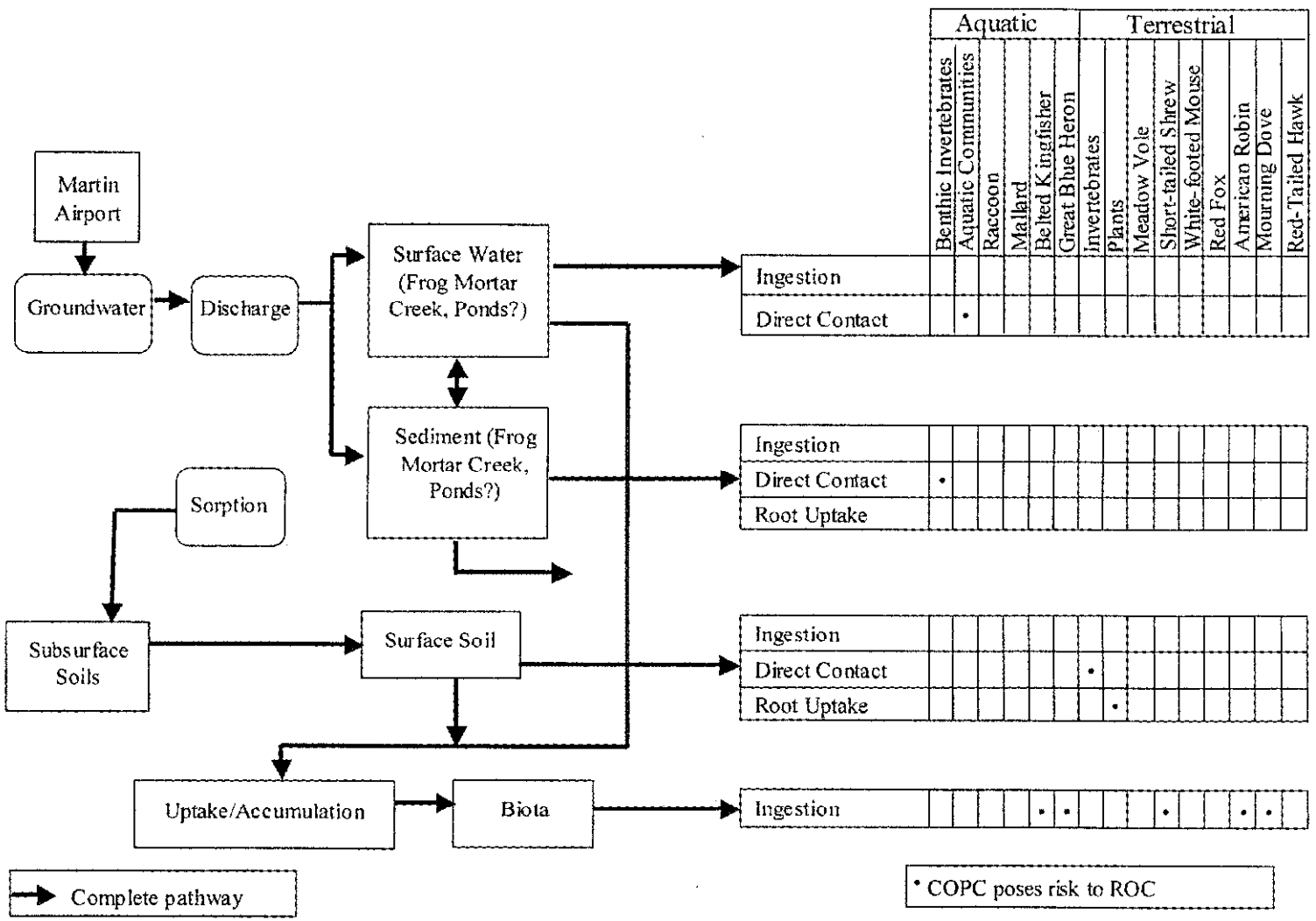

Figure MSA-3. Summary of potential risks for ROC at Martin State Airport .

SECTION 9
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APPENDIX A

TERRESTRIAL SPECIES
STEP 2 HAZARD QUOTIENT VALUES
MARTIN STATE AIRPORT

Ecological Contaminants of Concern	Vole		Shrew		Robin		Red fox		Mourning Dove		White-Footed		Red-Tailed Hawk	
	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l
Cadmium	**33.61**	**3.36**	**37.08**	**3.71**	**44.32**	**3.21**	**26.26**	**5.25**	**6.76**	0.49	**17.82**	**1.78**	**2.60**	0.19
Chromium	**28.97**	**5.80**	**35.18**	**7.04**	**272.76**	**54.55**	**40.73**	**8.16**	**102.87**	**20.57**	**58.51**	**11.70**	**6.91**	**1.38**
Copper	**1.14**	0.86	**1.52**	**1.14**	**3.94**	**3.00**	**4.47**	**3.44**	**3.20**	**2.43**	**4.17**	**3.13**	0.48	0.37
Lead	**3.92**	0.39	**5.22**	0.52	**31.35**	**6.25**	**5.52**	0.55	**79.23**	**7.92**	**14.38**	**1.44**	**1.16**	**0.23**
Mercury	0.13	0.03	0.14	0.03	**4.16**	**2.08**	0.99	0.20	**1.68**	0.84	0.08	0.02	0.01	0.00
Nickel	0.65	0.33	0.77	0.38	0.86	0.62	0.64	0.25	0.51	0.37	0.97	0.49	0.03	0.02
Selenium	**11.75**	**7.14**	**14.30**	**8.79**	**15.65**	**4.59**	**16.38**	**10.01**	**20.27**	**5.95**	**24.46**	**14.97**	**1.48**	0.43
Silver	0.22	0.04	0.24	0.05	0.60	0.12	0.31	0.06	0.06	0.01	0.16	0.03	0.01	0.00
Zinc	**2.90**	**1.45**	**3.28**	**1.64**	**69.04**	**7.64**	**24.11**	**4.83**	**21.11**	**2.34**	**2.37**	**1.18**	**4.95**	0.55
Endosulfan I	0.02	0.00	0.02	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.03	0.01	0.00	0.00
Endosulfan II	0.06	0.01	0.07	0.01	0.02	0.00	0.05	0.01	0.01	0.00	0.08	0.02	0.00	0.00
Toxaphene	0.11	0.02	0.13	0.03	**2.16**	0.43	0.16	0.03	0.53	0.11	0.14	0.03	0.10	0.02
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorphenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.00	0.03	0.01	0.00	0.00	0.01	0.00
Acenaphthylene	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Anthracene	0.00	0.00	0.00	0.00	0.30	0.06	0.00	0.00	0.28	0.06	0.01	0.00	0.05	0.01
Benzo(a)anthracene	0.98	0.20	**1.75**	0.35	**1.12**	0.22	**2.65**	0.53	0.89	0.18	**9.57**	**1.91**	0.18	0.04
Benzo(a)pyrene	**1.65**	0.33	**2.35**	0.47	**1.15**	0.23	**2.32**	0.47	0.71	0.14	**8.07**	**1.61**	0.15	0.03
Benzo(b)fluoranthene	**1.78**	0.36	**2.42**	0.49	**1.11**	0.22	**2.49**	0.50	0.63	0.13	**7.23**	**1.44**	0.13	0.03
Benzo(g,h,i)perylene	0.39	0.08	0.71	0.14	0.46	0.09	**1.11**	0.22	0.37	0.07	**4.01**	0.80	0.08	0.02
Benzo(k)fluoranthene	**1.46**	0.29	**2.03**	0.41	0.96	0.19	**2.04**	0.41	0.57	0.11	**6.51**	**1.30**	0.12	0.02
Chrysene	**1.42**	0.28	**2.23**	0.45	**1.24**	0.25	**2.65**	0.53	0.89	0.18	**9.75**	**1.94**	0.18	0.04
Dibenz(a,h)anthracene	0.19	0.04	0.30	0.06	0.17	0.03	0.35	0.07	0.12	0.02	**1.29**	0.26	0.02	0.00
Fluoranthene	0.01	0.00	0.01	0.00	**2.19**	0.44	0.02	0.00	**1.90**	0.38	0.08	0.02	0.37	0.07
Fluorene	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Hexachlorobutadiene	0.01	0.00	0.01	0.00	0.03	0.01	0.01	0.00	0.02	0.00	0.05	0.00	0.00	0.00
Hexachloroethane	0.00	0.00	0.00	0.00	NA	NA	0.00	0.00	NA	NA	0.00	0.00	NA	NA
Indeno(1,2,3-cd)pyrene	0.74	0.15	**1.10**	0.22	0.56	0.11	**1.11**	0.22	0.37	0.07	**4.15**	0.83	0.08	0.02
Pentachlorophenol	0.13	0.03	0.15	0.03	0.36	0.18	0.19	0.04	0.07	0.03	0.14	0.03	0.01	0.01
Phenanthrene	0.00	0.00	0.00	0.00	0.84	0.17	0.01	0.00	0.77	0.15	0.03	0.01	0.15	0.03
Pyrene	**3.00**	0.60	**4.26**	0.86	**2.08**	0.42	**4.21**	0.85	**1.34**	0.27	**14.53**	**2.89**	0.26	0.05
1,2,4-Trichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,2-Dichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,3-Dichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,4-Dichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Concentrations of Chemicals of Potential Concern Used in the Terrestrial Food-Web Analyses

Chemical	Surface Soil Concentration (mg/kg) (dw)	Water Concentration (mg/L)	Invertebrate Concentration (mg/kg) (dw) 2	Plant Concentration (mg/kg) (dw) 3	Omnivore Concentration (mg/kg) (dw)	Herbivore Concentration (mg/kg) (dw)	Invertivore Concentration (mg/kg) (dw)
Cadmium	13	0.0025	529.1	42.25	6.006	5.824	91.221
Chromium	480	0.0025	1516.8	40.32	167.52	148.32	159.84
Copper	490	0.015	749.7	306.25	271.46	632.1	547.33
Lead	320	0.0025	486.4	149.76	91.52	59.84	108.48
Mercury	0.72	0.0005	14.832	3.6	0.0936	0.13824	0.13824
Nickel	89	0.0025	420.97	125.579	52.421	79.922	51.442
Selenium	12.5	0.0025	7.638	17.1684	7.1991	6.7659	6.7659
Silver	2.1	0.025	32.13	0.0777	1.701	0.0147	1.0521
Zinc	600	0.025	7560	1092	1669.2	1390.2	1740.6
Endosulfan I	0.08	NM	0.48	0.027488	0.08	0.08	0.08
Endosulfan II	0.24	NM	1.44	0.075144	0.24	0.24	0.24
Toxaphene	2.4	NM	14.4	0.29208	2.4	2.4	2.4
4-Bromophenyl phenyl ether	0.27	0.005	0.27	0.015606	0.27	0.27	0.27
4-Chlorphenyl phenyl ether	0.27	0.005	0.27	0.045819	0.27	0.27	0.27
Acenaphthene	0.92	0.005	0.276	0.235888	0.92	0.92	0.92
Acenaphthylene	0.27	0.005	0.0594	0.044631	0.27	0.27	0.27
Anthracene	9.1	0.005	2.912	0.95641	9.1	9.1	9.1
Benzo(a)anthracene	31	0.005	14.88	0.6882	31	31	31
Benzo(a)pyrene	25	0.005	27.25	0.3375	25	25	25
Benzo(b)fluoranthene	22	0.005	29.7	0.3828	22	22	22
Benzo(g,h,I)perylene	13	0.005	5.85	0.0793	13	13	13
Benzo(k)fluoranthene	20	0.005	24.2	0.224	20	20	20
Chrysene	31	0.005	22.63	0.8959	31	31	31
Dibenz(a,h)anthracene	4.1	0.005	3.075	0.02788	4.1	4.1	4.1
Fluoranthene	64	0.005	23.68	3.9488	64	64	64
Fluorene	0.76	0.005	0.152	0.13604	0.76	0.76	0.76
Hexachlorobutadiene	0.27	0.005	0.27	0.019035	0.27	0.27	0.27
Hexachloroethane	0.27	0.005	0.27	0.064773	0.27	0.27	0.27
Indeno(1,2,3-cd)pyrene	13	0.005	12.09	0.0793	13	13	13
Pentachlorophenol	1.35	0.0125	10.8	0.06642	1.35	1.35	1.35
Phenanthrene	25	0.005	8.25	2.885	25	25	25
Pyrene	45	0.005	49.5	3.0915	45	45	45
1,2,4-Trichlorobenzene	0.27	0.0005	0.1512	0.059022	0.27	0.27	0.27
1,2-Dichlorobenzene	0.27	0.0005	0.27	0.147825	0.27	0.27	0.27
1,3-Dichlorobenzene	0.27	0.0005	0.27	0.099171	0.27	0.27	0.27
1,4-Dichlorobenzene	0.27	0.0005	0.27	0.136485	0.27	0.27	0.27

STEP 2 TERRESTRIAL FOOD WEB MODEL FOR THE MEADOW VOLE

Meadow Vole

Body Weight	0.0300000 kg
Food Ingestion Rate	0.0031000 kg/day - dry
Water Ingestion Rate	0.0133000 L/day
Soil Ingestion Rate	0.0002520 kg/day - dry
Area Use Factor	1.0000000

Max Concentrations

Ecological Contaminant of Concern	Soil Concentration (mg/kg) (dw)	Water Concentration (mg/L)	Plant Concentration (mg/kg) (dw)	Invertebrate Concentration (mg/kg) (dw)	Dose (mg/kg/day) (dw)	NOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL mg/kg/day	LOAEL HQ_l
Cadmium	13	0.0025	42.25000	529.10000	54.783975	1.63	**33.61**	16.3	**3.36**
Chromium	480	0.0025	40.32000	1516.80000	160.7691083	5.55	**28.97**	27.7	**5.80**
Copper	490	0.015	306.25000	749.70000	81.59165	71.4	**1.14**	95.2	0.86
Lead	320	0.0025	149.76000	486.40000	52.95044167	13.5	**3.92**	135	0.39
Mercury	0.72	0.0005	3.60000	14.83200	1.538909667	12.1	0.13	60.4	0.03
Nickel	89	0.0025	125.57900	420.97000	44.24894167	67.6	0.65	135	0.33
Selenium	12.5	0.0025	37.65000	16.75000	3.996608333	0.34	**11.75**	0.56	**7.14**
Silver	2.1	0.025	0.07770	32.13000	3.348823333	15.3	0.22	76.6	0.04
Zinc	600	0.025	1092.00000	7560.00000	786.2510833	271	**2.90**	541	**1.45**
Endosulfan I	0.08	NM	0.02749	0.48000	0.050272	2.54	0.02	12.7	0.00
Endosulfan II	0.24	NM	0.07514	1.44000	0.150816	2.54	0.06	12.7	0.01
Toxaphene	2.4	NM	0.29208	14.40000	1.50816	13.5	0.11	67.6	0.02
4-Bromophenyl-phenylether	0.27	0.005	0.01561	0.27000	0.032384667	NA	NA	NA	NA
4-Chlorophenyl-phenylether	0.27	0.005	0.04582	0.27000	0.032384667	NA	NA	NA	NA
Acenaphthene	0.92	0.005	0.23589	0.27600	0.038464667	320	0.00	640	0.00
Acenaphthylene	0.27	0.005	0.04463	0.05940	0.010622667	320	0.00	640	0.00
Anthracene	9.1	0.005	0.95641	2.91200	0.379563333	915	0.00	4575	0.00
Benzo(a)anthracene	31	0.005	0.68820	14.88000	1.800216667	1.83	0.98	9.15	0.20
Benzo(a)pyrene	25	0.005	0.33750	27.25000	3.02805	1.83	**1.65**	9.15	0.33
Benzo(b)fluoranthene	22	0.005	0.38280	29.70000	3.256016667	1.83	**1.78**	9.15	0.36
Benzo(g,h,I)perylene	13	0.005	0.07930	5.85000	0.715916667	1.83	0.39	9.15	0.08
Benzo(k)fluoranthene	20	0.005	0.22400	24.20000	2.670883333	1.83	**1.46**	9.15	0.29
Chrysene	31	0.005	0.89590	22.63000	2.60105	1.83	**1.42**	9.15	0.28
Dibenzo(a,h)anthracene	4.1	0.005	0.02788	3.07500	0.354406667	1.83	0.19	9.15	0.04
Fluoranthene	64	0.005	3.94880	23.68000	2.98675	457	0.01	2287	0.00
Fluorene	0.76	0.005	0.13604	0.15200	0.024307333	457	0.00	2287	0.00
Hexachlorobutadiene	0.27	0.005	0.01904	0.27000	0.032384667	3.38	0.01	33.8	0.00
Hexachloroethane	0.27	0.005	0.06477	0.27000	0.032384667	68.6	0.00	846	0.00
Indeno(1,2,3-cd)pyrene	13	0.005	0.07930	12.09000	1.360716667	1.83	0.74	9.15	0.15
Pentachlorophenol	1.35	0.0125	0.06642	10.80000	1.132881667	8.46	0.13	42.3	0.03
Phenanthrene	25	0.005	2.88500	8.25000	1.064716667	457	0.00	2287	0.00
Pyrene	45	0.005	3.09150	49.50000	5.495216667	1.83	**3.00**	9.15	0.60
1,2,4-Trichlorbenzene	0.27	0.0005	0.05902	0.15120	0.018113667	89.6	0.00	179	0.00
1,2-Dichlorobenzene	0.27	0.0005	0.14783	0.27000	0.030389667	145	0.00	725	0.00
1,3-Dichlorobenzene	0.27	0.0005	0.09917	0.27000	0.030389667	145	0.00	725	0.00
1,4-Dichlorobenzene	0.27	0.0005	0.13649	0.27000	0.030389667	423	0.00	846	0.00

HQn = Hazard Quotient based on the NOAEL. HQl = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = (Dose Food Plant + Dose Water + Dose Soil) x AUF

Dose Food Plant = (Food Concentration x Plant BCF) x Food Ingestion Rate x Fraction Diet

Dose Soil = Soil Concentration x Incidental Soil Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

STEP 2 TERRESTRIAL FOOD WEB MODEL FOR THE SHORT-TAILED SHREW

Short-Tailed Shrew

Body Weight	0.0133000 kg
Food Ingestion Rate	0.0019000 kg/day - dry
Water Ingestion Rate	0.0048000 L/day
Soil Ingestion Rate	0.0008200 kg/day - dry
Area Use Factor	1.0000000

Max Concentrations

Ecological Contaminant of Concern	Soil Concentration (mg/kg) (dw)	Water Concentration (mg/L)	Invertebrate Concentration (mg/kg) (dw)	Plant Concentration (mg/kg) (dw)	Dose (mg/kg/day) (dw)	NOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL (mg/kg/day)	LOAEL HQ_n
Cadmium	13	0.0025	529.1	42.25	76.3881203	2.06	**37.08**	20.6	**3.71**
Chromium	480	0.0025	1516.8	40.32	246.2806015	7	**35.18**	35	**7.04**
Copper	490	0.015	749.7	306.25	137.3159398	90.1	**1.52**	120	**1.14**
Lead	320	0.0025	486.4	149.76	89.21593985	17.1	**5.22**	171	0.52
Mercury	0.72	0.0005	14.832	3.6	2.163428571	15.2	0.14	76.2	0.03
Nickel	89	0.0025	420.97	125.579	65.62669173	85.4	0.77	171	0.38
Selenium	12.5	0.0025	16.75	37.65	6.150150376	0.43	**14.30**	0.7	**8.79**
Silver	2.1	0.025	32.13	0.0777	4.728496241	19.3	0.24	96.7	0.05
Zinc	600	0.025	7560	1092	1117.001504	341	**3.28**	683	**1.64**
Endosulfan I	0.08	NM	0.48	0.027488	0.073503759	3.2	0.02	16	0.00
Endosulfan II	0.24	NM	1.44	0.075144	0.220511278	3.2	0.07	16	0.01
Toxaphene	2.4	NM	14.4	0.29208	2.205112782	17.1	0.13	85.4	0.03
4-Bromophenyl-phenylether	0.27	0.005	0.27	0.015606	0.057022556	NA	**NA**	NA	**NA**
4-Chlorophenyl-phenylether	0.27	0.005	0.27	0.045819	0.057022556	NA	**NA**	NA	**NA**
Acenaphthene	0.92	0.005	0.276	0.235888	0.097954887	404	0.00	808	0.00
Acenaphthylene	0.27	0.005	0.0594	0.044631	0.026936842	404	0.00	808	0.00
Anthracene	9.1	0.005	2.912	0.95641	0.978857143	1155	0.00	5774	0.00
Benzo(a)anthracene	31	0.005	14.88	0.6882	4.038796992	2.31	**1.75**	11.5	0.35
Benzo(a)pyrene	25	0.005	27.25	0.3375	5.436015038	2.31	**2.35**	11.5	0.47
Benzo(b)fluoranthene	22	0.005	29.7	0.3828	5.601052632	2.31	**2.42**	11.5	0.49
Benzo(g,h,I)perylene	13	0.005	5.85	0.0793	1.639022556	2.31	0.71	11.5	0.14
Benzo(k)fluoranthene	29	0.005	24.2	0.224	4.692030075	2.31	**2.03**	11.5	0.41
Chrysene	31	0.005	22.63	0.8959	5.14593985	2.31	**2.23**	11.5	0.45
Dibenzo(a,h)anthracene	4.1	0.005	3.075	0.02788	0.69387218	2.31	0.30	11.5	0.06
Fluoranthene	64	0.005	23.68	3.9488	7.330526316	577	0.01	2887	0.00
Fluorene	0.76	0.005	0.152	0.13604	0.07037594	577	0.00	2887	0.00
Hexachlorobutadiene	0.27	0.005	0.27	0.019035	0.057022556	4.27	0.01	42.7	0.00
Hexachloroethane	0.27	0.005	0.27	0.064773	0.057022556	213	0.00	1067	0.00
Indeno(1,2,3-cd)pyrene	13	0.005	12.09	0.0793	2.530451128	2.31	**1.10**	11.5	0.22
Pentachlorophenol	1.35	0.0125	10.8	0.06642	1.630601504	10.7	0.15	53.4	0.03
Phenanthrene	25	0.005	8.25	2.885	2.721729323	577	0.00	2887	0.00
Pyrene	45	0.005	49.5	3.0915	9.847669173	2.31	**4.26**	11.5	0.86
1,2,4-Trichlorbenzene	0.27	0.0005	0.1512	0.059022	0.038427068	113	0.00	226	0.00
1,2-Dichlorobenzene	0.27	0.0005	0.27	0.147825	0.055398496	183	0.00	915	0.00
1,3-Dichlorobenzene	0.27	0.0005	0.27	0.099171	0.055398496	183	0.00	915	0.00
1,4-Dichlorobenzene	0.27	0.0005	0.27	0.136485	0.055398496	534	0.00	1067	0.00

HQn = Hazard Quotient based on the NOAEL, HQl = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = ((Whichever is greater Dose Food Invert. Or Dose Food Plant) + Dose Water + Dose Soil) x AUF

Dose Food Invertebrate = (Food Concentration x Worm BAF) x Food Ingestion Rate x Fraction Diet

Dose Food Plant = (Food Concentration x Plant BCF) x Food Ingestion Rate x Fraction Diet

Dose Soil = Soil Concentration x Incidental Soil Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

STEP 2 TERRESTRIAL FOOD WEB MODEL FOR THE AMERICAN ROBIN

American Robin

Body Weight	0.0635000 kg
Food Ingestion Rate	0.0074000 kg/day - dry
Water Ingestion Rate	0.0129000 L/day
Soil Ingestion Rate	0.0127000 kg/day - dry
Area Use Factor	1.0000000

Max Concentrations

Ecological Contaminant of Concern	Soil Concentration (mg/kg) (dw)	Water Concentration (mg/L)	Plant Concentration (mg/kg) (dw)	Invertebrate Concentration (mg/kg) (dw)	Dose (mg/kg/day) (dw)	NOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL (mg/kg/day)	LOAEL HQ_n
Cadmium	13	0.0025	42.250	529.100	64.25940551	1.45	**44.32**	20	**3.21**
Chromium	480	0.0025	40.320	1516.800	272.7614528	1	**272.76**	5	**54.55**
Copper	490	0.015	306.250	749.700	185.3696614	47	**3.94**	61.7	**3.00**
Lead	320	0.0025	149.760	486.400	120.6833425	3.85	**31.35**	19.3	**6.25**
Mercury	0.72	0.0005	3.600	14.832	1.872555118	0.45	**4.16**	0.9	**2.08**
Nickel	89	0.0025	125.579	420.970	66.85842913	77.4	0.86	107	0.62
Selenium	12.5	0.0025	37.650	16.750	6.888066929	0.44	**15.65**	1.5	4.59
Silver	2.1	0.025	0.078	32.130	4.169362205	7	0.60	35	0.12
Zinc	600	0.025	1092.000	7560.000	1001.012953	14.5	**69.04**	131	**7.64**
Endosulfan I	0.08	NM	0.027	0.480	0.071937008	10	0.01	50	0.00
Endosulfan II	0.24	NM	0.075	1.440	0.215811024	10	0.02	50	0.00
Toxaphene	2.4	NM	0.292	14.400	2.158110236	1	2.16	5	0.43
4-Bromophenyl-phenylether	0.27	0.005	0.016	0.270	0.086480315	NA	NA	NA	NA
4-Chlorophenyl-phenylether	0.27	0.005	0.046	0.270	0.086480315	NA	NA	NA	NA
Acenaphthene	0.92	0.005	0.236	0.276	0.217179528	7.1	0.03	35.5	0.01
Acenaphthylene	0.27	0.005	0.045	0.059	0.061937953	7.1	0.01	35.5	0.00
Anthracene	9.1	0.005	0.956	2.912	2.160366929	7.1	0.30	35.5	0.06
Benzo(a)anthracene	31	0.005	0.688	14.880	7.935062992	7.1	**1.12**	35.5	0.22
Benzo(a)pyrene	25	0.005	0.338	27.250	8.176606299	7.1	**1.15**	35.5	0.23
Benzo(b)fluoranthene	22	0.005	0.383	29.700	7.862118II	7.1	**1.11**	35.5	0.22
Benzo(g,h,I)perylene	13	0.005	0.079	5.850	3.282748031	7.1	0.46	35.5	0.09
Benzo(k)fluoranthene	20	0.005	0.224	24.200	6.821173228	7.1	0.96	35.5	0.19
Chrysene	31	0.005	0.896	22.630	8.838212598	7.1	**1.24**	35.5	0.25
Dibenzo(a,h)anthracene	4.1	0.005	0.028	3.075	1.179362205	7.1	0.17	35.5	0.03
Fluoranthene	64	0.005	3.949	23.680	15.5605748	7.1	**2.19**	35.5	0.44
Fluorene	0.76	0.005	0.136	0.152	0.170729134	7.1	0.02	35.5	0.00
Hexachlorobutadiene	0.27	0.005	0.019	0.270	0.086480315	3.39	0.03	17	0.01
Hexachloroethane	0.27	0.005	0.065	0.270	0.086480315	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	13	0.005	0.079	12.090	4.009929134	7.1	0.56	35.5	0.11
Pentachlorophenol	1.35	0.0125	0.066	10.800	1.531122047	4.26	0.36	8.52	0.18
Phenanthrene	25	0.005	2.885	8.250	5.962433071	7.1	0.84	35.5	0.17
Pyrene	45	0.005	3.092	49.500	14.76951969	7.1	**2.08**	35.5	0.42
1,2,4-Trichlorbenzene	0.27	0.0005	0.059	0.151	0.071721732	32.2	0.00	161	0.00
1,2-Dichlorobenzene	0.27	0.0005	0.148	0.270	0.085566142	32.2	0.00	161	0.00
1,3-Dichlorobenzene	0.27	0.0005	0.099	0.270	0.085566142	32.2	0.00	161	0.00
1,4-Dichlorobenzene	0.27	0.0005	0.136	0.270	0.085566142	32.2	0.00	161	0.00

HQn = Hazard Quotient based on the NOAEL, HQl = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = (Dose Food Plant + Dose Water + Dose Soil) x AUF

Dose Food Plant = (Food Concentration x Plant BCF) x Food Ingestion Rate x Fraction Diet

Dose Soil = Soil Concentration x Incidental Soil Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

STEP 3 TERRESTRIAL FOOD WEB MODEL FOR THE MOURNING DOVE

Mourning Dove

Body Weight	0.1050000 kg
Food Ingestion Rate	0.0179000 kg/day - dry
Water Ingestion Rate	0.0175000 L/day
Soil Ingestion Rate	0.0210000 kg/day - dry
Area Use Factor	1.0000000

Max Concentrations

Ecological Contaminant of Concern	Soil Concentration (mg/kg) (dw)	Water Concentration (mg/L)	Plant Concentration (mg/kg) (dw)	Dose (mg/kg/day) (dw)	NOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL (mg/kg/day)	LOAEL HQn
Cadmium	13	0.0025	42.25	9.803035714	1.45	**6.76**	20	0.49
Chromium	480	0.0025	40.32	102.8740167	1	**102.87**	5	**20.57**
Copper	490	0.015	306.25	150.2108333	47	**3.20**	61.7	2.43
Lead	320	0.0025	149.76	89.53093095	1.13	**79.23**	11.3	**7.92**
Mercury	0.72	0.0005	3.6	0.757797619	0.45	**1.68**	0.9	0.84
Nickel	89	0.0025	125.579	39.20864619	77.4	0.51	107	0.37
Selenium	12.5	0.0025	37.65	8.918845238	0.44	**20.27**	1.5	**5.95**
Silver	2.1	0.025	0.0777	0.437412667	7	0.06	35	0.01
Zinc	600	0.025	1092	306.1641667	14.5	**21.11**	131	**2.34**
Endosulfan I	0.08	NM	0.027488	0.02068605	10	0.00	50	0.00
Endosulfan II	0.24	NM	0.075144	0.060810263	10	0.01	50	0.00
Toxaphene	2.4	NM	0.29208	0.529792686	1	0.53	5	0.11
4-Bromophenyl-phenylether	0.27	0.005	0.015606	0.057493785	NA	NA	NA	NA
4-Chlorophenyl-phenylether	0.27	0.005	0.045819	0.062644382	NA	NA	NA	NA
Acenaphthene	0.92	0.005	0.235888	0.225046621	7.1	0.03	35.5	0.01
Acenaphthylene	0.27	0.005	0.044631	0.062441856	7.1	0.01	35.5	0.00
Anthracene	9.1	0.005	0.95641	1.983878467	7.1	0.28	35.5	0.06
Benzo(a)anthracene	31	0.005	0.6882	6.318155048	7.1	0.89	35.5	0.18
Benzo(a)pyrene	25	0.005	0.3375	5.058369048	7.1	0.71	35.5	0.14
Benzo(b)fluoranthene	22	0.005	0.3828	4.466091619	7.1	0.63	35.5	0.13
Benzo(g,h,I)perylene	13	0.005	0.0793	2.614352095	7.1	0.37	35.5	0.07
Benzo(k)fluoranthene	20	0.005	0.224	4.03902	7.1	0.57	35.5	0.11
Chrysene	31	0.005	0.8959	6.353562952	7.1	0.89	35.5	0.18
Dibenzo(a,h)anthracene	4.1	0.005	0.02788	0.82558621	7.1	0.12	35.5	0.02
Fluoranthene	64	0.005	3.9488	13.47400971	7.1	**1.90**	35.5	0.38
Fluorene	0.76	0.005	0.13604	0.176024914	7.1	0.02	35.5	0.00
Hexachlorobutadiene	0.27	0.005	0.019035	0.058078348	3.39	0.02	17	0.00
Hexachloroethane	0.27	0.005	0.064773	0.065875588	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	13	0.005	0.0793	2.614352095	7.1	0.37	35.5	0.07
Pentachlorophenol	1.35	0.0125	0.06642	0.283406362	4.26	0.07	8.52	0.03
Phenanthrene	25	0.005	2.885	5.492657143	7.1	0.77	35.5	0.15
Pyrene	45	0.005	3.0915	9.527860476	7.1	**1.34**	35.5	0.27
1,2,4-Trichlorbenzene	0.27	0.0005	0.059022	0.064145179	32.2	0.00	161	0.00
1,2-Dichlorobenzene	0.27	0.0005	0.147825	0.079283976	32.2	0.00	161	0.00
1,3-Dichlorobenzene	0.27	0.0005	0.099171	0.070989628	32.2	0.00	161	0.00
1,4-Dichlorobenzene	0.27	0.0005	0.136485	0.077350776	32.2	0.00	161	0.00

HQn = Hazard Quotient based on the NOAEL, HQl = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = ((Whichever is greater Dose Food Invert. Or Dose Food Plant) + Dose Water + Dose Soil) x AUF

Dose Food Invertebrate = (Food Concentration x Worm BAF) x Food Ingestion Rate x Fraction Diet

Dose Food Plant = (Food Concentration x Plant BCF) x Food Ingestion Rate x Fraction Diet

Dose Soil = Soil Concentration x Incidental Soil Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

STEP 2 TERRESTRIAL FOOD WEB MODEL FOR THE RED FOX

Red Fox

Body Weight	3.1700000 kg
Food Ingestion Rate	0.1476000 kg/day - dry
Water Ingestion Rate	0.4115000 L/day
Soil Ingestion Rate	0.0124000 kg/day - dry
Area Use Factor	1.0000000

Mean Concentrations

Ecological Contaminant of Concern	Soil Concentration (mg/kg) (dw)	Water Concentration (mg/L)	Omnivore Concentration (mg/kg) (dw)	Herbivore Concentration (mg/kg) (dw)	Invertivore Concentration (mg/kg) (dw)	Plant Concentration (mg/kg) (dw)	Invertebrate Concentration (mg/kg) (dw)	Dose (mg/kg/day) (dw)	NOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL (mg/kg/day)	LOAEL HQ_n
Cadmium	13	0.0025	6.006	5.824	91.221	42.25	329.1	24.68687342	0.94	26.26	4.7	5.25
Chromium	480	0.0025	167.52	148.32	159.84	40.32	1516.8	72.50243178	1.78	40.73	8.89	8.16
Copper	490	0.015	271.46	632.4	547.33	306.25	749.7	36.8258336	8.24	4.47	10.7	3.44
Lead	320	0.0025	91.52	59.84	108.48	149.76	486.4	23.89958005	4.33	5.52	43.3	0.55
Mercury	0.72	0.0005	0.0936	0.11824	0.13824	3.6	14.832	0.693481688	0.7	0.99	3.52	0.20
Nickel	89	0.0025	52.421	79.922	51.442	125.579	420.97	19.94946396	31.3	0.64	78.3	0.25
Selenium	12.5	0.0025	15.7875	14.8375	14.8375	37.65	16.75	1.802261435	0.11	16.38	0.18	10.01
Silver	2.1	0.025	1.701	0.0147	1.0521	0.0777	32.13	1.50748123	4.91	0.31	24.5	0.06
Zinc	600	0.025	1669.2	1390.2	1740.6	1092	7560	354.3552957	14.7	24.11	73.5	4.83
Endosulfan I	0.08	NM	0.08	0.08	0.08	0.027488	0.48	0.02266246	1.25	0.02	6.26	0.00
Endosulfan II	0.24	NM	0.24	0.24	0.24	0.075144	1.44	0.067987382	1.25	0.05	6.26	0.01
Toxaphene	2.4	NM	2.4	2.4	2.4	0.29208	14.4	0.679873817	4.33	0.16	21.7	0.03
4-Bromophenyl-phenylether	0.27	0.005	0.27	0.27	0.27	0.015606	0.27	0.014276814	NA	NA	NA	NA
4-Chlorophenyl-phenylether	0.27	0.005	0.27	0.27	0.27	0.045819	0.27	0.014276814	NA	NA	NA	NA
Acenaphthene	0.92	0.005	0.92	0.92	0.92	0.235888	0.276	0.047084385	103	0.00	205	0.00
Acenaphthylene	0.27	0.005	0.27	0.27	0.27	0.044631	0.0594	0.014276814	103	0.00	205	0.00
Anthracene	9.1	0.005	9.1	9.1	9.1	0.95641	2.912	0.459955047	293	0.00	1466	0.00
Benzo(a)anthracene	31	0.005	31	31	31	0.6882	14.88	1.565317823	0.59	2.65	2.93	0.53
Benzo(a)pyrene	25	0.005	25	25	25	0.3375	27.25	1.367242114	0.59	2.32	2.93	0.47
Benzo(b)fluoranthene	22	0.005	22	22	22	0.3828	29.7	1.469582808	0.59	2.49	2.93	0.50
Benzo(g,h,i)perylene	13	0.005	13	13	13	0.0793	5.85	0.636800473	0.59	1.11	2.93	0.22
Benzo(k)fluoranthene	20	0.005	20	20	20	0.224	24.2	1.203671136	0.59	2.04	2.93	0.41
Chrysene	31	0.005	31	31	31	0.8959	22.63	1.565317823	0.59	2.65	2.93	0.53
Dibenzo(a,h)anthracene	4.1	0.005	4.1	4.1	4.1	0.02788	2.075	0.207589117	0.59	0.35	2.93	0.07
Fluoranthene	64	0.005	64	64	64	3.9488	23.68	3.230932965	147	0.02	733	0.00
Fluorene	0.76	0.005	0.76	0.76	0.76	0.13604	0.152	0.039008675	147	0.00	733	0.00
Hexachlorobutadiene	0.27	0.005	0.27	0.27	0.27	0.019035	0.27	0.014276814	1.08	0.01	10.8	0.00
Hexachloroethane	0.27	0.005	0.27	0.27	0.27	0.004773	0.27	0.014276814	54.2	0.00	271	0.00
Indeno(1,2,3-cd)pyrene	13	0.005	13	13	13	0.0793	12.09	0.636800473	0.59	1.11	2.93	0.22
Pentachlorophenol	1.35	0.0125	1.35	1.35	1.35	0.06642	10.8	0.509767744	2.71	0.19	13.5	0.04
Phenanthrene	25	0.005	25	25	25	2.885	8.25	1.262478707	147	0.01	733	0.00
Pyrene	45	0.005	45	45	45	3.0915	49.5	2.481469243	0.59	4.21	2.93	0.85
1,2,4-Trichlorbenzene	0.27	0.0005	0.27	0.27	0.27	0.059022	0.1512	0.013692666	28.7	0.00	57.4	0.00
1,2-Dichlorobenzene	0.27	0.0005	0.27	0.27	0.27	0.147825	0.27	0.013692666	46.4	0.00	232	0.00
1,3-Dichlorobenzene	0.27	0.0005	0.27	0.27	0.27	0.099171	0.27	0.013692666	46.4	0.00	232	0.00
1,4-Dichlorobenzene	0.27	0.0005	0.27	0.27	0.27	0.136485	0.27	0.013692666	135	0.00	271	0.00

HQn = Hazard Quotient based on the NOAEL. HQ = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = ((Whichever is greater Dose Food Invert., Dose Food Mammal, or Dose Food Plant) + Dose Water + Dose Soil) x AUF

Dose Food Invertebrate = (Food Concentration x Worm BAF) x Food Ingestion Rate x Fraction Diet

Dose Food Mammal = (Food Concentration x Mammal BAF) x Food Ingestion Rate x Fraction Diet

Dose Food Plant = (Food Concentration x Plant BCF) x Food Ingestion Rate x Fraction Diet

Dose Soil = Soil Concentration x Incidental Soil Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

STEP 2 TERRESTRIAL FOOD WEB MODEL FOR THE WHITE-FOOTED MOUSE

White-Footed Mouse

Body Weight	0.0141000 kg
Food Ingestion Rate	0.0097000 kg/day - dry
Water Ingestion Rate	0.0092000 L/day
Soil Ingestion Rate	0.0001184 kg/day - dry
Area Use Factor	1.0000000

Max Concentrations

Ecological Contaminant of Concern	Soil Concentration (mg/kg) (dw)	Water Concentration (mg/L)	Plant Concentration (mg/kg) (dw)	Invertebrate Concentration (mg/kg) (dw)	Dose (mg/kg/day) (dw)	NOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL (mg/kg/day)	LOAEL HQ_l
Cadmium	13	0.0025	42.25000	529.10000	34.7512766	1.95	**17.82**	19.5	**1.78**
Chromium	480	0.0025	40.32000	1516.80000	388.4952482	6.64	**58.51**	33.2	**11.70**
Copper	490	0.015	306.25000	749.70000	356.9452482	85.5	**4.17**	114	**3.13**
Lead	320	0.0025	149.76000	486.40000	232.9434752	16.2	**14.38**	162	**1.44**
Mercury	0.72	0.0005	3.60000	14.83200	1.206453901	14.5	0.08	72.3	0.02
Nickel	89	0.0025	125.57900	420.97000	78.97177305	81	**0.97**	162	0.49
Selenium	12.5	0.0025	37.65000	16.75000	10.02680851	0.41	**24.46**	0.67	**14.97**
Silver	2.1	0.025	0.07770	32.13000	2.981631206	18.3	0.16	91.7	0.03
Zinc	600	0.025	1092.00000	7560.00000	766.8248227	324	**2.37**	648	**1.18**
Endosulfan I	0.08	NM	0.02749	0.48000	0.076028369	3.04	0.03	15.2	0.01
Endosulfan II	0.24	NM	0.07514	1.44000	0.228085106	3.04	0.08	15.2	0.02
Toxaphene	2.4	NM	0.29208	14.40000	2.280851064	16.2	0.14	81	0.03
4-Bromophenyl-phenylether	0.27	0.005	0.01561	0.27000	0.192836879	NA	NA	NA	NA
4-Chlorophenyl-phenylether	0.27	0.005	0.04582	0.27000	0.192836879	NA	NA	NA	NA
Acenaphthene	0.92	0.005	0.23589	0.27600	0.617248227	384	0.00	767	0.00
Acenaphthylene	0.27	0.005	0.04463	0.05940	0.18238156	384	0.00	767	0.00
Anthracene	9.1	0.005	0.95641	2.91200	6.08541844	1096	0.01	5479	0.00
Benzo(a)anthracene	31	0.005	0.68820	14.88000	20.96893617	2.19	**9.57**	11	**1.91**
Benzo(a)pyrene	25	0.005	0.33750	27.25000	17.66815603	2.19	**8.07**	11	**1.61**
Benzo(b)fluoranthene	22	0.005	0.38280	29.70000	15.83234043	2.19	**7.23**	11	**1.44**
Benzo(g,h,I)perylene	13	0.005	0.07930	5.85000	8.775957447	2.19	**4.01**	11	0.80
Benzo(k)fluoranthene	20	0.005	0.22400	24.20000	14.25432624	2.19	**6.51**	11	**1.30**
Chrysene	31	0.005	0.89590	22.63000	21.35368794	2.19	**9.75**	11	**1.94**
Dibenzo(a,h)anthracene	4.1	0.005	0.02788	3.07500	2.831099291	2.19	**1.29**	11	0.26
Fluoranthene	64	0.005	3.94880	23.68000	42.9377305	548	0.08	2740	0.02
Fluorene	0.76	0.005	0.13604	0.15200	0.506695035	548	0.00	2740	0.00
Hexachlorobutadiene	0.27	0.005	0.01904	0.27000	0.192836879	4.05	0.05	40.5	0.00
Hexachloroethane	0.27	0.005	0.06477	0.27000	0.192836879	203	0.00	1013	0.00
Indeno(1,2,3-cd)pyrene	13	0.005	0.07930	12.09000	9.085744681	2.19	**4.15**	11	0.83
Pentachlorophenol	1.35	0.0125	0.06642	10.80000	1.425177305	10.1	0.14	50.6	0.03
Phenanthrene	25	0.005	2.88500	8.25000	16.72489362	548	0.03	2740	0.01
Pyrene	45	0.005	3.09150	49.50000	31.82241135	2.19	**14.53**	11	**2.89**
1,2,4-Trichlorbenzene	0.27	0.0005	0.05902	0.15120	0.184002837	107	0.00	215	0.00
1,2-Dichlorobenzene	0.27	0.0005	0.14783	0.27000	0.189900709	174	0.00	868	0.00
1,3-Dichlorobenzene	0.27	0.0005	0.09917	0.27000	0.189900709	174	0.00	868	0.00
1,4-Dichlorobenzene	0.27	0.0005	0.13649	0.27000	0.189900709	506	0.00	1013	0.00

HQn = Hazard Quotient based on the NOAEL, HQl = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = (Dose Food Plant + Dose Water + Dose Soil) x AUF

Dose Food Plant = (Food Concentration x Plant BCF) x Food Ingestion Rate x Fraction Diet

Dose Soil = Soil Concentration x Incidental Soil Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

STEP 2 TERRESTRIAL FOOD WEB MODEL FOR THE RED-TAILED HAWK

Red-Tailed Hawk

Body Weight	0.9570000 kg
Food Ingestion Rate	0.0395000 kg/day - dry
Water Ingestion Rate	0.0680000 L/day
Soil Ingestion Rate	0.0000000 kg/day - dry
Area Use Factor	1.0000000

Mean Concentrations

Ecological Contaminant of Concern	Soil Concentration (mg/kg) (dw)	Water Concentration (mg/L)	Omnivore Concentration (mg/kg) (dw)	Herbivore Concentration (mg/kg) (dw)	Invertivore Concentration (mg/kg) (dw)	Dose (mg/kg/day) (dw)	NOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL (mg/kg/day)	LOAEL HQ_n
Cadmium	13	0.0025	6.006	5.824	91.221	3.765307732	1.45	**2.60**	20	0.19
Chromium	480	0.0025	167.52	148.32	159.84	6.914535005	1	**6.91**	5	**1.38**
Copper	490	0.015	271.46	632.1	547.33	22.59201149	47	0.48	61.7	0.37
Lead	320	0.0025	91.52	59.84	108.48	4.477669801	3.85	**1.16**	19.3	0.23
Mercury	0.72	0.0005	0.0936	0.13824	0.13824	0.005741358	0.49	0.01	1.2	0.00
Nickel	89	0.0025	52.421	79.922	51.442	2.163844828	77.4	0.03	107	0.02
Selenium	12.5	0.0025	15.7875	14.8375	14.8375	0.651803814	0.44	**1.48**	1.5	0.43
Silver	2.1	0.025	1.701	0.0147	1.0521	0.071984848	7	0.01	35	0.00
Zinc	600	0.025	1669.2	1390.2	1740.6	71.84472309	14.5	**4.95**	131	0.55
Endosulfan I	0.08	NM	0.08	0.08	0.08	0.003301985	10	0.00	50	0.00
Endosulfan II	0.24	NM	0.24	0.24	0.24	0.009905956	10	0.00	50	0.00
Toxaphene	2.4	NM	2.4	2.4	2.4	0.099059561	1	0.10	5	0.02
4-Bromophenyl-phenylether	0.27	0.005	0.27	0.27	0.27	0.011499478	NA	NA	NA	NA
4-Chlorophenyl-phenylether	0.27	0.005	0.27	0.27	0.27	0.011499478	NA	NA	NA	NA
Acenaphthene	0.92	0.005	0.92	0.92	0.92	0.038328109	7.1	0.01	35.5	0.00
Acenaphthylene	0.27	0.005	0.27	0.27	0.27	0.011499478	7.1	0.00	35.5	0.00
Anthracene	9.1	0.005	9.1	9.1	9.1	0.375956113	7.1	0.05	35.5	0.01
Benzo(a)anthracene	31	0.005	31	31	31	1.279874608	7.1	0.18	35.5	0.04
Benzo(a)pyrene	25	0.005	25	25	25	1.032225705	7.1	0.15	35.5	0.03
Benzo(b)fluoranthene	22	0.005	22	22	22	0.908401254	7.1	0.13	35.5	0.03
Benzo(g,h,i)perylene	13	0.005	13	13	13	0.5369279	7.1	0.08	35.5	0.02
Benzo(k)fluoranthene	20	0.005	20	20	20	0.82585162	7.1	0.12	35.5	0.02
Chrysene	31	0.005	31	31	31	1.279874608	7.1	0.18	35.5	0.04
Dibenzo(a,h)anthracene	4.1	0.005	4.1	4.1	4.1	0.169582027	7.1	0.02	35.5	0.00
Fluoranthene	64	0.005	64	64	64	2.641943574	7.1	0.37	35.5	0.07
Fluorene	0.76	0.005	0.76	0.76	0.76	0.031724138	7.1	0.00	35.5	0.00
Hexachlorobutadiene	0.27	0.005	0.27	0.27	0.27	0.011499478	3.39	0.00	17	0.00
Hexachloroethane	0.27	0.005	0.27	0.27	0.27	0.011499478	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	13	0.005	13	13	13	0.5369279	7.1	0.08	35.5	0.02
Pentachlorophenol	1.35	0.0125	1.35	1.35	1.35	0.056609195	4.26	0.01	8.52	0.01
Phenanthrene	25	0.005	25	25	25	1.032225705	7.1	0.15	35.5	0.03
Pyrene	45	0.005	45	45	45	1.857722048	7.1	0.26	35.5	0.05
1,2,4-Trichlorbenzene	0.27	0.0005	0.27	0.27	0.27	0.011179728	32.2	0.00	161	0.00
1,2-Dichlorobenzene	0.27	0.0005	0.27	0.27	0.27	0.011179728	32.2	0.00	161	0.00
1,3-Dichlorobenzene	0.27	0.0005	0.27	0.27	0.27	0.011179728	32.2	0.00	161	0.00
1,4-Dichlorobenzene	0.27	0.0005	0.27	0.27	0.27	0.011179728	32.2	0.00	161	0.00

HQn = Hazard Quotient based on the NOAEL, HQl = Hazard Quotient based on the LOAEL

Foodweb Model Calculations.

Dose = ((Whichever is greater Dose Food Invert., Dose Food Mammal, or Dose Food Plant) + Dose Water + Dose Soil) x AUF

Dose Food Invertebrate = (Food Concentration x Worm BAF) x Food Ingestion Rate x Fraction Diet

Dose Food Mammal = (Food Concentration x Mammal BAF) x Food Ingestion Rate x Fraction Diet

Dose Food Plant = (Food Concentration x Plant BCF) x Food Ingestion Rate x Fraction Diet

Dose Soil = Soil Concentration x Incidental Soil Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

STEP 2 FOOD-WEB INVERTEBRATE CONCENTRATIONS

Worm Calculations
Max Concentrations

COPC	Maximum Soil Concentration (mg/kg)	Invertebrate Bioaccumulation Factors (dw)	Invertebrate Concentration (dw)	Fraction Dry	Invertebrate Concentration (ww)
Cadmium	13	40.7	529.1	0.16	84.656
Chromium	480	3.16	1516.8	0.16	242.688
Copper	490	1.53	749.7	0.16	119.952
Lead	320	1.52	486.4	0.16	77.824
Mercury	0.72	20.6	14.832	0.16	2.37312
Nickel	89	4.73	420.97	0.16	67.3552
Selenium	12.5	1.34	16.75	0.16	2.68
Silver	2.1	15.3	32.13	0.16	5.1408
Zinc	600	12.6	7560	0.16	1209.6
Endosulfan I	0.08	6	0.48	0.16	0.0768
Endosulfan II	0.24	6	1.44	0.16	0.2304
Toxaphene	2.4	6	14.4	0.16	2.304
4-Bromophenyl-phenylether	0.27	1	0.27	0.16	0.0432
4-Chlorophenyl-phenylether	0.27	1	0.27	0.16	0.0432
Acenaphthene	0.92	0.3	0.276	0.16	0.04416
Acenaphthylene	0.27	0.22	0.0594	0.16	0.009504
Anthracene	9.1	0.32	2.912	0.16	0.46592
Benzo(a)anthracene	31	0.48	14.88	0.16	2.3808
Benzo(a)pyrene	25	1.09	27.25	0.16	4.36
Benzo(b)fluoranthene	22	1.35	29.7	0.16	4.752
Benzo(g,h,I)perylene	13	0.45	5.85	0.16	0.936
Benzo(k)fluoranthene	20	1.21	24.2	0.16	3.872
Chrysene	31	0.73	22.63	0.16	3.6208
Dibenzo(a,h)anthracene	4.1	0.75	3.075	0.16	0.492
Fluoranthene	64	0.37	23.68	0.16	3.7888
Fluorene	0.76	0.2	0.152	0.16	0.02432
Hexachlorobutadiene	0.27	1	0.27	0.16	0.0432
Hexachloroethane	0.27	1	0.27	0.16	0.0432
Indeno(1,2,3-cd)pyrene	13	0.93	12.09	0.16	1.9344
Pentachlorophenol	1.35	8	10.8	0.16	1.728
Phenanthrene	25	0.33	8.25	0.16	1.32
Pyrene	45	1.1	49.5	0.16	7.92
1,2,4-Trichlorbenzene	0.27	0.56	0.1512	0.16	0.024192
1,2-Dichlorobenzene	0.27	1	0.27	0.16	0.0432
1,3-Dichlorobenzene	0.27	1	0.27	0.16	0.0432
1,4-Dichlorobenzene	0.27	1	0.27	0.16	0.0432

STEP 2 FOOD WEB ANALYSIS PLANT CONCENTRATIONS

PLANT CALCULATIONS
Max Concentrations

COPC	Maximum Soil Concentration	Plant Bioaccumulation Factors (dw)	Plant Concentration (dw)	Fraction Dry	Plant Concentration (ww)
Cadmium	13	3.25	42.25	0.15	6.3375
Chromium	480	0.084	40.32	0.15	6.048
Copper	490	0.625	306.25	0.15	45.9375
Lead	320	0.468	149.76	0.15	22.464
Mercury	0.72	5	3.6	0.15	0.54
Nickel	89	1.411	125.579	0.15	18.83685
Selenium	12.5	3.012	37.65	0.15	5.6475
Silver	2.1	0.037	0.0777	0.15	0.011655
Zinc	600	1.82	1092	0.15	163.8
Endosulfan I	0.08	0.3436	0.027488	0.15	0.0041232
Endosulfan II	0.24	0.3131	0.075144	0.15	0.0112716
Toxaphene	2.4	0.1217	0.29208	0.15	0.043812
4-Bromophenyl-phenylether	0.27	0.0578	0.015606	0.15	0.0023409
4-Chlorophenyl-phenylether	0.27	0.1697	0.045819	0.15	0.00687285
Acenaphthene	0.92	0.2564	0.235888	0.15	0.0353832
Acenaphthylene	0.27	0.1653	0.044631	0.15	0.00669465
Anthracene	9.1	0.1051	0.95641	0.15	0.1434615
Benzo(a)anthracene	31	0.0222	0.6882	0.15	0.10323
Benzo(a)pyrene	25	0.0135	0.3375	0.15	0.050625
Benzo(b)fluoranthene	22	0.0174	0.3828	0.15	0.05742
Benzo(g,h,I)perylene	13	0.0061	0.0793	0.15	0.011895
Benzo(k)fluoranthene	20	0.0112	0.224	0.15	0.0336
Chrysene	31	0.0289	0.8959	0.15	0.134385
Dibenzo(a,h)anthracene	4.1	0.0068	0.02788	0.15	0.004182
Fluoranthene	64	0.0617	3.9488	0.15	0.59232
Fluorene	0.76	0.179	0.13604	0.15	0.020406
Hexachlorobutadiene	0.27	0.0705	0.019035	0.15	0.00285525
Hexachloroethane	0.27	0.2399	0.064773	0.15	0.00971595
Indeno(1,2,3-cd)pyrene	13	0.0061	0.0793	0.15	0.011895
Pentachlorophenol	1.35	0.0492	0.06642	0.15	0.009963
Phenanthrene	25	0.1154	2.885	0.15	0.43275
Pyrene	45	0.0687	3.0915	0.15	0.463725
1,2,4-Trichlorbenzene	0.27	0.2186	0.059022	0.15	0.0088533
1,2-Dichlorobenzene	0.27	0.5475	0.147825	0.15	0.02217375
1,3-Dichlorobenzene	0.27	0.3673	0.099171	0.15	0.01487565
1,4-Dichlorobenzene	0.27	0.5055	0.136485	0.15	0.02047275

STEP 2 FOOD WEB ANALYSIS SMALL MAMMAL CONCENTRATIONS

MAMMAL CALCULATIONS

Max Concentrations

COPC	Maximum Soil Concentration	Omnivore (Mouse) Bioaccumulation Factors (dw)	Herbivore (Vole) Bioaccumulation Factors (dw)	Insectivore (Shrew) Bioaccumulation Factors (dw)	Omnivore (Mouse) Concentration (dw)	Herbivore (Vole) Concentration (dw)	Insectivore (Shrew) Concentration (dw)
Cadmium	13	0.462	0.448	7.017	6.006	5.824	91.221
Chromium	480	0.349	0.309	0.333	167.52	148.32	159.84
Copper	490	0.554	1.29	1.117	271.46	632.1	547.33
Lead	320	0.286	0.187	0.339	91.52	59.84	108.48
Mercury	0.72	0.13	0.192	0.192	0.0936	0.13824	0.13824
Nickel	89	0.589	0.898	0.578	52.421	79.922	51.442
Selenium	12.5	1.263	1.187	1.187	15.7875	14.8375	14.8375
Silver	2.1	0.81	0.007	0.501	1.701	0.0147	1.0521
Zinc	600	2.782	2.317	2.901	1669.2	1390.2	1740.6
Endosulfan I	0.08	1	1	1	0.08	0.08	0.08
Endosulfan II	0.24	1	1	1	0.24	0.24	0.24
Toxaphene	2.4	1	1	1	2.4	2.4	2.4
4-Bromophenyl-phenylether	0.27	1	1	1	0.27	0.27	0.27
4-Chlorophenyl-phenylether	0.27	1	1	1	0.27	0.27	0.27
Acenaphthene	0.92	1	1	1	0.92	0.92	0.92
Acenaphthylene	0.27	1	1	1	0.27	0.27	0.27
Anthracene	9.1	1	1	1	9.1	9.1	9.1
Benzo(a)anthracene	31	1	1	1	31	31	31
Benzo(a)pyrene	25	1	1	1	25	25	25
Benzo(b)fluoranthene	22	1	1	1	22	22	22
Benzo(g,h,f)perylene	13	1	1	1	13	13	13
Benzo(k)fluoranthene	20	1	1	1	20	20	20
Chrysene	31	1	1	1	31	31	31
Dibenzo(a,h)anthracene	4.1	1	1	1	4.1	4.1	4.1
Fluoranthene	64	1	1	1	64	64	64
Fluorene	0.76	1	1	1	0.76	0.76	0.76
Hexachlorobutadiene	0.27	1	1	1	0.27	0.27	0.27
Hexachloroethane	0.27	1	1	1	0.27	0.27	0.27
Indeno(1,2,3-cd)pyrene	13	1	1	1	13	13	13
Pentachlorophenol	1.35	1	1	1	1.35	1.35	1.35
Phenanthrene	25	1	1	1	25	25	25
Pyrene	45	1	1	1	45	45	45
1,2,4-Trichlorbenzene	0.27	1	1	1	0.27	0.27	0.27
1,2-Dichlorobenzene	0.27	1	1	1	0.27	0.27	0.27
1,3-Dichlorobenzene	0.27	1	1	1	0.27	0.27	0.27
1,4-Dichlorobenzene	0.27	1	1	1	0.27	0.27	0.27

APPENDIX B

AQUATIC SPECIES
MAXIMUM CONCENTRATION HAZARD QUOTIENT VALUES
MARTIN STATE AIRPORT

	Raccoon		Mallard		Belted Kingfisher		Great Blue Heron	
Ecological Contaminants	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
of Concern	HQ_n	HQ_l	HQ_n	HQ_l	HQ_n	HQ_l	HQ_n	HQ_l
Total Cadmium	**403.80**	**80.38**	**182.86**	**13.26**	**14.20**	**1.03**	**15.14**	**1.10**
Dissolved Cadmium	**10.71**	**2.13**	0.00	0.00	**1.23**	0.09	**1.31**	0.09
Total Chromium	**4347.33**	**871.62**	**323.02**	**64.60**	**94.12**	**18.82**	**100.36**	**20.07**
Total Copper	**18.98**	**14.66**	**4.60**	**3.50**	0.26	0.20	0.28	0.21
Dissolved Copper	**6.47**	**5.00**	0.00	0.00	0.20	0.15	0.21	0.16
Total Lead	**25.30**	**2.53**	**12.01**	**1.20**	0.83	0.17	0.88	0.18
Dissolved Lead	0.41	0.04	0.00	0.00	0.08	0.02	0.09	0.02
Total Mercury	**37.48**	**7.50**	**8.62**	**2.87**	**179.78**	**59.93**	**191.70**	**63.90**
Total Nickel	**4.54**	**1.82**	0.23	0.17	0.23	0.17	0.25	0.18
Total Selenium	**187.81**	**117.38**	**11.64**	**6.40**	**1.50**	0.30	**1.60**	0.32
Total Silver	0.48	0.10	0.00	0.00	0.01	0.00	0.01	0.00
Dissolved Silver	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Total Zinc	**87.80**	**17.53**	**35.23**	**3.90**	**11.54**	**1.28**	**12.31**	**1.36**
Dissolved Zinc	**18.34**	**3.66**	0.00	0.00	**3.28**	0.36	**3.50**	0.39
Endosulfan I	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Endosulfan II	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Methoxychlor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Toxaphene	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA
Acenapthene	0.11	0.05	0.02	0.00	0.27	0.05	0.29	0.06
Acenapthylene	0.20	0.10	0.02	0.00	0.51	0.10	0.55	0.11
Anthracene	0.08	0.02	0.00	0.00	0.55	0.11	0.59	0.12
Benzo(a)anthracene	**154.29**	**30.63**	0.04	0.01	**2.24**	0.45	**2.39**	0.48
Benzo(b)fluoranthene	**231.95**	**46.04**	0.01	0.00	**3.37**	0.67	**3.60**	0.72
Benzo(g,h,I)perylene	**271.90**	**53.97**	0.01	0.00	**3.96**	0.79	**4.23**	0.85
Benzo(k)fluoranthene	**231.69**	**45.99**	0.01	0.00	**3.37**	0.67	**3.60**	0.72
Chrysene	**154.82**	**30.73**	0.01	0.00	**2.25**	0.45	**2.39**	0.48
Dibenz(a,h)anthracene	**269.63**	**53.52**	0.00	0.00	**3.94**	0.79	**4.20**	0.84
Fluoranthene	0.24	0.05	0.02	0.00	0.84	0.17	0.90	0.18
Fluorene	0.38	0.08	0.01	0.00	**1.38**	0.28	**1.48**	0.30
Hexachlorobenzene	**36.36**	**3.64**	0.48	0.09	**88.35**	**17.05**	**94.20**	**18.18**
Hexachlorobutadiene	**39.47**	**3.97**	0.01	0.00	**2.25**	0.45	**2.39**	0.48
Hexachlorocyclopentadiene	0.94	0.19	NA	NA	NA	NA	NA	NA
Hexachloroethane	0.08	0.02	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	**272.16**	**54.02**	0.01	0.00	**3.97**	0.79	**4.23**	0.85
Pentachlorophenol	**9.38**	**1.88**	0.07	0.04	**1.02**	0.51	**1.08**	0.54
Phenanthrene	**1.51**	0.30	0.02	0.00	**5.54**	**1.11**	**5.91**	**1.18**
Pyrene	**76.49**	**15.18**	0.04	0.01	**1.09**	0.22	**1.16**	0.23
1,1,1,2-Tetrachloroethane	0.01	0.00	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachlorethane	0.01	0.00	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00
1,2-Dichlorobenzene	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,3-Dichlorobenzene	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,4-Dichlorobenzene	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CONCENTRATIONS OF COPCS USED FOR STEP 2 AQUATIC FOOD-WEB ANALYSES

AQUATIC RECEPTOR MODELS
Martin State Airport

Chemical	Sediment Maximum Concentration (mg/kg)	Water Maximum Concentration (mg/L)	Benthic Invertebrate Concentration (mg/kg)	Plant Concentration (mg/kg)	Fish Concentration (mg/kg)
Total Cadmium	600	2.5	1842	1950	105.07
Dissolved Cadmium	NA	2.5	NA	NA	9.07
Total Chromium	12000	2.5	2280	1008	480.19
Total Copper	200	15	1592	125	62.60
Dissolved Copper	NA	17	NA	NA	48.28
Total Lead	210	2.5	69.3	98.28	16.30
Dissolved Lead	NA	2.5	NA	NA	1.60
Total Mercury	0.33	0.5	0.9471	1.65	23.85
Total Nickel	92	2.5	19.32	129.812	92.78
Total Selenium	12.5	2.5	12.5	37.65	13.79
Total Silver	1.3	2.5	0.234	0.0481	1.58
Dissolved Silver	NA	2.5	NA	NA	0.28
Total Zinc	790	25	3760.4	1437.8	853.90
Dissolved Zinc	NA	95	NA	NA	242.82
Endosulfan I	0.00013	NM	0.00013	0.000044668	0.00
Endosulfan II	0.00039	NM	0.00039	0.000122109	0.00
Methoxychlor	0.00065	NM	0.00065	0.000094055	0.01
Toxaphene	0.0039	NM	0.0039	0.00047463	0.04
4-Bromophenyl phenyl ether	0.44	0.005	0.44	0.025432	226.17
4-Chlorophenyl phenyl ether	0.44	0.005	0.44	0.074668	206.57
Acenapthene	0.44	0.005	0.8976	0.112816	9.82
Acenapthylene	0.44	0.005	0.8976	0.072732	18.59
Anthracene	0.44	0.005	0.1188	0.046244	19.94
Benzo(a)anthracene	1.5	0.005	2.1	0.0333	81.12
Benzo(b)fluoranthene	1.6	0.005	0.256	0.02784	122.24
Benzo(g,h,I)perylene	1.3	0.005	0.39	0.00793	143.53
Benzo(k)fluoranthene	1.5	0.005	0.63	0.0168	122.14
Chrysene	1.7	0.005	0.578	0.04913	81.32
Dibenz(a,h)anthracene	0.44	0.005	0.1188	0.002992	142.67
Fluoranthene	2.9	0.005	0.899	0.17893	30.59
Fluorene	0.44	0.005	0.4972	0.07876	50.12
Hexachlorobenzene	0.44	0.005	0.3784	0.016148	49.58
Hexachlorobutadiene	0.44	0.005	0.2684	0.03102	38.84
Hexachlorocyclopentadiene	0.44	0.005	0.44	0.020548	18.60
Hexachloroethane	0.44	0.005	0.44	0.105556	3.95
Indeno(1,2,3-cd)pyrene	1.4	0.005	0.504	0.00854	143.63
Pentachlorophenol	2.2	0.0125	2.2	0.10824	22.05
Phenanthrene	1.8	0.005	1.17	0.20772	200.70
Pyrene	2.9	0.005	2.32	0.19923	39.33
1,1,1,2-Tetrachloroethane	0.12	0.0005	0.12	0.140292	0.22
1,1,2,2-Tetrachlorethane	0.12	0.0005	0.12	0.214788	0.14
1,2,4-Trichlorobenzene	0.12	0.0005	0.0576	0.026232	0.46
1,2-Dichlorobenzene	0.44	0.0005	0.44	0.2409	0.23
1,3-Dichlorobenzene	0.44	0.0005	0.44	0.161612	0.18
1,4-Dichlorobenzene	0.44	0.0005	0.44	0.221936	0.17

STEP 2 FOOD WEB MODEL FOR THE RACCOON

Raccoon

Body Weight	4.2300000 kg
Food Ingestion Rate	0.0514000 kg/day - dry
Water Ingestion Rate	0.6092000 L/day
Soil Ingestion Rate	0.0204000 kg/day - dry

Maximum Concentrations

Ecological Contaminant of Concern	Sediment Concentration (mg/kg)	Water Concentration (mg/L)	Invertebrate Concentration (mg/kg)	Plant Concentration (mg/kg)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Total Cadmium	600	0.0025	1842	1950	105.07	343.232	0.85	4.27	**403.80**	**80.38**
Dissolved Cadmium	NA	0.0025	NA	NA	9.07	9.100	0.85	4.27	**10.71**	**2.13**
Total Chromium	12000	0.0025	2280	1008	480.19	7042.676	1.62	8.08	**4347.33**	**871.62**
Total Copper	200	0.015	1592	125	62.60	142.155	7.49	9.7	**18.98**	**14.66**
Dissolved Copper	NA	0.017	NA	NA	48.28	48.481	7.49	9.7	**6.47**	**5.00**
Total Lead	210	0.0025	69.3	98.28	16.30	99.676	3.94	39.4	**25.30**	**2.53**
Dissolved Lead	NA	0.0025	NA	NA	1.60	1.630	3.94	39.4	0.41	0.04
Total Mercury	0.33	0.0005	0.9471	1.65	23.85	23.984	0.64	3.2	**37.48**	**7.50**
Total Nickel	92	0.0025	19.32	129.812	92.78	129.323	28.5	71.2	**4.54**	**1.82**
Total Selenium	12.5	0.0025	12.5	37.65	12.79	18.781	0.1	0.16	**187.81**	**117.38**
Total Silver	1.3	0.0025	0.234	0.0481	1.58	2.126	4.46	22.3	0.48	0.10
Dissolved Silver	NA	0.0025	NA	NA	0.28	0.310	4.46	22.3	0.07	0.01
Total Zinc	790	0.025	3760.4	1437.8	853.90	1167.737	13.3	66.6	**87.80**	**17.53**
Dissolved Zinc	NA	0.095	NA	NA	242.82	243.936	13.3	66.6	**18.34**	**3.66**
Endosulfan I	0.00013	NM	0.00013	0.000044668	0.001	0.000	4.14	5.7	0.00	0.00
Endosulfan II	0.00039	NM	0.00039	0.000122109	0.00	0.001	4.14	5.7	0.00	0.00
Methoxychlor	0.00065	NM	0.00065	0.000094055	0.01	0.001	4.97	3.94	0.00	0.00
Toxaphene	0.0039	NM	0.0039	0.00047463	0.04	0.046	3.94	19.7	0.01	0.00
4-Bromophenyl phenyl ether	0.44	0.005	0.44	0.025432	226.17	226.399	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	0.44	0.005	0.44	0.074668	206.57	206.804	NA	NA	NA	NA
Acenaphthene	0.44	0.005	0.8976	0.112816	9.82	10.049	93.3	187	0.11	0.05
Acenaphthylene	0.44	0.005	0.8976	0.072732	18.59	18.819	93.3	187	0.20	0.10
Anthracene	0.44	0.005	0.1188	0.046244	19.94	20.174	267	1333	0.08	0.02
Benzo(a)anthracene	1.5	0.005	2.1	0.0333	81.12	81.775	0.53	2.67	**154.29**	**30.63**
Benzo(b)fluoranthene	1.6	0.005	0.256	0.02784	122.24	122.934	0.53	2.67	**231.95**	**46.04**
Benzo(g,h,i)perylene	1.2	0.005	0.39	0.00793	143.53	144.105	0.53	2.67	**271.90**	**53.97**
Benzo(k)fluoranthene	1.5	0.005	0.63	0.0168	122.14	122.795	0.53	2.67	**231.69**	**45.99**
Chrysene	1.7	0.005	0.578	0.04913	81.32	82.054	0.53	2.67	**154.82**	**30.73**
Dibenz(a,h)anthracene	0.44	0.005	0.1188	0.002992	142.67	142.904	0.53	2.67	**269.63**	**53.52**
Fluoranthene	2.9	0.005	0.899	0.17893	30.59	31.795	133	666	0.24	0.05
Fluorene	0.44	0.005	0.4972	0.07876	50.12	50.354	133	666	0.38	0.08
Hexachlorobenzene	0.44	0.005	0.3784	0.016148	49.58	49.812	1.37	13.7	**36.36**	**3.64**
Hexachlorobutadiene	0.44	0.005	0.2684	0.03102	38.84	39.074	0.99	9.85	**39.47**	**3.97**
Hexachlorocyclopentadiene	0.44	0.005	0.44	0.020548	18.60	18.829	20	100	0.94	0.19
Hexachloroethane	0.44	0.005	0.44	0.105556	3.95	4.184	49.3	246	0.08	0.02
Indeno(1,2,3-cd)pyrene	1.4	0.005	0.504	0.00854	143.63	144.243	0.53	2.67	**272.16**	**54.02**
Pentachlorophenol	2.2	0.0125	2.2	0.10824	22.05	23.071	2.46	12.3	**9.38**	**1.88**
Phenanthrene	1.8	0.005	1.17	0.20772	200.70	201.474	133	666	1.51	0.30
Pyrene	2.9	0.005	2.32	0.19923	39.33	40.540	0.53	2.67	**76.49**	**15.18**
1,1,1,2-Tetrachloroethane	0.12	0.0005	0.12	0.440292	9.22	9.271	37.4	187	0.01	0.00
1,1,2,2-Tetrachloroethane	0.12	0.0005	0.12	0.214788	0.14	0.268	37.4	187	0.01	0.00
1,2,4-Trichlorobenzene	0.12	0.0005	0.0576	0.026232	0.46	0.513	26.1	32.5	0.02	0.01
1,2-Dichlorobenzene	0.44	0.0005	0.44	0.2409	0.23	0.621	42.2	211	0.01	0.00
1,3-Dichlorobenzene	0.44	0.0005	0.44	0.161612	0.18	0.621	42.2	211	0.01	0.00
1,4-Dichlorobenzene	0.44	0.0005	0.44	0.221936	0.17	0.621	123	246	0.01	0.00

NA = Not Available, HQ_n = Hazard Quotient based on the NOAEL, HQ_l = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = ((Most Contaminated Food Dose) + Dose Sediment + Dose Water)/ Body Weight

Dose Food = Food Concentration x Food Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

Dose Sediment = Sediment Concentration x Sediment Ingestion Rate

Mallard **STEP 2 FOOD WEB MODEL FOR THE MALLARD**

Body Weight	0.6120000 kg
Food Ingestion Rate	0.0830000 kg/day - dry
Water Ingestion Rate	0.0850000 L/day
Sediment Ingestion Rate	0.0007038 kg/day - dry

Maximum Concentrations

Ecological Contaminant of Concern	Sediment Concentration (mg/kg)	Water Concentration (mg/L)	Invertebrate Concentration (mg/kg)	Plant Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Total Cadmium	600	0.0025	1842	1950	265.151	1.45	20	**182.86**	**13.26**
Dissolved Cadmium	NA	0.0025	NA	NA	0.000	1.45	20	0.00	0.00
Total Chromium	12000	0.0025	2280	1008	323.016	1	5	**323.02**	**64.60**
Total Copper	300	0.015	1592	125	216.141	47	61.7	**4.60**	**3.50**
Dissolved Copper	NA	0.017	NA	NA	0.002	47	61.7	0.00	0.00
Total Lead	210	0.0025	69.3	98.28	13.571	1.13	11.3	**12.01**	**1.20**
Dissolved Lead	NA	0.0025	NA	NA	0.000	1.13	11.3	0.00	0.00
Total Mercury	0.33	0.0005	0.9471	1.65	0.224	0.026	0.078	**8.62**	**2.87**
Total Nickel	92	0.0025	19.32	129.812	17.711	77.4	107	0.23	0.17
Total Selenium	12.5	0.0025	12.5	37.65	5.121	0.44	0.8	**11.64**	**6.40**
Total Silver	1.3	0.0025	0.234	0.0481	0.008	35.6	178	0.00	0.00
Dissolved Silver	NA	0.0025	NA	NA	0.000	35.6	178	0.00	0.00
Total Zinc	790	0.025	3760.4	1437.8	510.901	14.5	131	**35.23**	**3.90**
Dissolved Zinc	NA	0.095	NA	NA	0.013	14.5	131	0.00	0.00
Endosulfan I	0.00013	NM	0.00013	0.000044668	0.000	10	50	0.00	0.00
Endosulfan II	0.00039	NM	0.00039	0.000122109	0.000	10	50	0.00	0.00
Methoxychlor	0.00065	NM	0.00065	0.000094055	0.000	355	1775	0.00	0.00
Toxaphene	0.0039	NM	0.0039	0.00047463	0.001	1	5	0.00	0.00
4-Bromophenyl phenyl ether	0.44	0.005	0.44	0.025432	0.061	NA	NA	**NA**	**NA**
4-Chlorophenyl phenyl ether	0.44	0.005	0.44	0.074668	0.061	NA	NA	**NA**	**NA**
Acenapthene	0.44	0.005	0.8976	0.112816	0.123	7.1	35.5	0.02	0.00
Acenapthylene	0.44	0.005	0.8976	0.072732	0.123	7.1	35.5	0.02	0.00
Anthracene	0.44	0.005	0.1188	0.046244	0.017	7.1	35.5	0.00	0.00
Benzo(a)anthracene	1.5	0.005	2.1	0.0333	0.287	7.1	35.5	0.04	0.01
Benzo(b)fluoranthene	1.6	0.005	0.256	0.02784	0.037	7.1	35.5	0.01	0.00
Benzo(g,h,i)perylene	1.3	0.005	0.39	0.00793	0.055	7.1	35.5	0.01	0.00
Benzo(k)fluoranthene	1.5	0.005	0.63	0.0168	0.088	7.1	35.5	0.01	0.00
Chrysene	1.7	0.005	0.578	0.04913	0.083	7.1	35.5	0.01	0.00
Dibenz(a,h)anthracene	0.44	0.005	0.1188	0.002992	0.017	7.1	35.5	0.00	0.00
Fluoranthene	2.9	0.005	0.899	0.17893	0.126	7.1	35.5	0.02	0.00
Fluorene	0.44	0.005	0.4972	0.07876	0.069	7.1	35.5	0.01	0.00
Hexachlorobenzene	0.44	0.005	0.3784	0.016148	0.053	0.11	0.57	0.48	0.09
Hexachlorobutadiene	0.44	0.005	0.2684	0.03102	0.038	3.39	17	0.01	0.00
Hexachlorocyclopentadiene	0.44	0.005	0.44	0.020548	0.061	NA	NA	**NA**	**NA**
Hexachloroethane	0.44	0.005	0.44	0.105556	0.061	NA	NA	**NA**	**NA**
Indeno(1,2,3-cd)pyrene	1.4	0.005	0.504	0.00854	0.071	7.1	35.5	0.01	0.00
Pentachlorophenol	2.2	0.0125	2.2	0.10824	0.303	4.26	8.52	0.07	0.04
Phenanthrene	1.8	0.005	1.17	0.20772	0.161	7.1	35.5	0.02	0.00
Pyrene	2.9	0.005	2.32	0.19923	0.319	7.1	35.5	0.04	0.01
1,1,1,2-Tetrachloroethane	0.12	0.0005	0.12	0.140292	0.019	NA	NA	**NA**	**NA**
1,1,2,2-Tetrachlorethane	0.12	0.0005	0.12	0.214788	0.029	NA	NA	**NA**	**NA**
1,2,4-Trichlorobenzene	0.12	0.0005	0.0576	0.026232	0.008	32.2	161	0.00	0.00
1,2-Dichlorobenzene	0.44	0.0005	0.44	0.2409	0.060	32.2	161	0.00	0.00
1,3-Dichlorobenzene	0.44	0.0005	0.44	0.161612	0.060	32.2	161	0.00	0.00
1,4-Dichlorobenzene	0.44	0.0005	0.44	0.221936	0.060	32.2	161	0.00	0.00

NA = Not Available, HQn = Hazard Quotient based on the NOAEL, HQl = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = ((Most Contaminated Food Dose) + Dose Sediment + Dose Water)/ Body Weight

Dose Food = Food Concentration x Food Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

Belted Kingfisher

STEP 2 FOOD WEB MODEL FOR THE BELTED KINGFISHER

Body Weight 0.1250000 kg
Food Ingestion Rate 0.0245000 kg/day - dry
Water Ingestion Rate 0.0211000 L/Day
Sediment Ingestion Rate 0.0000000 kg/day - dry

Maximum Concentrations

Ecological Contaminant of Concern	Sediment Concentration (mg/kg)	Water Concentration (mg/L)	Invertebrate Concentration (mg/kg)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Total Cadmium	600	0.0025	1842	105.07	20.594	1.45	20	**14.20**	**1.03**
Dissolved Cadmium	NA	0.0025	NA	9.07	1.778	1.45	20	**1.23**	0.09
Total Chromium	12000	0.0025	2280	480.19	94.118	1	5	**94.12**	**18.82**
Total Copper	200	0.015	1592	62.60	12.272	47	61.7	0.26	0.20
Dissolved Copper	NA	0.017	NA	48.28	9.466	47	61.7	0.20	0.15
Total Lead	210	0.0025	69.3	16.30	3.195	3.85	19.3	0.83	0.17
Dissolved Lead	NA	0.0025	NA	1.60	0.314	3.85	19.3	0.08	0.02
Total Mercury	0.33	0.0005	0.9471	23.85	4.674	0.026	0.078	**179.78**	**59.93**
Total Nickel	92	0.0025	19.32	92.78	18.185	77.4	107	0.23	0.17
Total Selenium	12.5	0.0025	12.5	13.79	2.703	1.8	9	**1.50**	0.30
Total Silver	1.3	0.0025	0.234	1.58	0.310	35.6	178	0.01	0.00
Dissolved Silver	NA	0.0025	NA	0.28	0.055	35.6	178	0.00	0.00
Total Zinc	790	0.025	3760.4	853.90	167.369	14.5	131	**11.54**	**1.28**
Dissolved Zinc	NA	0.095	NA	242.82	47.609	14.5	131	**3.28**	0.36
Endosulfan I	0.00013	NM	0.00013	0.00	0.000	10	50	0.00	0.00
Endosulfan II	0.00039	NM	0.00039	0.00	0.000	10	50	0.00	0.00
Methoxychlor	0.00065	NM	0.00065	0.01	0.000	355	1775	0.00	0.00
Toxaphene	0.0039	NM	0.0039	0.04	0.001	1	5	0.00	0.00
4-Bromophenyl phenyl ether	0.44	0.005	0.44	226.17	44.329	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	0.44	0.005	0.44	206.57	40.489	NA	NA	NA	NA
Acenapthene	0.44	0.005	0.8976	9.82	1.925	7.1	35.5	0.27	0.05
Acenapthylene	0.44	0.005	0.8976	18.59	3.644	7.1	35.5	0.51	0.10
Anthracene	0.44	0.005	0.1188	19.94	3.909	7.1	35.5	0.55	0.11
Benzo(a)anthracene	1.5	0.005	2.1	81.12	15.900	7.1	35.5	**2.24**	0.45
Benzo(b)fluoranthene	1.6	0.005	0.256	122.24	23.960	7.1	35.5	**3.37**	0.67
Benzo(g,h,I)perylene	1.3	0.005	0.39	143.53	28.133	7.1	35.5	**3.96**	0.79
Benzo(k)fluoranthene	1.5	0.005	0.63	122.14	23.940	7.1	35.5	**3.37**	0.67
Chrysene	1.7	0.005	0.578	81.32	15.940	7.1	35.5	**2.25**	0.45
Dibenz(a,h)anthracene	0.44	0.005	0.1188	142.67	27.964	7.1	35.5	**3.94**	0.79
Fluoranthene	2.9	0.005	0.899	30.59	5.996	7.1	35.5	0.84	0.17
Fluorene	0.44	0.005	0.4972	50.12	9.824	7.1	35.5	**1.38**	0.28
Hexachlorobenzene	0.44	0.005	0.3784	49.58	9.718	0.11	0.57	**88.35**	**17.05**
Hexachlorobutadiene	0.44	0.005	0.2684	38.84	7.613	3.39	17	**2.25**	0.45
Hexachlorocyclopentadiene	0.44	0.005	0.44	18.60	3.645	NA	NA	NA	NA
Hexachloroethane	0.44	0.005	0.44	3.95	0.775	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.4	0.005	0.504	143.63	28.152	7.1	35.5	**3.97**	0.79
Pentachlorophenol	2.2	0.0125	2.2	22.05	4.324	4.26	8.52	**1.02**	0.51
Phenanthrene	1.8	0.005	1.17	200.70	39.338	7.1	35.5	**5.54**	**1.11**
Pyrene	2.9	0.005	2.32	39.33	7.710	7.1	35.5	**1.09**	0.22
1,1,1,2-Tetrachloroethane	0.12	0.0005	0.12	0.22	0.043	NA	NA	NA	NA
1,1,2,2-Tetrachlorethane	0.12	0.0005	0.12	0.14	0.027	NA	NA	NA	NA
1,2,4-Trichlorobenzene	0.12	0.0005	0.0576	0.46	0.090	32.2	161	0.00	0.00
1,2-Dichlorobenzene	0.44	0.0005	0.44	0.23	0.086	32.2	161	0.00	0.00
1,3-Dichlorobenzene	0.44	0.0005	0.44	0.18	0.086	32.2	161	0.00	0.00
1,4-Dichlorobenzene	0.44	0.0005	0.44	0.17	0.086	32.2	161	0.00	0.00

NA = Not Available, HQn = Hazard Quotient based on the NOAEL, HQl = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = ((Most Contaminated Food Dose) + Dose Sediment + Dose Water)/ Body Weight
Dose Food = Food Concentration x Food Ingestion Rate
Dose Water = Water Concentration x Water Ingestion Rate
Dose Sediment = Sediment Concentration x Sediment Ingestion Rate

STEP 2 FOOD WEB ANALYSIS FOR GREAT BLUE HERON

Great Blue Heron

Body Weight	2.1000000 kg
Food Ingestion Rate	0.4389000 kg/day - dry
Water Ingestion Rate	0.1090000 L/Day
Sediment Ingestion Rate	0.0000000 kg/day - dry

Maximum Concentrations

Ecological Contaminant of Concern	Sediment Concentration (mg/kg)	Water Concentration (mg/L)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Total Cadmium	600	0.0025	105.07	21.960	1.45	20	**15.14**	**1.10**
Dissolved Cadmium	NA	0.0025	9.07	1.896	1.45	20	**1.31**	0.09
Total Chromium	12000	0.0025	480.19	100.360	1	5	**100.36**	**20.07**
Total Copper	200	0.015	62.60	13.084	47	61.7	0.28	0.21
Dissolved Copper	NA	0.017	48.28	10.091	47	61.7	0.21	0.16
Total Lead	210	0.0025	16.30	3.407	3.85	19.3	0.88	0.18
Dissolved Lead	NA	0.0025	1.60	0.335	3.85	19.3	0.09	0.02
Total Mercury	0.33	0.0005	23.85	4.984	0.026	0.078	**191.70**	**63.90**
Total Nickel	92	0.0025	92.78	19.391	77.4	107	0.25	0.18
Total Selenium	12.5	0.0025	13.79	2.882	1.8	9	**1.60**	0.32
Total Silver	1.3	0.0025	1.58	0.330	35.6	178	0.01	0.00
Dissolved Silver	NA	0.0025	0.28	0.059	35.6	178	0.00	0.00
Total Zinc	790	0.025	853.90	178.466	14.5	131	**12.31**	**1.36**
Dissolved Zinc	NA	0.095	242.82	50.754	14.5	131	**3.50**	0.39
Endosulfan I	0.00013	NM	0.00	0.000	10	50	0.00	0.00
Endosulfan II	0.00039	NM	0.00	0.001	10	50	0.00	0.00
Methoxychlor	0.00065	NM	0.01	0.002	355	1775	0.00	0.00
Toxaphene	0.0039	NM	0.04	0.009	1	5	0.01	0.00
4-Bromophenyl phenyl ether	0.44	0.005	226.17	47.269	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	0.44	0.005	206.57	43.173	NA	NA	NA	NA
Acenapthene	0.44	0.005	9.82	2.052	7.1	35.5	0.29	0.06
Acenapthylene	0.44	0.005	18.59	3.885	7.1	35.5	0.55	0.11
Anthracene	0.44	0.005	19.94	4.168	7.1	35.5	0.59	0.12
Benzo(a)anthracene	1.5	0.005	81.12	16.954	7.1	35.5	**2.39**	0.48
Benzo(b)fluoranthene	1.6	0.005	122.24	25.548	7.1	35.5	**3.60**	0.72
Benzo(g,h,I)perylene	1.3	0.005	143.53	29.998	7.1	35.5	**4.23**	0.85
Benzo(k)fluoranthene	1.5	0.005	122.14	25.528	7.1	35.5	**3.60**	0.72
Chrysene	1.7	0.005	81.32	16.996	7.1	35.5	**2.39**	0.48
Dibenz(a,h)anthracene	0.44	0.005	142.67	29.818	7.1	35.5	**4.20**	0.84
Fluoranthene	2.9	0.005	30.59	6.393	7.1	35.5	0.90	0.18
Fluorene	0.44	0.005	50.12	10.475	7.1	35.5	**1.48**	0.30
Hexachlorobenzene	0.44	0.005	49.58	10.362	0.11	0.57	**94.20**	**18.18**
Hexachlorobutadiene	0.44	0.005	38.84	8.118	3.39	17	**2.39**	0.48
Hexachlorocyclopentadiene	0.44	0.005	18.60	3.887	NA	NA	NA	NA
Hexachloroethane	0.44	0.005	3.95	0.826	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.4	0.005	143.63	30.019	7.1	35.5	**4.23**	0.85
Pentachlorophenol	2.2	0.0125	22.05	4.609	4.26	8.52	**1.08**	0.54
Phenanthrene	1.8	0.005	200.70	41.947	7.1	35.5	**5.91**	**1.18**
Pyrene	2.9	0.005	39.33	8.220	7.1	35.5	**1.16**	0.23
1,1,1,2-Tetrachloroethane	0.12	0.0005	0.22	0.045	NA	NA	NA	NA
1,1,2,2-Tetrachlorethane	0.12	0.0005	0.14	0.028	NA	NA	NA	NA
1,2,4-Trichlorobenzene	0.12	0.0005	0.46	0.096	32.2	161	0.00	0.00
1,2-Dichlorobenzene	0.44	0.0005	0.23	0.048	32.2	161	0.00	0.00
1,3-Dichlorobenzene	0.44	0.0005	0.18	0.038	32.2	161	0.00	0.00
1,4-Dichlorobenzene	0.44	0.0005	0.17	0.035	32.2	161	0.00	0.00

NA = Not Available, HQn = Hazard Quotient based on the NOAEL, HQl = Hazard Quotient based on the LOAEL

Foodweb Model Calculations.

Dose = ((Most Contaminated Food Dose) + Dose Sediment + Dose Water)/ Body Weight

Dose Food = Food Concentration x Food Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

Dose Sediment = Sediment Concentration x Sediment Ingestion Rate

STEP 2 FOOD WEB ANALYSIS BENTHIC INVERTEBRATE CONCENTRATIONS

BENTHIC INVERTEBRATE CONCENTRATION

COPC	Invertebrate Bioconcentration Factors (dw)	Maximum Sediment Concentration (mg/kg)	Invertebrate Concentration (dw)	Fraction Dry	Invertebrate Concentration (ww)
Total Cadmium	3.07	600	1842	0.16	294.72
Dissolved Cadmium	3.07	NA	NA	0.16	NA
Total Chromium	0.19	12000	2280	0.16	364.8
Total Copper	7.96	200	1592	0.16	254.72
Dissolved Copper	7.96	NA	NA	0.16	NA
Total Lead	0.33	210	69.3	0.16	11.088
Dissolved Lead	0.33	NA	NA	0.16	NA
Total Mercury	2.87	0.33	0.9471	0.16	0.151536
Total Nickel	0.21	92	19.32	0.16	3.0912
Total Selenium	1	12.5	12.5	0.16	2
Total Silver	0.18	1.3	0.234	0.16	0.03744
Dissolved Silver	0.18	NA	NA	0.16	NA
Total Zinc	4.76	790	3760.4	0.16	601.664
Dissolved Zinc	4.76	NA	NA	0.16	NA
Endosulfan I	1	0.00013	0.00013	0.16	0.0000208
Endosulfan II	1	0.00039	0.00039	0.16	0.0000624
Methoxychlor	1	0.00065	0.00065	0.16	0.000104
Toxaphene	1	0.0039	0.0039	0.16	0.000624
4-Bromophenyl phenyl ether	1	0.44	0.44	0.16	0.0704
4-Chlorophenyl phenyl ether	1	0.44	0.44	0.16	0.0704
Acenapthene	2.04	0.44	0.8976	0.16	0.143616
Acenapthylene	2.04	0.44	0.8976	0.16	0.143616
Anthracene	0.27	0.44	0.1188	0.16	0.019008
Benzo(a)anthracene	1.4	1.5	2.1	0.16	0.336
Benzo(b)fluoranthene	0.16	1.6	0.256	0.16	0.04096
Benzo(g,h,I)perylene	0.3	1.3	0.39	0.16	0.0624
Benzo(k)fluoranthene	0.42	1.5	0.63	0.16	0.1008
Chrysene	0.34	1.7	0.578	0.16	0.09248
Dibenz(a,h)anthracene	0.27	0.44	0.1188	0.16	0.019008
Fluoranthene	0.31	2.9	0.899	0.16	0.14384
Fluorene	1.13	0.44	0.4972	0.16	0.079552
Hexachlorobenzene	0.86	0.44	0.3784	0.16	0.060544
Hexachlorobutadiene	0.61	0.44	0.2684	0.16	0.042944
Hexachlorocyclopentadiene	1	0.44	0.44	0.16	0.0704
Hexachloroethane	1	0.44	0.44	0.16	0.0704
Indeno(1,2,3-cd)pyrene	0.36	1.4	0.504	0.16	0.08064
Pentachlorophenol	1	2.2	2.2	0.16	0.352
Phenanthrene	0.65	1.8	1.17	0.16	0.1872
Pyrene	0.8	2.9	2.32	0.16	0.3712
1,1,1,2-Tetrachloroethane	1	0.12	0.12	0.16	0.0192
1,1,2,2-Tetrachlorethane	1	0.12	0.12	0.16	0.0192
1,2,4-Trichlorobenzene	0.48	0.12	0.0576	0.16	0.009216
1,2-Dichlorobenzene	1	0.44	0.44	0.16	0.0704
1,3-Dichlorobenzene	1	0.44	0.44	0.16	0.0704
1,4-Dichlorobenzene	1	0.44	0.44	0.16	0.0704

STEP 2 FOOD WEB ANALSIS AQUATIC PLANT CONCENTRATIONS

PLANT CONCENTRATIONS

COPC	Sediment Concentration (dw)	Plant Bioconcentration Factors (dw)	Plant Concentration (dw)	Fraction Dry	Plant Concentration (ww)
Total Cadmium	600	3.25	1950	0.15	292.5
Dissolved Cadmium	NA	3.25	NA	0.15	NA
Total Chromium	12000	0.084	1008	0.15	151.2
Total Copper	200	0.625	125	0.15	18.75
Dissolved Copper	NA	0.625	NA	0.15	NA
Total Lead	210	0.468	98.28	0.15	14.742
Dissolved Lead	NA	0.468	NA	0.15	NA
Total Mercury	0.33	5	1.65	0.15	0.2475
Total Nickel	92	1.411	129.812	0.15	19.4718
Total Selenium	12.5	3.012	37.65	0.15	5.6475
Total Silver	1.3	0.037	0.0481	0.15	0.007215
Dissolved Silver	NA	0.037	NA	0.15	NA
Total Zinc	790	1.82	1437.8	0.15	215.67
Dissolved Zinc	NA	1.82	NA	0.15	NA
Endosulfan I	0.00013	0.3436	0.000044668	0.15	6.7002E-06
Endosulfan II	0.00039	0.3131	0.000122109	0.15	1.83164E-05
Methoxychlor	0.00065	0.1447	0.000094055	0.15	1.41083E-05
Toxaphene	0.0039	0.1217	0.00047463	0.15	7.11945E-05
4-Bromophenyl phenyl ether	0.44	0.0578	0.025432	0.15	0.0038148
4-Chlorophenyl phenyl ether	0.44	0.1697	0.074668	0.15	0.0112002
Acenapthene	0.44	0.2564	0.112816	0.15	0.0169224
Acenapthylene	0.44	0.1653	0.072732	0.15	0.0109098
Anthracene	0.44	0.1051	0.046244	0.15	0.0069366
Benzo(a)anthracene	1.5	0.0222	0.0333	0.15	0.004995
Benzo(b)fluoranthene	1.6	0.0174	0.02784	0.15	0.004176
Benzo(g,h,f)perylene	1.3	0.0061	0.00793	0.15	0.0011895
Benzo(k)fluoranthene	1.5	0.0112	0.0168	0.15	0.00252
Chrysene	1.7	0.0289	0.04913	0.15	0.0073695
Dibenz(a,h)anthracene	0.44	0.0068	0.002992	0.15	0.0004488
Fluoranthene	2.9	0.0617	0.17893	0.15	0.0268395
Fluorene	0.44	0.179	0.07876	0.15	0.011814
Hexachlorobenzene	0.44	0.0367	0.016148	0.15	0.0024222
Hexachlorobutadiene	0.44	0.0705	0.03102	0.15	0.004653
Hexachlorocyclopentadiene	0.44	0.0467	0.020548	0.15	0.0030822
Hexachloroethane	0.44	0.2399	0.105556	0.15	0.0158334
Indeno(1,2,3-cd)pyrene	1.4	0.0061	0.00854	0.15	0.001281
Pentachlorophenol	2.2	0.0492	0.10824	0.15	0.016236
Phenanthrene	1.8	0.1154	0.20772	0.15	0.031158
Pyrene	2.9	0.0687	0.19923	0.15	0.0298845
1,1,1,2-Tetrachloroethane	0.12	1.1691	0.140292	0.15	0.0210438
1,1,2,2-Tetrachloroethane	0.12	1.7899	0.214788	0.15	0.0322182
1,2,4-Trichlorobenzene	0.12	0.2186	0.026232	0.15	0.0039348
1,2-Dichlorobenzene	0.44	0.5475	0.2409	0.15	0.036135
1,3-Dichlorobenzene	0.44	0.3673	0.161612	0.15	0.0242418
1,4-Dichlorobenzene	0.44	0.5044	0.221936	0.15	0.0332904

STEP 2 FOOD WEB ANALYSIS SURFACE WATER FISH CONCENTRATIONS

FISH CONCENTRATIONS FROM SURFACE WATER

COPC	Fish Bioconcentration Factors (mg/kg dw)	Surface Water Concentration (mg/L)	Fish Concentration (mg/kg)
Total Cadmium	3628	0.0025	9.07
Dissolved Cadmium	3628	0.0025	9.07
Total Chromium	76	0.0025	0.19
Total Copper	2840	0.015	42.60
Dissolved Copper	2840	0.017	48.28
Total Lead	640	0.0025	1.60
Dissolved Lead	640	0.0025	1.60
Total Mercury	44672	0.0005	22.34
Total Nickel	312	0.0025	0.78
Total Selenium	516	0.0025	1.29
Total Silver	112	0.0025	0.28
Dissolved Silver	112	0.0025	0.28
Total Zinc	2556	0.025	63.90
Dissolved Zinc	2556	0.095	242.82
Endosulfan I	1960	NM	NA
Endosulfan II	10469	NM	NA
Methoxychlor	59803	NM	NA
Toxaphene	220814	NM	NA
4-Bromophenyl phenyl ether	45145	0.005	225.73
4-Chlorophenyl phenyl ether	41226	0.005	206.13
Acenapthene	1875	0.005	9.38
Acenapthylene	3629	0.005	18.15
Anthracene	3900	0.005	19.50
Benzo(a)anthracene	15924	0.005	79.62
Benzo(b)fluoranthene	24128	0.005	120.64
Benzo(g,h,I)perylene	28446	0.005	142.23
Benzo(k)fluoranthene	24128	0.005	120.64
Chrysene	15924	0.005	79.62
Dibenz(a,h)anthracene	28446	0.005	142.23
Fluoranthene	5537	0.005	27.69
Fluorene	9936	0.005	49.68
Hexachlorobenzene	9833	0.005	49.17
Hexachlorobutadiene	7680	0.005	38.40
Hexachlorocyclopentadiene	3631	0.005	18.16
Hexachloroethane	702	0.005	3.51
Indeno(1,2,3-cd)pyrene	28446	0.005	142.23
Pentachlorophenol	1588	0.0125	19.85
Phenanthrene	39780	0.005	198.90
Pyrene	7286	0.005	36.43
1,1,1,2-Tetrachloroethane	194	0.0005	0.10
1,1,2,2-Tetrachlorethane	32	0.0005	0.02
1,2,4-Trichlorobenzene	902	0.0005	0.45
1,2-Dichlorobenzene	380	0.0005	0.19
1,3-Dichlorobenzene	286	0.0005	0.14
1,4-Dichlorobenzene	256	0.0005	0.13

STEP 2 FOOD WEB ANALYSIS SEDIMENT FISH CONCENTRATIONS

FISH CONCENTRATIONS FROM SEDIMENT

COPC	Fish Bioconcentration Factors (mg/kg dw)	Sediment Concentration (mg/kg)	Fish Concentration (mg/kg)
Total Cadmium	0.16	600	96.00
Dissolved Cadmium	0.16	NA	NA
Total Chromium	0.04	12000	480.00
Total Copper	0.1	200	20.00
Dissolved Copper	0.1	NA	NA
Total Lead	0.07	210	14.70
Dissolved Lead	0.07	NA	NA
Total Mercury	4.58	0.33	1.51
Total Nickel	1	92	92.00
Total Selenium	1	12.5	12.50
Total Silver	1	1.3	1.30
Dissolved Silver	1	NA	NA
Total Zinc	1	790	790.00
Dissolved Zinc	1	NA	NA
Endosulfan I	11.3	0.00013	0.00
Endosulfan II	11.3	0.00039	0.00
Methoxychlor	11.3	0.00065	0.01
Toxaphene	11.3	0.0039	0.04
4-Bromophenyl phenyl ether	1	0.44	0.44
4-Chlorophenyl phenyl ether	1	0.44	0.44
Acenapthene	1	0.44	0.44
Acenapthylene	1	0.44	0.44
Anthracene	1	0.44	0.44
Benzo(a)anthracene	1	1.5	1.50
Benzo(b)fluoranthene	1	1.6	1.60
Benzo(g,h,I)perylene	1	1.3	1.30
Benzo(k)fluoranthene	1	1.5	1.50
Chrysene	1	1.7	1.70
Dibenz(a,h)anthracene	1	0.44	0.44
Fluoranthene	1	2.9	2.90
Fluorene	1	0.44	0.44
Hexachlorobenzene	0.94	0.44	0.41
Hexachlorobutadiene	1	0.44	0.44
Hexachlorocyclopentadiene	1	0.44	0.44
Hexachloroethane	1	0.44	0.44
Indeno(1,2,3-cd)pyrene	1	1.4	1.40
Pentachlorophenol	1	2.2	2.20
Phenanthrene	1	1.8	1.80
Pyrene	1	2.9	2.90
1,1,1,2-Tetrachloroethane	1	0.12	0.12
1,1,2,2-Tetrachlorethane	1	0.12	0.12
1,2,4-Trichlorobenzene	0.07	0.12	0.01
1,2-Dichlorobenzene	0.09	0.44	0.04
1,3-Dichlorobenzene	0.09	0.44	0.04
1,4-Dichlorobenzene	0.09	0.44	0.04

STEP 2 FOOD WEB ANALYSIS TOTAL FISH CONCENTRATION

TOTAL FISH CONCENTRATIONS

COPC	Fish Concentration from Sediment	Fish Concentration from Surface Water	Total Fish Concentration
Total Cadmium	96.00	9.07	105.07
Dissolved Cadmium	NA	9.07	9.07
Total Chromium	480.00	0.19	480.19
Total Copper	20.00	42.60	62.60
Dissolved Copper	NA	48.28	48.28
Total Lead	14.70	1.60	16.30
Dissolved Lead	NA	1.60	1.60
Total Mercury	1.51	22.34	23.85
Total Nickel	92.00	0.78	92.78
Total Selenium	12.50	1.29	13.79
Total Silver	1.30	0.28	1.58
Dissolved Silver	NA	0.28	0.28
Total Zinc	790.00	63.90	853.90
Dissolved Zinc	NA	242.82	242.82
Endosulfan I	0.00	NA	0.00
Endosulfan II	0.00	NA	0.00
Methoxychlor	0.01	NA	0.01
Toxaphene	0.04	NA	0.04
4-Bromophenyl phenyl ether	0.44	225.73	226.17
4-Chlorophenyl phenyl ether	0.44	206.13	206.57
Acenapthene	0.44	9.38	9.82
Acenapthylene	0.44	18.15	18.59
Anthracene	0.44	19.50	19.94
Benzo(a)anthracene	1.50	79.62	81.12
Benzo(b)fluoranthene	1.60	120.64	122.24
Benzo(g,h,I)perylene	1.30	142.23	143.53
Benzo(k)fluoranthene	1.50	120.64	122.14
Chrysene	1.70	79.62	81.32
Dibenz(a,h)anthracene	0.44	142.23	142.67
Fluoranthene	2.90	27.69	30.59
Fluorene	0.44	49.68	50.12
Hexachlorobenzene	0.41	49.17	49.58
Hexachlorobutadiene	0.44	38.40	38.84
Hexachlorocyclopentadiene	0.44	18.16	18.60
Hexachloroethane	0.44	3.51	3.95
Indeno(1,2,3-cd)pyrene	1.40	142.23	143.63
Pentachlorophenol	2.20	19.85	22.05
Phenanthrene	1.80	198.90	200.70
Pyrene	2.90	36.43	39.33
1,1,1,2-Tetrachloroethane	0.12	0.10	0.22
1,1,2,2-Tetrachlorethane	0.12	0.02	0.14
1,2,4-Trichlorobenzene	0.01	0.45	0.46
1,2-Dichlorobenzene	0.04	0.19	0.23
1,3-Dichlorobenzene	0.04	0.14	0.18
1,4-Dichlorobenzene	0.04	0.13	0.17

APPENDIX C

TERRESTRIAL SPECIES
STEP 3 HAZARD QUOTIENT VALUES
MARTIN STATE AIRPORT

Ecological Contaminants of Concern	Vole		Shrew		American Robin		Red fox		Mourning Dove		White-Footed Mouse		Red-Tailed Hawk	
	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l
Cadmium	0.01	0.00	0.21	0.02	0.07	0.01	0.00	0.00	0.06	0.00	0.03	0.00	0.00	0.00
Chromium	0.02	0.00	0.63	0.13	**2.19**	0.44	0.01	0.00	**2.18**	0.44	0.09	0.02	0.00	0.00
Copper	0.00	0.00	0.06	0.04	0.05	0.04	0.00	0.00	0.05	0.04	0.01	0.01	0.00	0.00
Lead	0.01	0.00	0.28	0.03	0.62	0.12	0.00	0.00	**2.10**	0.21	0.04	0.00	0.00	0.00
Mercury	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
Selenium	0.13	0.08	**1.45**	0.89	0.64	0.19	0.02	0.01	0.65	0.19	0.23	0.14	0.00	0.00
Zinc	0.00	0.00	0.04	0.02	0.39	0.04	0.00	0.00	0.38	0.04	0.01	0.00	0.00	0.00
Toxaphene	0.00	0.00	0.01	0.00	0.07	0.01	0.00	0.00	0.06	0.01	0.00	0.00	0.00	0.00
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorphenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.00	0.00	0.14	0.03	0.02	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00
Benzo(a)pyrene	0.00	0.00	0.12	0.02	0.02	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00
Benzo(b)fluoranthene	0.00	0.00	0.11	0.02	0.02	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00
Benzo(g,h,I)perylene	0.00	0.00	0.07	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00
Benzo(k)fluoranthene	0.00	0.00	0.09	0.02	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00
Chrysene	0.00	0.00	0.14	0.03	0.02	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00
Dibenzo(a,h)anthracene	0.00	0.00	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fluoranthene	0.00	0.00	0.00	0.00	0.07	0.01	0.00	0.00	0.07	0.01	0.00	0.00	0.00	0.00
Hexachloroethane	0.00	0.00	0.00	0.00	NA	NA	0.00	0.00	NA	NA	0.00	0.00	NA	NA
Indeno(1,2,3-cd)pyrene	0.00	0.00	0.07	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00
Pyrene	0.01	0.00	0.20	0.04	0.03	0.01	0.00	0.00	0.03	0.01	0.03	0.01	0.00	0.00

CONCENTRATIONS OF COPCS USED IN STEP 3 TERRESTRIAL FOOD WEB ANALYSES

Chemical	Surface Soil Concentration (mg/kg) (dw)	Water Concentration (mg/L)	Invertebrate Concentration (mg/kg) (dw) [2]	Plant Concentration (mg/kg) (dw) [3]	Omnivore Concentration (mg/kg) (dw)	Herbivore Concentration (mg/kg) (dw)	Invertivore Concentration (mg/kg) (dw) [4]
Cadmium	2.8	0.0025	3.43	0.22	0.13	0.12	1.98
Chromium	67.8	0.0025	3.47	0.49	2.00	1.91	2.04
Copper	75.9	0.00825	5.71	1.40	2.70	2.65	12.19
Lead	73.9	0.0025	3.67	0.42	1.30	0.97	3.50
Mercury	0.186	0.0005	0.04	0.01	0.00	0.00	0.00
Selenium	8.5	0.0025	1.33	0.72	0.70	0.74	0.74
Zinc	164.9	0.025	65.43	8.86	26.86	15.46	44.96
Toxaphene	2	NM	1.28	0.01	0.64	0.64	0.64
4-Bromophenyl phenyl ether	0.23	0.005	0.04	0.00	0.07	0.07	0.07
4-Chlorphenyl phenyl ether	0.23	0.005	0.04	0.00	0.07	0.07	0.07
Benzo(a)anthracene	4.9	0.005	0.21	0.01	1.57	1.57	1.57
Benzo(a)pyrene	4.3	0.005	0.23	0.01	1.38	1.38	1.38
Benzo(b)fluoranthene	3.8	0.005	0.13	0.01	1.22	1.22	1.22
Benzo(g,h,I)perylene	2.4	0.005	0.06	0.00	0.77	0.77	0.77
Benzo(k)fluoranthene	3.2	0.005	0.11	0.00	1.02	1.02	1.02
Chrysene	5	0.005	0.35	0.01	1.60	1.60	1.60
Dibenzo(a,h)anthracene	0.89	0.005	0.07	0.00	0.28	0.28	0.28
Fluoranthene	15.9	0.005	0.94	0.10	5.09	5.09	5.09
Hexachloroethane	0.23	0.005	0.04	0.01	0.07	0.07	0.07
Indeno(1,2,3-cd)pyrene	2.3	0.005	0.15	0.00	0.74	0.74	0.74
Pyrene	6.9	0.005	0.43	0.04	2.21	2.21	2.21

STEP 3 TERRESTRIAL FOOD WEB MODEL FOR THE MEADOW VOLE

Martin State Airport

Meadow Vole

Body Weight	0.0428000	kg
Food Ingestion Rate	0.0021000	kg/day
Water Ingestion Rate	0.0090000	L/day
Soil Ingestion Rate	0.0000360	kg/day
Area Use Factor	1.0000000	
Fraction Diet Plants (%)	0.9560000	
Fraction Diet Invertebrates (%)	0.0200000	

Max Concentrations

Ecological Contaminant of Concern	Soil Concentration (mg/kg) (dw)	Water Concentration (mg/L)	Plant Concentration (mg/kg) (ww)	Invertebrate Concentration (mg/kg) (ww)	Dose (mg/kg/day) (ww)	AUF * Dose (mg/kg/day) (ww)	NOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL (mg/kg/day	LOAEL HQ_l
Cadmium	2.8	0.0025	0.21588	3.43168	0.016374562	0.016374562	1.63	0.0100	16.3	0.00100
Chromium	67.8	0.0025	0.48816	3.47136	0.083858111	0.083858111	5.55	0.0151	27.7	0.00303
Copper	75.9	0.00825	1.40036	5.70768	0.13686274	0.13686274	71.4	0.0019	95.2	0.00144
Lead	73.9	0.0025	0.42123	3.66544	0.086039949	0.086039949	13.5	0.0064	135	0.00064
Mercury	0.186	0.0005	0.00960	0.03541	0.000746531	0.000746531	12.1	0.0001	60.4	0.00001
Selenium	8.5	0.0025	0.72293	1.33280	0.042893033	0.042893033	0.34	0.1262	0.56	0.07659
Zinc	164.9	0.025	8.85513	65.43232	0.623530758	0.623530758	271	0.0023	541	0.00115
Toxaphene	2	NM	0.00768	1.28000	0.00329856	0.00329856	13.5	0.0002	67.6	0.00005
4-Bromophenyl phenyl ether	0.23	0.005	0.00172	0.03680	0.001361724	0.001361724	NA	NA	NA	NA
4-Chlorphenyl phenyl ether	0.23	0.005	0.00184	0.03680	0.001367226	0.001367226	NA	NA	NA	NA
Benzo(a)anthracene	4.9	0.005	0.01448	0.21168	0.006059804	0.006059804	1.83	0.0033	9.15	0.00066
Benzo(a)pyrene	4.3	0.005	0.00735	0.23392	0.005242676	0.005242676	1.83	0.0029	9.15	0.00057
Benzo(b)fluoranthene	3.8	0.005	0.00576	0.12768	0.004642998	0.004642998	1.83	0.0025	9.15	0.00051
Benzo(g,h,I)perylene	2.4	0.005	0.00187	0.05760	0.003214426	0.003214426	1.83	0.0018	9.15	0.00035
Benzo(k)fluoranthene	3.2	0.005	0.00485	0.10752	0.004075904	0.004075904	1.83	0.0022	9.15	0.00045
Chrysene	5	0.005	0.01478	0.35200	0.006295474	0.006295474	1.83	0.0034	9.15	0.00069
Dibenzo(a,h)anthracene	0.89	0.005	0.00071	0.06978	0.00190166	0.00190166	1.83	0.0010	9.15	0.00021
Fluoranthene	15.9	0.005	0.10136	0.94128	0.020103484	0.020103484	457	0.0000	2287	0.00001
Hexachloroethane	0.23	0.005	0.00651	0.03680	0.001586502	0.001586502	68.6	0.0000	846	0.00000
Indeno(1,2,3-cd)pyrene	2.3	0.005	0.00193	0.15088	0.003224665	0.003224665	1.83	0.0018	9.15	0.00035
Pyrene	6.9	0.005	0.04461	0.43056	0.009370083	0.009370083	1.83	0.0051	9.15	0.00102

HQ_n = Hazard Quotient based on the NOAEL, HQ_l = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = (Dose Food Plant + Dose Food Invertebrate + Dose Water + Dose Soil) / Body Weight

Dose Food Plant = (Soil Concentration x Plant BCF) x Food Ingestion Rate x Fraction Diet

Dose Food Invertebrate = (Soil Concentration x Invertebrate BAF) x Food Ingestion Rate x Fraction Diet

STEP 3 TERRESTRIAL FOOD WEB MODEL FOR THE SHORT-TAILED SHREW

Short-Tailed Shrew

Body Weight	0.0169000 kg
Food Ingestion Rate	0.0015000 kg/day
Water Ingestion Rate	0.0038000 L/day
Soil Ingestion Rate	0.0010400 kg/day
Area Use Factor	1.0000000
Fraction Diet Invertebrates	0.8230000 %
Fraction Diet Vegetation	0.0470000 %

Max Concentrations

Ecological Contaminant of Concern	Soil Concentration (mg/kg) (dw)	Water Concentration (mg/L)	Invertebrate Concentration (mg/kg) (ww)	Plant Concentration (mg/kg) (ww)	Dose (mg/kg/day) (ww)	AUF * Dose (mg/kg/day) (ww)	NOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL (mg/kg/day)	LOAEL HQ_n
Cadmium	2.8	0.0025	3.43168	0.21588	0.424445473	0.424445473	2.06	0.2060	20.6	0.0206
Chromium	67.8	0.0025	3.47136	0.48816	4.428479834	4.428479834	7	0.6326	35	0.1265
Copper	75.9	0.00825	5.70768	1.400355	5.095396804	5.095396804	90.1	0.0566	120	0.0425
Lead	73.9	0.0025	3.66544	0.42123	4.817762272	4.817762272	17.1	0.2817	171	0.0282
Mercury	0.186	0.0005	0.0354144	0.0095976	0.014185545	0.014185545	15.2	0.0009	76.2	0.0002
Selenium	8.5	0.0025	1.3328	0.722925	0.624012297	0.624012297	0.43	**1.4512**	0.7	0.8914
Zinc	164.9	0.025	65.43232	8.85513	14.9699104	14.9699104	341	0.0439	683	0.0219
Toxaphene	2	NM	1.28	0.00768	0.216609553	0.216609553	17.1	0.0127	85.4	0.0025
4-Bromophenyl phenyl ether	0.23	0.005	0.0368	0.00172155	0.01797343	0.01797343	NA	**NA**	NA	**NA**
4-Chlorphenyl phenyl ether	0.23	0.005	0.0368	0.00183885	0.017973919	0.017973919	NA	**NA**	NA	**NA**
Benzo(a)anthracene	4.9	0.005	0.21168	0.0144795	0.318185785	0.318185785	2.31	0.1377	11.5	0.0277
Benzo(a)pyrene	4.3	0.005	0.23392	0.007353	0.282857552	0.282857552	2.31	0.1224	11.5	0.0246
Benzo(b)fluoranthene	3.8	0.005	0.12768	0.005757	0.244321114	0.244321114	2.31	0.1058	11.5	0.0212
Benzo(g,h,i)perylene	2.4	0.005	0.0576	0.001872	0.153031904	0.153031904	2.31	0.0662	11.5	0.0133
Benzo(k)fluoranthene	3.2	0.005	0.10752	0.004848	0.205921611	0.205921611	2.31	0.0891	11.5	0.0179
Chrysene	5	0.005	0.352	0.014775	0.334590866	0.334590866	2.31	0.1448	11.5	0.0291
Dibenzo(a,h)anthracene	0.89	0.005	0.069776	0.00070755	0.060993394	0.060993394	2.31	0.0264	11.5	0.0053
Fluoranthene	15.9	0.005	0.94128	0.1013625	1.04876664	1.04876664	577	0.0018	2887	0.0004
Hexachloroethane	0.23	0.005	0.0368	0.0065136	0.017993421	0.017993421	213	0.0001	1067	0.0000
Indeno(1,2,3-cd)pyrene	2.3	0.005	0.15088	0.001932	0.153692164	0.153692164	2.31	0.0665	11.5	0.0134
Pyrene	6.9	0.005	0.43056	0.0446085	0.457376995	0.457376995	2.31	0.1980	11.5	0.0398

HQn = Hazard Quotient based on the NOAEL. HQl = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = (Dose Food Plant + Dose Food Invertebrate + Dose Water + Dose Soil) / Body Weight

American Robin

Body Weight	0.0773000 kg
Food Ingestion Rate	0.0055000 kg/day
Water Ingestion Rate	0.0106000 L/day
Soil Ingestion Rate	0.0154600 kg/day
Area Use Factor	0.1600000
Fraction Diet Plants	0.5160000 %
Fraction Diet Invertebrates	0.4360000 %

Max Concentrations

Ecological Contaminant of Concern	Soil Concentration (mg/kg) (dw)	Water Concentration (mg/L)	Plant Concentration (mg/kg) (ww)	Invertebrate Concentration (mg/kg) (ww)	Dose (mg/kg/day) (ww)	AUF * Dose (mg/kg/day) (ww)	NOAEL (mg/kg/day)	NOAEL HQn	LOAEL (mg/kg/day)	LOAEL HQn
Cadmium	2.8	0.0025	0.216	3.432	0.674726211	0.107956194	1.45	0.0745	20	0.0054
Chromium	67.8	0.0025	0.488	3.471	13.68595368	2.189752589	1	**2.1898**	5	0.4380
Copper	75.9	0.00825	1.400	5.708	15.40960769	2.46553723	47	0.0525	61.7	0.0400
Lead	73.9	0.0025	0.421	3.665	14.90951715	2.385522744	3.85	0.6196	19.3	0.1236
Mercury	0.186	0.0005	0.010	0.035	0.038719557	0.006195129	0.45	0.0138	0.9	0.0069
Selenium	8.5	0.0025	0.723	1.333	1.768230473	0.282916876	0.44	0.6430	1.5	0.1886
Zinc	164.9	0.025	8.855	65.432	35.33837726	5.654140362	14.5	0.3899	131	0.0432
Toxaphene	2	NM	0.008	1.280	0.439990114	0.070398418	1	0.0704	5	0.0141
4-Bromophenyl phenyl ether	0.23	0.005	0.002	0.037	0.047890455	0.007662473	NA	NA	NA	NA
4-Chlorphenyl phenyl ether	0.23	0.005	0.002	0.037	0.047894761	0.007663162	NA	NA	NA	NA
Benzo(a)anthracene	4.9	0.005	0.014	0.212	0.987783978	0.158045436	7.1	0.0223	35.5	0.0045
Benzo(a)pyrene	4.3	0.005	0.007	0.234	0.868212264	0.138913962	7.1	0.0196	35.5	0.0039
Benzo(b)fluoranthene	3.8	0.005	0.006	0.128	0.764857891	0.122377263	7.1	0.0172	35.5	0.0034
Benzo(g,h,I)perylene	2.4	0.005	0.002	0.058	0.482541236	0.077206598	7.1	0.0109	35.5	0.0022
Benzo(k)fluoranthene	3.2	0.005	0.005	0.108	0.644199115	0.103071858	7.1	0.0145	35.5	0.0029
Chrysene	5	0.005	0.015	0.352	1.012147832	0.161943653	7.1	0.0228	35.5	0.0046
Dibenzo(a,h)anthracene	0.89	0.005	0.001	0.070	0.180876208	0.028940193	7.1	0.0041	35.5	0.0008
Fluoranthene	15.9	0.005	0.101	0.941	3.213607454	0.514177193	7.1	0.0724	35.5	0.0145
Hexachloroethane	0.23	0.005	0.007	0.037	0.048066391	0.007690623	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	2.3	0.005	0.002	0.151	0.46543717	0.074469947	7.1	0.0105	35.5	0.0021
Pyrene	6.9	0.005	0.045	0.431	1.39568023	0.223308837	7.1	0.0315	35.5	0.0063

HQn = Hazard Quotient based on the NOAEL, HQl = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = (Dose Food Plant + Dose Food Invertebrate + Dose Water + Dose Soil) / Body Weight

Dose Food Plant = (Soil Concentration x Plant BCF) x Food Ingestion Rate x Fraction Diet

Dose Food Invertebrate = (Soil Concentration x Invertebrate BAF) x Food Ingestion Rate x Fraction Diet

Dose Soil = Soil Concentration x Soil Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

STEP 3 TERRESTRIAL FOOD WEB MODEL FOR THE MOURNING DOVE

Mourning Dove

Body Weight	0.1265000 kg
Food Ingestion Rate	0.0151000 kg/day
Water Ingestion Rate	0.0148000 L/day
Soil Ingestion Rate	0.0253000 kg/day
Area Use Factor	0.1600000
Fraction Diet Plants	0.9500000 %

Max Concentrations

Ecological Contaminant of Concern	Soil Concentration (mg/kg) (dw)	Water Concentration (mg/L)	Plant Concentration (mg/kg) (ww)	Dose (mg/kg/day) (ww)	AUF * Dose (mg/kg/day) (ww)	NOAEL (mg/kg/day)	NOAEL HQn	LOAEL (mg/kg/day)	LOAEL HQn
Cadmium	2.8	0.0025	0.21588	0.584773111	0.093563698	1.45	0.06	20	0.00
Chromium	67.8	0.0025	0.48816	13.61564945	2.178503912	1	**2.18**	5	0.44
Copper	75.9	0.00825	1.400355	15.33976437	2.454362299	47	0.05	61.7	0.04
Lead	73.9	0.0025	0.42123	14.82805964	2.372489542	1.13	**2.10**	11.3	0.21
Mercury	0.186	0.0005	0.0095976	0.038346858	0.006135497	0.45	0.01	0.9	0.01
Selenium	8.5	0.0025	0.722925	1.782271614	0.285163458	0.44	0.65	1.5	0.19
Zinc	164.9	0.025	8.85513	33.98708964	5.437934343	14.5	0.38	131	0.04
Toxaphene	2	NM	0.00768	0.400870906	0.064139345	1	0.06	5	0.01
4-Bromophenyl phenyl ether	0.23	0.005	0.00172155	0.046780203	0.007484832	NA	NA	NA	NA
4-Chlorphenyl phenyl ether	0.23	0.005	0.00183885	0.046793504	0.007486961	NA	NA	NA	NA
Benzo(a)anthracene	4.9	0.005	0.0144795	0.982226944	0.157156311	7.1	0.02	35.5	0.00
Benzo(a)pyrene	4.3	0.005	0.007353	0.861418805	0.137827009	7.1	0.02	35.5	0.00
Benzo(b)fluoranthene	3.8	0.005	0.005757	0.761237819	0.121798051	7.1	0.02	35.5	0.00
Benzo(g,h,I)perylene	2.4	0.005	0.001872	0.480797264	0.076927562	7.1	0.01	35.5	0.00
Benzo(k)fluoranthene	3.2	0.005	0.004848	0.64113474	0.102581558	7.1	0.01	35.5	0.00
Chrysene	5	0.005	0.014775	1.002260454	0.160361673	7.1	0.02	35.5	0.00
Dibenzo(a,h)anthracene	0.89	0.005	0.00070755	0.178665216	0.028586435	7.1	0.00	35.5	0.00
Fluoranthene	15.9	0.005	0.1013625	3.192079408	0.510732705	7.1	0.07	35.5	0.01
Hexachloroethane	0.23	0.005	0.0065136	0.047323617	0.007571779	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	2.3	0.005	0.001932	0.460804068	0.073728651	7.1	0.01	35.5	0.00
Pyrene	6.9	0.005	0.0446085	1.385643549	0.221702968	7.1	0.03	35.5	0.01

HQn = Hazard Quotient based on the NOAEL, HQl = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = (Dose Food Plant+ Dose Water + Dose Soil) / Body Weight

Dose Food Plant = (Soil Concentration x Plant BCF) x Food Ingestion Rate x Fraction Diet

Dose Soil = Soil Concentration x Soil Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

STEP 3 TERRESTRIAL FOOD WEB MODEL FOR THE RED FOX

Red Fox

Body Weight	4.0600000	kg
Food Ingestion Rate	0.1231000	kg/day
Water Ingestion Rate	0.3494000	L/day
Soil Ingestion Rate	0.0159000	kg/day
Area Use Factor	0.0300000	
Fraction Diet Small Mammal	0.8740000	%
Fraction Diet Plants	0.0700000	%
Fraction Diet Invertebrates	0.0280000	%

Mean Concentrations

Ecological Contaminant of Concern	Soil Concentration (mg/kg) (dw)	Water Concentration (mg/L)	Omnivore Concentration (mg/kg) (ww)	Herbivore Concentration (mg/kg) (ww)	Invertivore Concentration (mg/kg) (ww)	Plant Concentration (mg/kg) (ww)	Invertebrate Concentration (mg/kg) (ww)	Dose (mg/kg/day) (ww)	AUF * Dose (mg/kg/day) (ww)	NOAEL (mg/kg/day)	NOAEL HQn	LOAEL (mg/kg/day)	LOAEL HQn
Cadmium	2.8	0.0025	0.129024	0.120064	1.981952	0.21588	3.43168	0.038354795	0.001150644	0.94	0.00122	4.7	0.000245
Chromium	67.8	0.0025	1.996032	1.909248	2.039424	0.48816	3.47136	0.326030668	0.00978092	1.78	0.00549	8.89	0.001100
Copper	75.9	0.00825	2.695968	2.647392	12.192576	1.400355	5.70768	0.466156646	0.013984699	8.24	0.00170	10.7	0.001307
Lead	73.9	0.0025	1.30064	0.969568	3.499904	0.42123	3.66544	0.348732706	0.010461981	4.33	0.00242	43.3	0.000242
Mercury	0.186	0.0005	0.00321408	0.00398784	0.00398784	0.0095976	0.0354144	0.000953608	2.86082E-05	0.7	0.00004	3.52	0.000008
Selenium	8.5	0.0025	0.70176	0.74256	0.74256	0.722925	1.3328	0.056263149	0.001687894	0.11	0.01534	0.18	0.009377
Zinc	164.9	0.025	26.858912	15.461024	44.958336	8.85513	65.43232	1.565288047	0.046958641	14.7	0.00319	73.3	0.000641
Toxaphene	3	NAI	0.64	0.64	0.64	0.00768	1.28	0.027515627	0.000825469	4.33	0.00019	21.7	0.000038
4-Bromophenyl phenyl ether	0.23	0.005	0.0736	0.0736	0.0736	0.00172155	0.0368	0.00336099	0.000100083	NA	NA	NA	NA
4-Chlorphenyl phenyl ether	0.23	0.005	0.0736	0.0736	0.0736	0.00183885	0.0368	0.00336109	0.000100833	NA	NA	NA	NA
Benzo(a)anthracene	4.9	0.005	1.568	1.568	1.568	0.0144795	0.21168	0.061633284	0.001848999	0.59	0.00313	2.93	0.000631
Benzo(a)pyrene	4.3	0.005	1.376	1.376	1.376	0.007353	0.23392	0.054236711	0.001627101	0.59	0.00276	2.93	0.000555
Benzo(b)fluoranthene	3.8	0.005	1.216	1.216	1.216	0.005757	0.12768	0.047811767	0.001434353	0.59	0.00243	2.93	0.000490
Benzo(g,h,i)perylene	2.4	0.005	0.768	0.768	0.768	0.001872	0.0576	0.030305037	0.000909151	0.59	0.00154	2.93	0.000310
Benzo(k)fluoranthene	3.2	0.005	1.024	1.024	1.024	0.004848	0.10752	0.040330482	0.001209914	0.59	0.00205	2.93	0.000413
Chrysene	5	0.005	1.6	1.6	1.6	0.014775	0.352	0.063170973	0.001895129	0.59	0.00321	2.93	0.000647
Dibenzo(a,h)anthracene	0.89	0.005	0.2848	0.2848	0.2848	0.00070755	0.069776	0.011611616	0.000348348	0.59	0.00059	2.93	0.000119
Fluoranthene	15.9	0.005	5.088	5.088	5.088	0.1013625	0.94128	0.199613855	0.005988416	147	0.00004	733	0.000008
Hexachloroethane	0.23	0.005	0.0736	0.0736	0.0736	0.0065136	0.0368	0.003365058	0.000100952	54.2	0.00000	271	0.000000
Indeno(1,2,3-cd)pyrene	2.3	0.005	0.736	0.736	0.736	0.001932	0.15088	0.029263446	0.000877903	0.59	0.00149	2.93	0.000300
Pyrene	6.9	0.005	2.208	2.208	2.208	0.0446085	0.43056	0.086915834	0.002607475	0.59	0.00442	2.93	0.000890

HQn = Hazard Quotient based on the NOAEL. HQl = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = (Dose Food Omnivore + Dose Food Herbivore + Dose Food Invertivore + Dose Food Plant + Dose Food Invertebrate + Dose Water + Dose Soil) / Body Weight

Dose Food Invertebrate = (Food Concentration x Invertebrate BAF) x Food Ingestion Rate x Fraction Diet

Dose Food Omnivore = (Food Concentration x Omnivore BAF) x Food Ingestion Rate x (Fraction Diet Mammal / 3)

Dose Food Herbivore = (Food Concentration x Herbivore BAF) x Food Ingestion Rate x (Fraction Diet Mammal / 3)

Dose Food Invertivore = (Food Concentration x Invertivore BAF) x Food Ingestion Rate x (Fraction Diet Mammal / 3)

Dose Food Plant = (Food Concentration x Plant BCF) x Food Ingestion Rate x Fraction Diet

Dose Soil = Soil Concentration x Soil Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

STEP 3 FOOD WEB MODEL FOR THE WHITE-FOOTED MOUSE

White-Footed Mouse

Body Weight	0.0208000	kg
Food Ingestion Rate	0.0005000	kg/day
Water Ingestion Rate	0.0062000	L/day
Soil Ingestion Rate	0.0001740	kg/day
Area Use Factor	0.0001750	kg/day
Fraction Diet Plants (%)	0.5100000	
Fraction Diet Invertebrates (%)	0.47	

Max Concentrations

Ecological Contaminant of Concern	Soil Concentration (mg/kg) (dw)	Water Concentration (mg/L)	Plant Concentration (mg/kg) (ww)	Invertebrate Concentration (mg/kg)(ww)	Dose (mg/kg/day) (ww)	AUF * Dose (mg/kg/day) (ww)	NOAEL (mg/kg/day)	NOAEL HQn	LOAEL (mg/kg/day	LOAEL HQl
Cadmium	2.8	0.0025	0.21588	3.43168	0.06558626	0.003279313	1.95	0.03	19.5	0.00
Chromium	67.8	0.0025	0.48816	3.47136	0.613122615	0.030656131	6.64	0.09	33.2	0.02
Copper	75.9	0.00825	1.40036	5.70768	0.719045448	0.035952272	85.5	0.01	114	0.01
Lead	73.9	0.0025	0.42123	3.66544	0.665523656	0.033276183	16.2	0.04	162	0.00
Mercury	0.186	0.0005	0.00960	0.03541	0.002222778	0.000111139	14.5	0.00	72.3	0.00
Selenium	8.5	0.0025	0.72293	1.33280	0.095771821	0.004788591	0.41	0.23	0.67	0.14
Zinc	164.9	0.025	8.85513	65.43232	2.234723719	0.111736186	324	0.01	648	0.00
Toxaphene	2	NM	0.00768	1.28000	0.031286462	0.001564323	16.2	0.00	81	0.00
4-Bromophenyl phenyl ether	0.23	0.005	0.00172	0.03680	0.003851298	0.000192565	NA	NA	NA	NA
4-Chlorphenyl phenyl ether	0.23	0.005	0.00184	0.03680	0.003852736	0.000192637	NA	NA	NA	NA
Benzo(a)anthracene	4.9	0.005	0.01448	0.21168	0.045049859	0.002252493	2.19	0.02	11	0.00
Benzo(a)pyrene	4.3	0.005	0.00735	0.23392	0.04019453	0.002009726	2.19	0.02	11	0.00
Benzo(b)fluoranthene	3.8	0.005	0.00576	0.12768	0.034791963	0.001739598	2.19	0.02	11	0.00
Benzo(g,h,J)perylene	2.4	0.005	0.00187	0.05760	0.022241027	0.001112051	2.19	0.01	11	0.00
Benzo(k)fluoranthene	3.2	0.005	0.00485	0.10752	0.029533819	0.001476691	2.19	0.01	11	0.00
Chrysene	5	0.005	0.01478	0.35200	0.047475367	0.002373768	2.19	0.02	11	0.00
Dibenzo(a,h)anthracene	0.89	0.005	0.00071	0.06978	0.009732586	0.000486629	2.19	0.00	11	0.00
Fluoranthene	15.9	0.005	0.10136	0.94128	0.146377319	0.007318866	548	0.00	2740	0.00
Hexachloroethane	0.23	0.005	0.00651	0.03680	0.003910047	0.000195502	203	0.00	1013	0.00
Indeno(1,2,3-cd)pyrene	2.3	0.005	0.00193	0.15088	0.022459109	0.001122955	2.19	0.01	11	0.00
Pyrene	6.9	0.005	0.04461	0.43056	0.064622922	0.003231146	2.19	0.03	11	0.01

HQn = Hazard Quotient based on the NOAEL, HQl = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = (Dose Food Plant + Dose Food Invertebrate + Dose Water + Dose Soil) / Body Weight

Dose Food Plant = (Soil Concentration x Plant BCF) x Food Ingestion Rate x Fraction Diet

Dose Food Invertebrate = (Soil Concentration x Invertebrate BAF) x Food Ingestion Rate x Fraction Diet

Dose Soil = Soil Concentration x Soil Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

STEP 3 FOOD WEB MODEL FOR THE RED-TAILED HAWK

Red-Tailed Hawk

Body Weight	0.9570000 kg
Food Ingestion Rate	0.0395000 kg/day
Water Ingestion Rate	0.0680000 L/day
Soil Ingestion Rate	0.0000000 kg/day
Area Use Factor	0.0300000
Fraction Diet Small Mammal	1.0000000 %

Mean Concentrations

Ecological Contaminant of Concern	Soil Concentration (mg/kg) (dw)	Water Concentration (mg/L)	Omnivore Concentration (mg/kg) (ww)	Herbivore Concentration (mg/kg) (ww)	Invertivore Concentration (mg/kg) (ww)	Dose (mg/kg/day) (ww)	AUF * Dose (mg/kg/day) (ww)	NOAEL (mg/kg/day)	NOAEL HQn	LOAEL (mg/kg/day)	LOAEL HQn
Cadmium	2.8	0.0025	0.129024	0.120064	1.981952	0.030872894	0.000926187	1.45	0.0006	20	0.00005
Chromium	67.8	0.0025	1.996032	1.909248	2.039424	0.081966495	0.002458995	1	0.0025	5	0.00049
Copper	75.9	0.00825	2.695968	2.647392	12.192576	0.241850391	0.007255512	47	0.0002	61.7	0.00012
Lead	73.9	0.0025	1.30064	0.969568	3.499904	0.079564411	0.002386932	3.85	0.0006	19.3	0.00012
Mercury	0.186	0.0005	0.00321408	0.00398784	0.00398784	0.000189479	5.68438E-06	0.49	0.0000	1.2	0.00000
Selenium	8.5	0.0025	0.70176	0.74256	0.74256	0.030265329	0.00090796	0.44	0.0021	1.5	0.00061
Zinc	164.9	0.025	26.858912	15.461024	44.958336	1.202574623	0.036077239	14.5	0.0025	131	0.00028
Toxaphene	2	NM	0.64	0.64	0.64	0.026415883	0.000792476	1	0.0008	5	0.00016
4-Bromophenyl phenyl ether	0.23	0.005	0.0736	0.0736	0.0736	0.003393103	0.000101793	NA	NA	NA	NA
4-Chlorphenyl phenyl ether	0.23	0.005	0.0736	0.0736	0.0736	0.003393103	0.000101793	NA	NA	NA	NA
Benzo(a)anthracene	4.9	0.005	1.568	1.568	1.568	0.06507419	0.001952226	7.1	0.0003	35.5	0.00005
Benzo(a)pyrene	4.3	0.005	1.376	1.376	1.376	0.057149425	0.001714483	7.1	0.0002	35.5	0.00005
Benzo(b)fluoranthene	3.8	0.005	1.216	1.216	1.216	0.050545455	0.001516364	7.1	0.0002	35.5	0.00004
Benzo(g,h,I)perylene	2.4	0.005	0.768	0.768	0.768	0.032054336	0.00096163	7.1	0.0001	35.5	0.00003
Benzo(k)fluoranthene	3.2	0.005	1.024	1.024	1.024	0.04262069	0.001278621	7.1	0.0002	35.5	0.00004
Chrysene	5	0.005	1.6	1.6	1.6	0.066394984	0.00199185	7.1	0.0003	35.5	0.00006
Dibenzo(a,h)anthracene	0.89	0.005	0.2848	0.2848	0.2848	0.012110345	0.00036331	7.1	0.0001	35.5	0.00001
Fluoranthene	15.9	0.005	5.088	5.088	5.088	0.210361546	0.006310846	7.1	0.0009	35.5	0.00018
Hexachloroethane	0.23	0.005	0.0736	0.0736	0.0736	0.003393103	0.000101793	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	2.3	0.005	0.736	0.736	0.736	0.030733542	0.000922006	7.1	0.0001	35.5	0.00003
Pyrene	6.9	0.005	2.208	2.208	2.208	0.091490073	0.002744702	7.1	0.0004	35.5	0.00008

HQn = Hazard Quotient based on the NOAEL, HQl = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose =(Dose Food Omnivore + Dose Food Herbivore + Dose Food Invertivore + Dose Water + Dose Soil) / Body Weight

Dose Food Omnivore = (Food Concentration x Omnivore BAF) x Food Ingestion Rate x (Fraction Diet Mammal / 3)

Dose Food Herbivore = (Food Concentration x Herbivore BAF) x Food Ingestion Rate x (Fraction Diet Mammal / 3)

Dose Food Invertivore = (Food Concentration x Invertivore BAF) x Food Ingestion Rate x (Fraction Diet Mammal / 3)

Dose Soil = Soil Concentration x Soil Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

Dose Water = Water Concentration x Water Ingestion Rate

STEP 3 FOOD WEB MODEL SOIL INVERTEBRATE CONCENTRATIONS

WORM CALCULATIONS

Mean Concentrations

COPC	Mean Soil Concentration (mg/kg)	Invertebrate Bioaccumulation Factors (dw)	Invertebrate Concentration (dw)	Fraction Dry	Invertebrate Concentration (ww)
Cadmium	2.8	7.66	21.448	0.16	3.43168
Chromium	67.8	0.32	21.696	0.16	3.47136
Copper	75.9	0.47	35.673	0.16	5.70768
Lead	73.9	0.31	22.909	0.16	3.66544
Mercury	0.186	1.19	0.22134	0.16	0.0354144
Selenium	8.5	1.66	14.11	0.16	2.2576
Zinc	164.9	0.98	161.602	0.16	25.85632
Toxaphene	2	2.05	4.1	0.16	0.656
4-Bromophenyl phenyl ether	0.23	2.48	0.5704	0.16	0.091264
4-Chlorphenyl phenyl ether	0.23	4	0.92	0.16	0.1472
Benzo(a)anthracene	4.9	1	4.9	0.16	0.784
Benzo(a)pyrene	4.3	1	4.3	0.16	0.688
Benzo(b)fluoranthene	3.8	0.27	1.026	0.16	0.16416
Benzo(g,h,I)perylene	2.4	0.34	0.816	0.16	0.13056
Benzo(k)fluoranthene	3.2	0.21	0.672	0.16	0.10752
Chrysene	5	0.15	0.75	0.16	0.12
Dibenzo(a,h)anthracene	0.89	0.21	0.1869	0.16	0.029904
Fluoranthene	15.9	0.44	6.996	0.16	1.11936
Hexachloroethane	0.23	0.49	0.1127	0.16	0.018032
Indeno(1,2,3-cd)pyrene	2.3	0.37	0.851	0.16	0.13616
Pyrene	6.9	1	6.9	0.16	1.104
0	0	0.41	0	0.16	0
0	0	5.28	0	0.16	0
0	0	0.39	0	0.16	0

STEP 3 FOOD WEB MODEL TERRESTRIAL PLANT CONCENTRATIONS

PLANT CALCULATIONS

Mean Concentrations

COPC	Mean Soil Concentration	Plant Bioaccumulation Factors (dw)	Plant Concentration (dw)	Fraction Dry	Plant Concentration (ww)
Cadmium	2.8	0.514	1.4392	0.15	0.21588
Chromium	67.8	0.048	3.2544	0.15	0.48816
Copper	75.9	0.123	9.3357	0.15	1.400355
Lead	73.9	0.038	2.8082	0.15	0.42123
Mercury	0.186	0.344	0.063984	0.15	0.0095976
Selenium	8.5	0.034	0.289	0.15	0.04335
Zinc	164.9	0.567	93.4983	0.15	14.024745
Toxaphene	2	0.013	0.026	0.15	0.0039
4-Bromophenyl phenyl ether	0.23	0.358	0.08234	0.15	0.012351
4-Chlorphenyl phenyl ether	0.23	0.0256	0.005888	0.15	0.0008832
Benzo(a)anthracene	4.9	0.0499	0.24451	0.15	0.0366765
Benzo(a)pyrene	4.3	0.0533	0.22919	0.15	0.0343785
Benzo(b)fluoranthene	3.8	0.0197	0.07486	0.15	0.011229
Benzo(g,h,I)perylene	2.4	0.0114	0.02736	0.15	0.004104
Benzo(k)fluoranthene	3.2	0.0101	0.03232	0.15	0.004848
Chrysene	5	0.0052	0.026	0.15	0.0039
Dibenzo(a,h)anthracene	0.89	0.0101	0.008989	0.15	0.00134835
Fluoranthene	15.9	0.0197	0.31323	0.15	0.0469845
Hexachloroethane	0.23	0.0053	0.001219	0.15	0.00018285
Indeno(1,2,3-cd)pyrene	2.3	0.0425	0.09775	0.15	0.0146625
Pyrene	6.9	0.1888	1.30272	0.15	0.195408
0	0	0.0056	0	0.15	0
0	0	0.0443	0	0.15	0
0	0	0.0431	0	0.15	0

STEP 3 FOOD WEB MODEL SMALL MAMMAL CONCENTRATIONS

MAMMAL CALCULATIONS

Mean Concentrations

COPC	Mean Soil Conc. (mg/kg)	Omnivore (Mouse) Bioaccumulation Factors (dw)	Herbivore (Vole) Bioaccumulation Factors (dw)	Insectivore (Shrew) Bioaccumulation Factors (dw)	Omnivore Conc. (dw)	Herbivore Conc. (dw)	Insectivore Conc. (dw)	Fraction Dry	Omnivore Conc. (ww)	Herbivore Conc. (ww)	Insectivore Conc. (ww)
Cadmium	2.8	0.144	0.134	2.212	0.4032	0.3752	6.1936	0.32	0.129024	0.120064	1.981952
Chromium	67.8	0.092	0.088	0.094	6.2376	5.9664	6.3732	0.32	1.996032	1.909248	2.039424
Copper	75.9	0.111	0.109	0.502	8.4249	8.2731	38.1018	0.32	2.695968	2.647392	12.192576
Lead	73.9	0.055	0.041	0.148	4.0645	3.0299	10.9372	0.32	1.30064	0.969568	3.499904
Mercury	0.186	0.054	0.067	0.067	0.010044	0.012462	0.012462	0.32	0.00321408	0.0039878	0.00398784
Selenium	8.5	0.258	0.273	0.273	2.193	2.3205	2.3205	0.32	0.70176	0.74256	0.74256
Zinc	164.9	0.509	0.293	0.852	83.9341	48.3157	140.4948	0.32	26.858912	15.461024	44.958336
Toxaphene	2	1	1	1	2	2	2	0.32	0.64	0.64	0.64
4-Bromophenyl phenyl ether	0.23	1	1	1	0.23	0.23	0.23	0.32	0.0736	0.0736	0.0736
4-Chlorphenyl phenyl ether	0.23	1	1	1	0.23	0.23	0.23	0.32	0.0736	0.0736	0.0736
Benzo(a)anthracene	4.9	1	1	1	4.9	4.9	4.9	0.32	1.568	1.568	1.568
Benzo(a)pyrene	4.3	1	1	1	4.3	4.3	4.3	0.32	1.376	1.376	1.376
Benzo(b)fluoranthene	3.8	1	1	1	3.8	3.8	3.8	0.32	1.216	1.216	1.216
Benzo(g,h,I)perylene	2.4	1	1	1	2.4	2.4	2.4	0.32	0.768	0.768	0.768
Benzo(k)fluoranthene	3.2	1	1	1	3.2	3.2	3.2	0.32	1.024	1.024	1.024
Chrysene	5	1	1	1	5	5	5	0.32	1.6	1.6	1.6
Dibenzo(a,h)anthracene	0.89	1	1	1	0.89	0.89	0.89	0.32	0.2848	0.2848	0.2848
Fluoranthene	15.9	1	1	1	15.9	15.9	15.9	0.32	5.088	5.088	5.088
Hexachloroethane	0.23	1	1	1	0.23	0.23	0.23	0.32	0.0736	0.0736	0.0736
Indeno(1,2,3-cd)pyrene	2.3	1	1	1	2.3	2.3	2.3	0.32	0.736	0.736	0.736
Pyrene	6.9	1	1	1	6.9	6.9	6.9	0.32	2.208	2.208	2.208

APPENDIX D

AQUATIC SPECIES
MEAN CONCENTRATION HAZARD QUOTIENT VALUES
MARTIN STATE AIRPORT

	Raccoon		Mallard		Belted Kingfisher		Great Blue Heron	
Ecological Contaminants	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
of Concern	HQ_n	HQ_l	HQ_n	HQ_l	HQ_n	HQ_l	HQ_n	HQ_l
Total Cadmium	0.11	0.02	0.02	0.00	0.12	0.01	0.78	0.06
Dissolved Cadmium	0.00	0.00	0.00	0.00	0.03	0.00	0.28	0.02
Total Chromium	0.88	0.18	0.13	0.03	0.54	0.11	**3.62**	0.72
Total Copper	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.02
Dissolved Copper	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.02
Total Lead	0.01	0.00	0.00	0.00	0.01	0.00	0.06	0.01
Total Mercury	0.00	0.00	0.00	0.00	**4.58**	**1.53**	**38.49**	**12.83**
Total Nickel	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01
Total Selenium	0.09	0.05	0.00	0.00	0.03	0.01	0.25	0.05
Total Zinc	0.01	0.00	0.00	0.00	0.04	0.00	0.28	0.03
Dissolved Zinc	0.00	0.00	0.00	0.00	0.04	0.00	0.33	0.04
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.00	0.00	0.00	0.00	0.01	0.00	0.07	0.01
Benzo(b)fluoranthene	0.00	0.00	0.00	0.00	0.01	0.00	0.07	0.01
Benzo(g,h,I)perylene	0.00	0.00	0.00	0.00	0.01	0.00	0.06	0.01
Benzo(k)fluoranthene	0.00	0.00	0.00	0.00	0.01	0.00	0.07	0.01
Chrysene	0.00	0.00	0.00	0.00	0.01	0.00	0.07	0.01
Dibenz(a,h)anthracene	0.00	0.00	0.00	0.00	0.01	0.00	0.06	0.01
Fluorene	0.00	0.00	0.00	0.00	0.03	0.01	0.23	0.05
Hexachlorobenzene	0.00	0.00	0.00	0.00	0.26	0.05	**2.15**	0.41
Hexachlorobutadiene	0.00	0.00	0.00	0.00	0.02	0.00	0.20	0.04
Hexachlorocyclopentadiene	0.00	0.00	NA	NA	NA	NA	NA	NA
Hexachloroethane	0.00	0.00	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.00	0.00	0.00	0.00	0.01	0.00	0.07	0.01
Pentachlorophenol	0.00	0.00	0.00	0.00	0.01	0.00	0.07	0.04
Phenanthrene	0.00	0.00	0.00	0.00	0.08	0.02	0.64	0.13
Pyrene	0.00	0.00	0.00	0.00	0.01	0.00	0.07	0.01
1,1,1,2-Tetrachloroethane	0.00	0.00	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachlorethane	0.00	0.00	NA	NA	NA	NA	NA	NA
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

STEP 3 MEAN CONCENTRATIONS OF COPC FOR USE IN FOOD-WEB MODELING

AQUATIC RECEPTOR MODELS

Chemical	Sediment Mean Concentration (mg/kg)	Water Mean Concentration (mg/L)	Benthic Invertebrate Concentration (mg/kg)	Plant Concentration (mg/kg)	Fish Concentration (mg/kg)
Total Cadmium	102.75	2.5	69.87	52.8135	6.38
Dissolved Cadmium	NA	2.5	NA	NA	2.27
Total Chromium	2047.5	2.5	163.8	98.28	20.52
Total Copper	50.92	8.25	46.8464	6.26316	7.13
Dissolved Copper	NA	9.75	NA	NA	6.92
Total Lead	53.6	2.5	4.288	2.0368	1.34
Total Mercury	0.114	0.5	0.12312	0.039216	5.68
Total Nickel	25.8	2.5	3.354	0.8772	6.65
Total Selenium	8.8	2.5	8.8	4.9896	2.52
Total Zinc	190.2	25	180.69	68.0916	23.11
Dissolved Zinc	NA	42.5	NA	NA	27.16
4-Bromophenyl phenyl ether	0.312	0.005	0.312	0.0155688	17.82
4-Chlorophenyl phenyl ether	0.312	0.005	0.312	0.0166296	16.28
Benzo(a)anthracene	0.495	0.005	0.1782	0.0097515	2.62
Benzo(b)fluoranthene	0.511	0.005	0.07665	0.0051611	2.63
Benzo(g,h,I)perylene	0.462	0.005	0.09702	0.0024024	2.62
Benzo(k)fluoranthene	0.495	0.005	0.11385	0.0049995	2.62
Chrysene	0.528	0.005	0.1056	0.0104016	2.63
Dibenz(a,h)anthracene	0.312	0.005	0.05928	0.0016536	2.58
Fluorene	0.312	0.005	0.14976	0.0445536	9.08
Hexachlorobenzene	0.312	0.005	0.16224	0.0047736	1.34
Hexachlorobutadiene	0.202	0.005	0.07878	0.0129684	3.93
Hexachlorocyclopentadiene	0.312	0.005	0.312	0.0092664	0.90
Hexachloroethane	0.312	0.005	0.312	0.0589056	0.78
Indeno(1,2,3-cd)pyrene	0.478	0.005	0.08126	0.0026768	2.62
Pentachlorophenol	1.335	0.0125	1.335	0.0591405	1.70
Phenanthrene	0.545	0.005	0.15805	0.049486	25.64
Pyrene	0.728	0.005	0.32032	0.0313768	2.68
1,1,1,2-Tetrachloroethane	0.0253	0.0005	0.0253	0.02957823	0.03
1,1,2,2-Tetrachlorethane	0.0253	0.0005	0.0253	0.04071023	0.01

STEP 3 FOOD WEB MODEL FOR THE RACCOON

Raccoon

Body Weight	5.9400000 kg
Food Ingestion Rate	0.1000000 kg/day - dry
Water Ingestion Rate	0.4921000 L/day
Soil Ingestion Rate	0.0286000 kg/day - dry
Area Use Factor	0.1400000
Dietary Composition	

Benthic Inverts.	0.436
Aquatic Plants	0.4
Fish Consumption	0.07

Mean Concentrations

Ecological Contaminant of Concern	Sediment Concentration (mg/kg)	Water Concentration (mg/L)	Invertebrate Concentration (mg/kg)	Plant Concentration (mg/kg)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	AUF * Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Total Cadmium	102.75	0.0025	11.1792	7.922025	6.38	0.638	0.089	0.85	4.27	0.11	0.02
Dissolved Cadmium	NA	0.0025	NA	NA	2.27	0.003	0.000	0.85	4.27	0.00	0.00
Total Chromium	2047.5	0.0025	26.208	14.742	20.52	10.174	1.424	1.62	8.08	0.88	0.18
Total Copper	50.92	0.00825	7.495424	0.939474	7.13	0.316	0.044	7.49	9.7	0.01	0.00
Dissolved Copper	NA	0.00975	NA	NA	6.92	0.009	0.001	7.49	9.7	0.00	0.00
Total Lead	53.6	0.0025	0.68608	0.30552	1.34	0.267	0.037	3.94	39.4	0.01	0.00
Total Mercury	0.114	0.0005	0.0196992	0.0058824	5.68	0.007	0.001	0.64	3.2	0.00	0.00
Total Nickel	25.6	0.0025	0.53664	0.13158	6.65	0.137	0.019	28.5	71.2	0.00	0.00
Total Selenium	8.8	0.0025	1.408	0.74844	2.52	0.061	0.009	0.1	0.16	0.09	0.05
Total Zinc	190.2	0.025	28.9104	10.21374	23.11	1.226	0.172	13.3	66.6	0.01	0.00
Dissolved Zinc	NA	0.0425	NA	NA	27.16	0.036	0.005	13.3	66.6	0.00	0.00
4-Bromophenyl phenyl ether	0.312	0.005	0.04992	0.00233532	17.82	0.023	0.003	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	0.312	0.005	0.04992	0.00249444	16.28	0.021	0.003	NA	NA	NA	NA
Benzo(a)anthracene	0.495	0.005	0.028512	0.001462725	2.62	0.006	0.001	0.53	2.67	0.00	0.00
Benzo(b)fluoranthene	0.511	0.005	0.012264	0.000774165	2.63	0.006	0.001	0.53	2.67	0.00	0.00
Benzo(g,h,i)perylene	0.462	0.005	0.0155232	0.00036036	2.62	0.006	0.001	0.53	2.67	0.00	0.00
Benzo(k)fluoranthene	0.495	0.005	0.018216	0.000749925	2.62	0.006	0.001	0.53	2.67	0.00	0.00
Chrysene	0.528	0.005	0.016896	0.00156024	2.63	0.006	0.001	0.53	2.67	0.00	0.00
Dibenz(a,h)anthracene	0.312	0.005	0.0094848	0.00024804	2.58	0.005	0.001	0.53	2.67	0.00	0.00
Fluorene	0.312	0.005	0.0239616	0.00668304	9.08	0.013	0.002	133	666	0.00	0.00
Hexachlorobenzene	0.312	0.005	0.0259584	0.00071604	1.34	0.004	0.001	1.37	13.7	0.00	0.00
Hexachlorobutadiene	0.202	0.005	0.0126048	0.00194526	3.93	0.006	0.001	0.99	9.85	0.00	0.00
Hexachlorocyclopentadiene	0.312	0.005	0.04992	0.00138996	0.90	0.003	0.000	20	100	0.00	0.00
Hexachloroethane	0.312	0.005	0.04992	0.00883584	0.78	0.003	0.000	49.3	246	0.00	0.00
Indeno(1,2,3-cd)pyrene	0.478	0.005	0.0130016	0.00040152	2.62	0.006	0.001	0.53	2.67	0.00	0.00
Pentachlorophenol	1.335	0.0125	0.2136	0.008871075	1.70	0.011	0.002	2.46	12.3	0.00	0.00
Phenanthrene	0.545	0.005	0.025288	0.0074229	25.64	0.033	0.005	133	666	0.00	0.00
Pyrene	0.728	0.005	0.0512512	0.00470652	2.68	0.007	0.001	0.53	2.67	0.00	0.00
1,1,1,2-Tetrachloroethane	0.0253	0.0005	0.004048	0.004436735	0.03	0.000	0.000	37.4	187	0.00	0.00
1,1,2,2-Tetrachlorethane	0.0253	0.0005	0.004048	0.006106535	0.01	0.000	0.000	37.4	187	0.00	0.00

NA = Not Available, HQ_n = Hazard Quotient based on the NOAEL, HQ_l = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = ((Sum of the Food Doses) + Dose Sediment + Dose Water)/ Body Weight

Dose Food = Food Concentration x Food Ingestion Rate x Dietary Component of Food Item

Dose Water = Water Concentration x Water Ingestion Rate

Dose Sediment = Sediment Concentration x Food Ingestion Rate x Dietary Component of Sediment

STEP 3 FOOD WEB MODEL FOR THE MALLARD

Mallard

Body Weight	1.1770000 kg
Food Ingestion Rate	0.0647000 kg/day - dry
Water Ingestion Rate	0.0658000 L/day
Sediment Ingestion Rate	0.0013500 kg/day - dry
Area Use Factor	0.0400000
Dietary Composition	
Benthic Inverts.	0.100
Aquatic Plants	0.867
Fish Consumption	0.00

Mean Concentrations

Ecological Contaminant of Concern	Sediment Concentration (mg/kg)	Water Concentration (mg/L)	Invertebrate Concentration (mg/kg)	Plant Concentration (mg/kg)	Dose (mg/kg/day)	AUF * Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Total Cadmium	102.75	0.0025	11.1792	7.922025	0.557	0.022	1.45	20	0.02	0.00
Dissolved Cadmium	NA	0.0025	NA	NA	0.000	0.000	1.45	20	0.00	0.00
Total Chromium	2047.5	0.0025	26.208	14.742	3.195	0.128	1	5	0.13	0.03
Total Copper	50.92	0.00825	7.495424	0.939474	0.145	0.006	47	61.7	0.00	0.00
Dissolved Copper	NA	0.00975	NA	NA	0.001	0.000	47	61.7	0.00	0.00
Total Lead	53.6	0.0025	0.68608	0.30552	0.080	0.003	1.13	11.3	0.00	0.00
Total Mercury	0.114	0.0005	0.0196992	0.0058824	0.001	0.000	0.026	0.078	0.00	0.00
Total Nickel	25.8	0.0025	0.53664	0.13158	0.039	0.002	77.4	107	0.00	0.00
Total Selenium	8.8	0.0025	1.408	0.74844	0.054	0.002	0.44	0.8	0.00	0.00
Total Zinc	190.2	0.025	28.9104	10.21374	0.865	0.035	14.5	131	0.00	0.00
Dissolved Zinc	NA	0.0425	NA	NA	0.002	0.000	14.5	131	0.00	0.00
4-Bromophenyl phenyl ether	0.312	0.005	0.04992	0.00233532	0.001	0.000	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	0.312	0.005	0.04992	0.00249444	0.001	0.000	NA	NA	NA	NA
Benzo(a)anthracene	0.495	0.005	0.028512	0.001462725	0.001	0.000	7.1	35.5	0.00	0.00
Benzo(b)fluoranthene	0.511	0.005	0.012264	0.000774165	0.001	0.000	7.1	35.5	0.00	0.00
Benzo(g,h,i)perylene	0.462	0.005	0.0155232	0.00036036	0.001	0.000	7.1	35.5	0.00	0.00
Benzo(k)fluoranthene	0.495	0.005	0.018216	0.000749925	0.001	0.000	7.1	35.5	0.00	0.00
Chrysene	0.528	0.005	0.016896	0.00156024	0.001	0.000	7.1	35.5	0.00	0.00
Dibenz(a,h)anthracene	0.312	0.005	0.0094848	0.00024804	0.001	0.000	7.1	35.5	0.00	0.00
Fluorene	0.312	0.005	0.0239616	0.00668304	0.001	0.000	7.1	35.5	0.00	0.00
Hexachlorobenzene	0.312	0.005	0.0259584	0.00071604	0.001	0.000	0.11	0.57	0.00	0.00
Hexachlorobutadiene	0.202	0.005	0.0126048	0.00194526	0.001	0.000	3.39	17	0.00	0.00
Hexachlorocyclopentadiene	0.312	0.005	0.04992	0.00138996	0.001	0.000	NA	NA	NA	NA
Hexachloroethane	0.312	0.005	0.04992	0.00883584	0.001	0.000	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.478	0.005	0.0130016	0.00040152	0.001	0.000	7.1	35.5	0.00	0.00
Pentachlorophenol	1.335	0.0125	0.2136	0.008871075	0.004	0.000	4.26	8.52	0.00	0.00
Phenanthrene	0.545	0.005	0.025288	0.0074229	0.001	0.000	7.1	35.5	0.00	0.00
Pyrene	0.728	0.005	0.0512512	0.00470652	0.002	0.000	7.1	35.5	0.00	0.00
1,1,1,2-Tetrachloroethane	0.0253	0.0005	0.004048	0.004436735	0.000	0.000	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	0.0253	0.0005	0.004048	0.006106535	0.000	0.000	NA	NA	NA	NA

NA = Not Available. HQn = Hazard Quotient based on the NOAEL, HQl = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = ((Sum of the Food Doses) + Dose Sediment + Dose Water)/ Body Weight

Dose Food = Food Concentration x Food Ingestion Rate x Dietary Component of Food Item

Dose Water = Water Concentration x Water Ingestion Rate

Dose Sediment = Sediment Concentration x Food Ingestion Rate x Dietary Component of Sediment

Belted Kingfisher

STEP 3 FOOD WEB MODEL FOR THE BELTED KINGFISHER

Body Weight	0.1480000	kg
Food Ingestion Rate	0.0168000	kg/day - dry
Water Ingestion Rate	0.0164000	L/Day
Sediment Ingestion Rate	0.0000000	kg/day - dry
Area Use Factor	0.2200000	
Dietary Composition		
Benthic Inverts.	0.160	
Aquatic Plants	0.000	
Fish Consumption	0.84	

Mean Concentrations

Ecological Contaminant of Concern	Sediment Concentration (mg/kg)	Water Concentration (mg/L)	Invertebrate Concentration (mg/kg)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	AUF * Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Total Cadmium	102.75	0.0025	11.1792	6.38	0.811	0.179	1.45	20	0.12	0.01
Dissolved Cadmium	NA	0.0025	NA	2.27	0.216	0.048	1.45	20	0.03	0.00
Total Chromium	2047.5	0.0025	26.208	20.52	2.433	0.535	1	5	0.54	0.11
Total Copper	50.92	0.00825	7.495424	7.13	0.817	0.180	47	61.7	0.00	0.00
Dissolved Copper	NA	0.00975	NA	6.92	0.661	0.145	47	61.7	0.00	0.00
Total Lead	53.6	0.0025	0.68608	1.34	0.140	0.031	3.85	19.3	0.01	0.00
Total Mercury	0.114	0.0005	0.0196992	5.68	0.542	0.119	0.026	0.078	**4.58**	**1.53**
Total Nickel	25.8	0.0025	0.53664	6.65	0.644	0.142	77.4	107	0.00	0.00
Total Selenium	8.8	0.0025	1.408	2.52	0.266	0.059	1.8	9	0.03	0.01
Total Zinc	190.2	0.025	28.9104	23.11	2.731	0.601	14.5	131	0.04	0.00
Dissolved Zinc	NA	0.0425	NA	27.16	2.594	0.571	14.5	131	0.04	0.00
4-Bromophenyl phenyl ether	0.312	0.005	0.04992	17.82	1.700	0.374	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	0.312	0.005	0.04992	16.28	1.554	0.342	NA	NA	NA	NA
Benzo(a)anthracene	0.495	0.005	0.028512	2.62	0.251	0.055	7.1	35.5	0.01	0.00
Benzo(b)fluoranthene	0.511	0.005	0.012264	2.63	0.251	0.055	7.1	35.5	0.01	0.00
Benzo(g,h,i)perylene	0.462	0.005	0.0155232	2.62	0.250	0.055	7.1	35.5	0.01	0.00
Benzo(k)fluoranthene	0.495	0.005	0.018216	2.62	0.251	0.055	7.1	35.5	0.01	0.00
Chrysene	0.528	0.005	0.016896	2.63	0.252	0.055	7.1	35.5	0.01	0.00
Dibenz(a,h)anthracene	0.312	0.005	0.0094848	2.58	0.247	0.054	7.1	35.5	0.01	0.00
Fluorene	0.312	0.005	0.0239616	9.08	0.867	0.191	7.1	35.5	0.03	0.01
Hexachlorobenzene	0.312	0.005	0.0259584	1.34	0.129	0.028	0.11	0.57	0.26	0.05
Hexachlorobutadiene	0.202	0.005	0.0126048	3.93	0.376	0.083	3.39	17	0.02	0.00
Hexachlorocyclopentadiene	0.312	0.005	0.04992	0.90	0.088	0.019	NA	NA	NA	NA
Hexachloroethane	0.312	0.005	0.04992	0.78	0.076	0.017	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.478	0.005	0.0130016	2.62	0.251	0.055	7.1	35.5	0.01	0.00
Pentachlorophenol	1.335	0.0125	0.2136	1.70	0.167	0.037	4.26	8.52	0.01	0.00
Phenanthrene	0.545	0.005	0.025288	25.64	2.445	0.538	7.1	35.5	0.08	0.02
Pyrene	0.728	0.005	0.0512512	2.68	0.257	0.057	7.1	35.5	0.01	0.00
1,1,1,2-Tetrachloroethane	0.0253	0.0005	0.004048	0.03	0.003	0.001	NA	NA	NA	NA
1,1,2,2-Tetrachlorethane	0.0253	0.0005	0.004048	0.01	0.001	0.000	NA	NA	NA	NA

NA = Not Available. HQn = Hazard Quotient based on the NOAEL, HQl = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = ((Sum of the Food Doses) + Dose Sediment + Dose Water)/ Body Weight

Dose Food = Food Concentration x Food Ingestion Rate x Dietary Component of Food Item

Dose Water = Water Concentration x Water Ingestion Rate

Dose Sediment = Sediment Concentration x Food Ingestion Rate x Dietary Component of Sediment

STEP 3 FOOD-WEB ANALYSIS GREAT BLUE HERON

Great Blue Heron

Body Weight	2.2300000	kg
Food Ingestion Rate	0.3931000	kg/day - dry
Water Ingestion Rate	0.1010000	L/Day
Sediment Ingestion Rate	0.0000000	kg/day - dry
Area Use Factor	1.0000000	
Dietary Composition		
Fish Consumption	1.00	

Mean Concentrations

Ecological Contaminant of Concern	Sediment Concentration (mg/kg)	Water Concentration (mg/L)	Fish Concentration (mg/kg)	Dose (mg/kg/day)	AUF * Dose (mg/kg/day)	NOAEL (mg/kg/day)	LOAEL (mg/kg/day)	NOAEL HQ_n	LOAEL HQ_l
Total Cadmium	102.75	0.0025	6.38	1.124	1.124	1.45	20	0.78	0.06
Dissolved Cadmium	NA	0.0025	2.27	0.400	0.400	1.45	20	0.28	0.02
Total Chromium	2047.5	0.0025	20.52	3.618	3.618	1	5	**3.62**	0.72
Total Copper	50.92	0.00825	7.13	1.257	1.257	47	61.7	0.03	0.02
Dissolved Copper	NA	0.00975	6.92	1.221	1.221	47	61.7	0.03	0.02
Total Lead	53.6	0.0025	1.34	0.236	0.236	3.85	19.3	0.06	0.01
Total Mercury	0.114	0.0005	5.68	1.001	1.001	0.026	0.078	**38.49**	**12.83**
Total Nickel	25.8	0.0025	6.65	1.171	1.171	77.4	107	0.02	0.01
Total Selenium	8.8	0.0025	2.52	0.445	0.445	1.8	9	0.25	0.05
Total Zinc	190.2	0.025	23.11	4.074	4.074	14.5	131	0.28	0.03
Dissolved Zinc	NA	0.0425	27.16	4.789	4.789	14.5	131	0.33	0.04
4-Bromophenyl phenyl ether	0.312	0.005	17.82	3.141	3.141	NA	NA	**NA**	**NA**
4-Chlorophenyl phenyl ether	0.312	0.005	16.28	2.870	2.870	NA	NA	**NA**	**NA**
Benzo(a)anthracene	0.495	0.005	2.62	0.463	0.463	7.1	35.5	0.07	0.01
Benzo(b)fluoranthene	0.511	0.005	2.63	0.463	0.463	7.1	35.5	0.07	0.01
Benzo(g,h,i)perylene	0.462	0.005	2.62	0.461	0.461	7.1	35.5	0.06	0.01
Benzo(k)fluoranthene	0.495	0.005	2.62	0.463	0.463	7.1	35.5	0.07	0.01
Chrysene	0.528	0.005	2.63	0.464	0.464	7.1	35.5	0.07	0.01
Dibenz(a,h)anthracene	0.312	0.005	2.58	0.455	0.455	7.1	35.5	0.06	0.01
Fluorene	0.312	0.005	9.08	1.600	1.600	7.1	35.5	0.23	0.05
Hexachlorobenzene	0.312	0.005	1.34	0.236	0.236	0.11	0.57	**2.15**	0.41
Hexachlorobutadiene	0.202	0.005	3.93	0.694	0.694	3.39	17	0.20	0.04
Hexachlorocyclopentadiene	0.312	0.005	0.90	0.159	0.159	NA	NA	**NA**	**NA**
Hexachloroethane	0.312	0.005	0.78	0.137	0.137	NA	NA	**NA**	**NA**
Indeno(1,2,3-cd)pyrene	0.478	0.005	2.62	0.462	0.462	7.1	35.5	0.07	0.01
Pentachlorophenol	1.335	0.0125	1.70	0.300	0.300	4.26	8.52	0.07	0.04
Phenanthrene	0.545	0.005	25.64	4.519	4.519	7.1	35.5	0.64	0.13
Pyrene	0.728	0.005	2.68	0.473	0.473	7.1	35.5	0.07	0.01
1,1,1,2-Tetrachloroethane	0.0253	0.0005	0.03	0.005	0.005	NA	NA	**NA**	**NA**
1,1,2,2-Tetrachlorethane	0.0253	0.0005	0.01	0.002	0.002	NA	NA	**NA**	**NA**

NA = Not Available, HQn = Hazard Quotient based on the NOAEL, HQl = Hazard Quotient based on the LOAEL

Foodweb Model Calculations:

Dose = ((Sum of the Food Doses) + Dose Sediment + Dose Water)/ Body Weight

Dose Food = Food Concentration x Food Ingestion Rate x Dietary Component of Food Item

Dose Water = Water Concentration x Water Ingestion Rate

Dose Sediment = Sediment Concentration x Food Ingestion Rate x Dietary Component of Sediment

STEP 3 FOOD WEB ANALYSIS BENTHIC INVERTEBRATE CONCENTRATIONS

BENTHIC INVERTEBRATE CONCENTRATION

COPC	Invertebrate Bioconcentration Factors (dw)	Mean Sediment Concentration (mg/kg)	Invertebrate Concentration (dw)	Fraction Dry	Invertebrate Concentration (ww)
Total Cadmium	0.68	102.75	69.87	0.16	11.1792
Dissolved Cadmium	0.68	NA	NA	0.16	NA
Total Chromium	0.08	2047.5	163.8	0.16	26.208
Total Copper	0.92	50.92	46.8464	0.16	7.495424
Dissolved Copper	0.92	NA	NA	0.16	NA
Total Lead	0.08	53.6	4.288	0.16	0.68608
Total Mercury	1.08	0.114	0.12312	0.16	0.0196992
Total Nickel	0.13	25.8	3.354	0.16	0.53664
Total Selenium	1	8.8	8.8	0.16	1.408
Total Zinc	0.95	190.2	180.69	0.16	28.9104
Dissolved Zinc	0.95	NA	NA	0.16	NA
4-Bromophenyl phenyl ether	1	0.312	0.312	0.16	0.04992
4-Chlorophenyl phenyl ether	1	0.312	0.312	0.16	0.04992
Benzo(a)anthracene	0.36	0.495	0.1782	0.16	0.028512
Benzo(b)fluoranthene	0.15	0.511	0.07665	0.16	0.012264
Benzo(g,h,I)perylene	0.21	0.462	0.09702	0.16	0.0155232
Benzo(k)fluoranthene	0.23	0.495	0.11385	0.16	0.018216
Chrysene	0.2	0.528	0.1056	0.16	0.016896
Dibenz(a,h)anthracene	0.19	0.312	0.05928	0.16	0.0094848
Fluorene	0.48	0.312	0.14976	0.16	0.0239616
Hexachlorobenzene	0.52	0.312	0.16224	0.16	0.0259584
Hexachlorobutadiene	0.39	0.202	0.07878	0.16	0.0126048
Hexachlorocyclopentadiene	1	0.312	0.312	0.16	0.04992
Hexachloroethane	1	0.312	0.312	0.16	0.04992
Indeno(1,2,3-cd)pyrene	0.17	0.478	0.08126	0.16	0.0130016
Pentachlorophenol	1	1.335	1.335	0.16	0.2136
Phenanthrene	0.29	0.545	0.15805	0.16	0.025288
Pyrene	0.44	0.728	0.32032	0.16	0.0512512
1,1,1,2-Tetrachloroethane	1	0.0253	0.0253	0.16	0.004048
1,1,2,2-Tetrachlorethane	1	0.0253	0.0253	0.16	0.004048

STEP 3 FOOD-WEB ANALYSIS AQUATIC PLANT CONCENTRATIONS

PLANT CONCENTRATIONS

COPC	Sediment Concentration (dw)	Plant Bioconcentration Factors (dw)	Plant Concentration (dw)	Fraction Dry	Plant Concentration (ww)
Total Cadmium	102.75	0.514	52.8135	0.15	7.922025
Dissolved Cadmium	NA	0.514	NA	0.15	NA
Total Chromium	2047.5	0.048	98.28	0.15	14.742
Total Copper	50.92	0.123	6.26316	0.15	0.939474
Dissolved Copper	NA	0.123	NA	0.15	NA
Total Lead	53.6	0.038	2.0368	0.15	0.30552
Total Mercury	0.114	0.344	0.039216	0.15	0.0058824
Total Nickel	25.8	0.034	0.8772	0.15	0.13158
Total Selenium	8.8	0.567	4.9896	0.15	0.74844
Total Zinc	190.2	0.358	68.0916	0.15	10.21374
Dissolved Zinc	NA	0.358	NA	0.15	NA
4-Bromophenyl phenyl ether	0.312	0.0499	0.0155688	0.15	0.00233532
4-Chlorophenyl phenyl ether	0.312	0.0533	0.0166296	0.15	0.00249444
Benzo(a)anthracene	0.495	0.0197	0.0097515	0.15	0.001462725
Benzo(b)fluoranthene	0.511	0.0101	0.0051611	0.15	0.000774165
Benzo(g,h,I)perylene	0.462	0.0052	0.0024024	0.15	0.00036036
Benzo(k)fluoranthene	0.495	0.0101	0.0049995	0.15	0.000749925
Chrysene	0.528	0.0197	0.0104016	0.15	0.00156024
Dibenz(a,h)anthracene	0.312	0.0053	0.0016536	0.15	0.00024804
Fluorene	0.312	0.1428	0.0445536	0.15	0.00668304
Hexachlorobenzene	0.312	0.0153	0.0047736	0.15	0.00071604
Hexachlorobutadiene	0.202	0.0642	0.0129684	0.15	0.00194526
Hexachlorocyclopentadiene	0.312	0.0297	0.0092664	0.15	0.00138996
Hexachloroethane	0.312	0.1888	0.0589056	0.15	0.00883584
Indeno(1,2,3-cd)pyrene	0.478	0.0056	0.0026768	0.15	0.00040152
Pentachlorophenol	1.335	0.0443	0.0591405	0.15	0.008871075
Phenanthrene	0.545	0.0908	0.049486	0.15	0.0074229
Pyrene	0.728	0.0431	0.0313768	0.15	0.00470652
1,1,1,2-Tetrachloroethane	0.0253	1.1691	0.02957823	0.15	0.004436735
1,1,2,2-Tetrachlorethane	0.0253	1.6091	0.04071023	0.15	0.006106535

STEP 3 FOOD WEB ANALYSIS FISH CONCENTRATIONS FROM SURFACE WATER

FISH CONCENTRATIONS FROM SURFACE WATER

COPC	Fish Bioconcentration Factors (mg/kg ww)	Surface Water Concentration (mg/L)	Fish Concentration (mg/kg)
Total Cadmium	907	0.0025	2.27
Dissolved Cadmium	907	0.0025	2.27
Total Chromium	19	0.0025	0.05
Total Copper	710	0.00825	5.86
Dissolved Copper	710	0.00975	6.92
Total Lead	160	0.0025	0.40
Total Mercury	11168	0.0005	5.58
Total Nickel	78	0.0025	0.20
Total Selenium	129	0.0025	0.32
Total Zinc	639	0.025	15.98
Dissolved Zinc	639	0.0425	27.16
4-Bromophenyl phenyl ether	3548	0.005	17.74
4-Chlorophenyl phenyl ether	3240	0.005	16.20
Benzo(a)anthracene	500	0.005	2.50
Benzo(b)fluoranthene	500	0.005	2.50
Benzo(g,h,l)perylene	500	0.005	2.50
Benzo(k)fluoranthene	500	0.005	2.50
Chrysene	500	0.005	2.50
Dibenz(a,h)anthracene	500	0.005	2.50
Fluorene	1800	0.005	9.00
Hexachlorobenzene	253	0.005	1.27
Hexachlorobutadiene	783	0.005	3.92
Hexachlorocyclopentadiene	165	0.005	0.83
Hexachloroethane	140	0.005	0.70
Indeno(1,2,3-cd)pyrene	500	0.005	2.50
Pentachlorophenol	109	0.0125	1.36
Phenanthrene	5100	0.005	25.50
Pyrene	500	0.005	2.50
1,1,1,2-Tetrachloroethane	48	0.0005	0.02
1,1,2,2-Tetrachlorethane	8	0.0005	0.00

STEP 3 FOOD WEB ANALYSIS FISH CONCENTRATION FROM SEDIMENT

COPC	Fish Bioconcentration Factors (mg/kg dw)	Sediment Concentration (mg/kg)	Fish Concentration (mg/kg)	Fraction Dry	Fish Concentration (mg/kg) (ww)
Total Cadmium	0.16	102.75	16.440	0.25	4.11
Dissolved Cadmium	0.16	NA	NA	0.25	NA
Total Chromium	0.04	2047.5	81.900	0.25	20.475
Total Copper	0.1	50.92	5.092	0.25	1.273
Dissolved Copper	0.1	NA	NA	0.25	NA
Total Lead	0.07	53.6	3.752	0.25	0.938
Total Mercury	3.25	0.114	0.371	0.25	0.092625
Total Nickel	1	25.8	25.800	0.25	6.45
Total Selenium	1	8.8	8.800	0.25	2.2
Total Zinc	0.15	190.2	28.530	0.25	7.1325
Dissolved Zinc	0.15	NA	NA	0.25	NA
4-Bromophenyl phenyl ether	1	0.312	0.312	0.25	0.078
4-Chlorophenyl phenyl ether	1	0.312	0.312	0.25	0.078
Benzo(a)anthracene	1	0.495	0.495	0.25	0.12375
Benzo(b)fluoranthene	1	0.511	0.511	0.25	0.12775
Benzo(g,h,I)perylene	1	0.462	0.462	0.25	0.1155
Benzo(k)fluoranthene	1	0.495	0.495	0.25	0.12375
Chrysene	1	0.528	0.528	0.25	0.132
Dibenz(a,h)anthracene	1	0.312	0.312	0.25	0.078
Fluorene	1	0.312	0.312	0.25	0.078
Hexachlorobenzene	0.94	0.312	0.293	0.25	0.07332
Hexachlorobutadiene	0.38	0.202	0.077	0.25	0.01919
Hexachlorocyclopentadiene	1	0.312	0.312	0.25	0.078
Hexachloroethane	1	0.312	0.312	0.25	0.078
Indeno(1,2,3-cd)pyrene	1	0.478	0.478	0.25	0.1195
Pentachlorophenol	1	1.335	1.335	0.25	0.33375
Phenanthrene	1	0.545	0.545	0.25	0.13625
Pyrene	1	0.728	0.728	0.25	0.182
1,1,1,2-Tetrachloroethane	1	0.0253	0.025	0.25	0.006325
1,1,2,2-Tetrachlorethane	1	0.0253	0.025	0.25	0.006325

STEP 3 FOOD WEB ANALYSIS TOTAL FISH CONCENTRATION

COPC	Fish Concentration from Sediment	Fish Concentration from Surface Water	Total Fish Concentration
Total Cadmium	4.11	2.27	6.38
Dissolved Cadmium	NA	2.27	2.27
Total Chromium	20.48	0.05	20.52
Total Copper	1.27	5.86	7.13
Dissolved Copper	NA	6.92	6.92
Total Lead	0.94	0.40	1.34
Total Mercury	6.45	5.58	12.03
Total Nickel	2.20	0.20	2.40
Total Selenium	7.13	0.32	7.46
Total Zinc	0.08	15.98	16.05
Dissolved Zinc	0.12	27.16	27.16
4-Bromophenyl phenyl ether	0.13	17.74	17.87
4-Chlorophenyl phenyl ether	0.12	16.20	16.32
Benzo(a)anthracene	0.12	2.50	2.62
Benzo(b)fluoranthene	0.13	2.50	2.63
Benzo(g,h,I)perylene	0.08	2.50	2.58
Benzo(k)fluoranthene	0.08	2.50	2.58
Chrysene	0.07	2.50	2.57
Dibenz(a,h)anthracene	0.02	2.50	2.52
Fluorene	0.08	9.00	9.08
Hexachlorobenzene	0.08	1.27	1.34
Hexachlorobutadiene	0.12	3.92	4.03
Hexachlorocyclopentadiene	0.33	0.83	1.16
Hexachloroethane	0.14	0.70	0.84
Indeno(1,2,3-cd)pyrene	0.18	2.50	2.68
Pentachlorophenol	0.01	1.36	1.37
Phenanthrene	0.01	25.50	25.51
Pyrene	0.00	2.50	2.50
1,1,1,2-Tetrachloroethane	0.00	0.02	0.02
1,1,2,2-Tetrachlorethane	0.00	0.00	0.00

http://www.bcpl.net/~tross/baltreg.html

TABLES

Table 1. Ecological inventory of possible animal species for Martin State Airport.

Species Name	Common Name
Avian Species	
Recurvirostra americana	Avocet, American
Botaurus lentiginosus	Bittern, American
Ixobrychus exilis	Bittern, least
Agelaius phoeniceus	Blackbird, red-winged
Euphagus carolinus	Blackbird, rusty
Sialia sialis	Bluebird, eastern
Dolichonyx oryzivorus	Bobolink
Colinus virginianus	Bobwhite, northern
Bucephala albeola	Bufflehead
Passerina cyanea	Bunting, indigo
Plectrophenax nivalis	Bunting, snow
Aythya valisineria	Canvasback
Cardinalis cardinalis	Cardinal, northern
Dumetella carolinensis	Catbird, gray
Icteria virens	Chat, yellow-breasted
Poecile atricapilla	Chickadee, black-capped
Parus carolinensis	Chickadee, Carolina
Fulica americana	Coot, American
Phalacrocorax auritus	Cormorant, double-crested
Phalacrocorax carbo	Cormorant, great
Molothrus ater	Cowbird, brown-headed
Certhia americana	Creeper, brown
Corvus brachyrhynchos	Crow, American
Corvus ossifragus	Crow, fish
Coccyzus erythropthalmus	Cuckoo, black-billed
Coccyzus americanus	Cuckoo, yellow-billed
Zenaida macroura	Dove, mourning
Columba livia	Dove, rock
Limnodromus scolopaceus	Dowitcher, long-billed
Limnodromus griseus	Dowitcher, short-billed
Anas rubripes	Duck, American black
Aythya collaris	Duck, ring-necked
Oxyura jamaicensis	Duck, ruddy
Aix sponea	Duck, wood
Calidris alpina	Dunlin
Haliaeetus leucocephalus	Eagle, bald
Aquila chrysaetos	Eagle, golden
Bubulcus ibis	Egret, cattle
Ardea alba	Egret, great
Egretta thula	Egret, snowy
Falco peregrinus	Falcon, peregrine
Carpodacus mexicanus	Finch, house
Carpodacus purpureus	Finch, purple
Colaptes auratus	Flicker, Northern
Empidonax virescens	Flycatcher, Acadian
Empidonax alnorum	Flycatcher, Alder
Myiarchus crinitus	Flycatcher, great crested

Table 1. continued.

Species Name	Common Name
Avian Species	
Empidonax minimus	Flycatcher, least
Empidonax traillii	Flycatcher, willow
Empidonax flaviventris	Flycatcher, yellow-bellied
Anas strepera	Gadwall
Polioptila caerulea	Gnatcatcher, blue-gray
Carduelis tristis	Goldfinch, American
Limosa haemastica	Godwit, Hudsonian
Limosa fedoa	Godwit, marbled
Bucephala clangula	Goldeneye, common
Branta canadensis	Goose, Canada
Chen caerulescen	Goose, snow
Quiscalus quiscula	Grackle, common
Podiceps auritus	Grebe, horned
Podilymbus podiceps	Grebe, pied-billed
Podiceps grisegena	Grebe, red-necked
Guiraca caerulea	Grosbeak, blue
Coccothraustes vespertinus	Grosbeak, evening
Pheucticus ludovicianus	Grosbeak, rose-breasted
Larus ridibundus	Gull, black-headed
Larus Philadelphia	Gull, Bonaparte's
Larus hyperboreus	Gull, glaucous
Larus marinus	Gull, great black-backed
Larus argentatus	Gull, herring
Larus glaucoides	Gull, Iceland
Larus atricilla	Gull, laughing
Larus fuscus	Gull, lesser black-backed
Larus minutus	Gull, little
Larus delawarensis	Gull, ring-billed
Circus cyaneus	Harrier, northern
Buteo platypterus	Hawk, broad-winged
Accipiter cooperii	Hawk, Cooper's
Buteo lineatus	Hawk, red-shouldered
Buteo jamaicensis	Hawk, red-tailed
Buteo lagopus	Hawk, rough-legged
Accipiter striatus	Hawk, sharp-shinned
Egretta caerulea	Heron, little blue
Nycticorax nycticorax	Heron, black-crowned night
Ardea herodias	Heron, great blue
Butorides virescens	Heron, green
Egretta tricolor	Heron, tri-colored
Nyctanassa violacea	Heron, yellow-crowned night
Archilochus colubris	Hummingbird, ruby-throated
Plegadis falcinellus	Ibis, glossy
Cyanocitta cristata	Jay, blue
Junco hyemalis	Junco, dark-eyed
Falco sparverius	Kestrel, American
Charadrius vociferus	Killdeer
Tyrannus tyrannus	Kingbird, eastern

Table 1. continued.

Species Name	Common Name
Avian Species	
Ceryle alcyon	Kingfisher, belted
Regulus satrapa	Kinglet, golden-crowned
Regulus calendula	Kinglet, ruby-crowned
Calidris canutus	Knot, red
Eremophila alpestris	Lark, horned
Calcarius lapponicus	Longspur, lapland
Gavia immer	Loon, common
Gavia stellata	Loon, red-throated
Anas platyrhynchos	Mallard
Progne subis	Martin, purple
Sturnella magna	Meadowlark, eastern
Mergus merganser	Merganser, common
Lophodytes cucullatus	Merganser, hooded
Mergus serrator	Merganser, red-breasted
Falco columbarius	Merlin
Mimus polyglottos	Mockingbird, northern
Gallinula chloropus	Moorhen, common
Chordeiles minor	Nighthawk, common
Sitta canadensis	Nuthatch, red-breasted
Sitta carolinensis	Nuthatch, white-breasted
Clangula hyemalis	Oldsquaw
Icterus galbula	Oriole, Baltimore
Icterus spurius	Oriole, orchard
Pandion haliaetus	Osprey
Seiurus aurocapillus	Ovenbird
Tyto alba	Owl, common barn
Strix varia	Owl, barred
Otus asio	Owl, Eastern screech
Bubo virginianus	Owl, great horned
Aegolius acadicus	Owl, northern saw-whet
Asio flammeus	Owl, short-eared
Contopus virens	Pewee, eastern wood
Phalaropus tricolor	Phalarope, Wilson's
Phasianus colchicus	Pheasant, ring-necked
Sayornis phoebe	Phoebe, eastern
Anas acuta	Pintail, northern
Anthus rubescens	Pipit, American
Pluvialis squatarola	Plover, black-bellied
Pluvialis dominica	Plover, American golden
Charadrius semipalmatus	Plover, semipalmated
Laterallus jamaicensis	Rail, black
Rallus limicola	Rail, Virginia
Rallus elegans	Rail, king
Aythya americana	Redhead
Setophaga ruticilla	Redstart, American
Turdus migratorius	Robin, American
Calidris alba	Sanderling
Calidris bairdii	Sandpiper, Baird's

Table 1. continued.

Species Name	Common Name
Avian Species	
Tryngites subruficollis	Sandpiper, buff-breasted
Calidris minutilla	Sandpiper, least
Calidris melantos	Sandpiper, pectoral
Calidris pusilla	Sandpiper, semipalmated
Tringa solitaria	Sandpiper, solitary
Actitis macularia	Sandpiper, spotted
Calidris himantipus	Sandpiper, stilt
Bartramia longicauda	Sandpiper, upland
Calidris mauri	Sandpiper, western
Calidris fuscicollis	Sandpiper, white-rumped
Sphyrapicus varius	Sapsucker, yellow-bellied
Aythya marila	Scaup, greater
Aythya affinis	Scaup, lesser
Melanitta fusca	Scoter, white-winged
Anas clypeata	Shoveler, northern
Carduelis pinus	Siskin, pine
Gallinago gallinago	Snipe, common
Porzana carolina	Sora
Spizella arborea	Sparrow, American tree
Spizella passerina	Sparrow, chipping
Spizella pusilla	Sparrow, field
Passerella iliaca	Sparrow, fox
Ammodramus savannarum	Sparrow, grasshopper
Passer domesticus	Sparrow, house
Melospiza lincolnii	Sparrow, Lincoln's
Ammodramus nelsoni	Sparrow, Nelson's Sharp-tailed
Ammodramus cauductus	Sparrow, Saltmarsh Sharp-tailed
Passerculus sandwichensis	Sparrow, Savannah
Ammodramus maritimus	Sparrow, seaside
Melospiza melodia	Sparrow, song
Melospiza georgiana	Sparrow, swamp
Pooecetes gramineus	Sparrow, vesper
Zonotrichia leucophrys	Sparrow, white-crowned
Zonotrichia albicollis	Sparrow, white-throated
Sturnus vulgaris	Starling, European
Riparia riparia	Swallow, bank
Hirundo rustica	Swallow, barn
Petrochelidon pyrrhonota	Swallow, cliff
Stelgidopteryx serripennis	Swallow, Northern rough-winged
Tachycineta bicolor	Swallow, tree
Cygnus olor	Swan, mute
Cygnus columbianus	Swan, tundra
Chaetura pelagica	Swift, chimney
Piranga olivacea	Tanager, scarlet
Piranga rubra	Tanager, summer
Anas discors	Teal, blue-winged
Anas crecca	Teal, green-winged
Chilidonias niger	Tern, black

Table 1. continued.

Species Name	Common Name
Avian Species	
Sterna caspia	Tern, Caspian
Sterna hirundo	Tern, common
Sterna forsteri	Tern, Forster's
Sterna antillarum	Tern, least
Toxostoma rufum	Thrasher, brown
Catharus bicknelli	Thrush, Bicknell's
Catharus minimus	Thrush, gray-cheeked
Catharus guttatus	Thrush, hermit
Catharus ustulatus	Thrush, Swainson's
Hylocichla mustelina	Thrush, wood
Parus bicolor	Titmouse, tufted
Pipilo erythrophthalmus	Towhee, Eastern
Meleagris gallopavo	Turkey, wild
Arenaria interpres	Turnstone, ruddy
Catharus fuscescens	Veery
Vireo solitarius	Vireo, blue-headed
Vireo philadelphicus	Vireo, Philadelphia
Vireo olivaceus	Vireo, red-eyed
Vireo gilvus	Vireo, warbling
Vireo griseus	Vireo, white-eyed
Vireo flavifrons	Vireo, yellow-throated
Coragyps atratus	Vulture, black
Cathartes aura	Vulture, turkey
Dendroica castnea	Warbler, bay-breasted
Mniotilta varia	Warbler, black-and-white
Dendroica virens	Warbler, black-throated green
Dendroica fusca	Warbler, blackburnian
Vermivora pinus	Warbler, blue-winged
Wilsonia Canadensis	Warbler, Canada
Dendroica tigrina	Warbler, Cape May
Dendroica cerulean	Warbler, cerulean
Dendroica pensylvanica	Warbler, chestnut-sided
Oporornis agilis	Warbler, Connecticut
Vermivora chrysoptera	Warbler, golden-winged
Wilsonia citrina	Warbler, hooded
Oporornis formosus	Warbler, Kentucky
Dendroica coronata	Warbler, yellow-rumped
Dendroica magnolia	Warbler, magnolia
Oporornis Philadelphia	Warbler, mourning
Vermivora ruficapilla	Warbler, Nashville
Parula americana	Warbler, northern parula
Vermivora celata	Warbler, orange-crowned
Dendroica palmarum	Warbler, palm
Dendroica pinus	Warbler, pine
Dendroica discolor	Warbler, prairie
Protonotaria citrea	Warbler, prothonotary
Vermivora peregrine	Warbler, Tennessee
Wilsonia pusilla	Warbler, Wilson's

Table 1. continued.

Species Name	Common Name
Avian Species	
Helmitheros vermivorus	Warbler, worm-eating
Dendroica petechia	Warbler, yellow
Dendroica dominica	Warbler, yellow-throated
Seiurus motacilla	Waterthrush, Louisiana
Seiurus noveboracensis	Waterthrush, Northern
Bombycilla cedrorum	Waxwing, cedar
Numenius phaeopus	Whimbrel
Caprimulgus vociferus	Whip-poor-will
Caprimulgus carolinensis	Chuck-will's-widow
Anas americana	Wigeon, American
Catoptrophorus semipalmatus	Willet
Scolopax minor	Woodcock, American
Picoides pubescans	Woodpecker, downy
Picoides villosus	Woodpecker, hairy
Dryocopus pileatus	Woodpecker, pileated
Melanerpes carolinus	Woodpecker, red-bellied
Melanerpes erythrocephalus	Woodpecker, red-headed
Thryothorus ludovicianus	Wren, Carolina
Troglodytes aedon	Wren, house
Cistothorus palustris	Wren, marsh
Troglodytes troglodytes	Wren, winter
Tringa melanoleuca	Yellowlegs, greater
Tringa flavipes	Yellowlegs, lesser
Geothlypis trichas	Yellowthroat, common
Mammalian Species	
Eptesicus fuscus	Bat, big brown
Lasiurus borealis	Bat, eastern red
Nycticeius humeralis	Bat, evening
Lasiurus cinereus	Bat, hoary
Myotis sodalist	Bat, Indiana
Lasiurus borealis	Bat, red
Lasionycteris noctivagans	Bat, silver-haired
Castor canadensis	Beaver
Tamias striatus	Chipmunk, eastern
Sylvilagus floridanus	Cottontail, eastern
Canis latrans	Coyote
Odocoileus virginianus	Deer, white-tailed
Martes pennanti	Fisher
Urocyon cineroeargenteus	Fox, gray
Vulpes vulpes	Fox, red
Synaptomys cooperi	Lemming, southern bog
Mustela vison	Mink
Scalopus aquaticus	Mole, eastern
Condylura cristata	Mole, star-nosed
Peromyscus maniculatus	Mouse, deer
Reithrodontomys humulus	Mouse, eastern harvest
Zapus hudsonius	Mouse, meadow jumping
Peromyscus leucopus	Mouse, white-footed

Table 1. continued.

Species Name	Common Name
Mammalian Species	
Mus musculus	Mouse, house
Ondatra zibethica	Muskrat
Myotis leibii	Myotis, eastern small-footed
Myotis lucifugus	Myotis, little brown
Myotis septentrionalis	Myotis, northern
Didelphis virginianus	Opossum
Lutra canadensis	Otter, northern river
Pipistrellus subflavus	Pipistrelle, eastern
Procyon lotor	Raccoon
Neotoma magister	Rat, Allegheny wood
Rattus rattus	Rat, black
Rattus norvegicus	Rat, Norway
Oryzomys palustris	Rat, marsh rice
Cryptotis parva	Shrew, least
Sorex cinereus	Shrew, masked
Blarina carolinensis	Shrew, short-tailed
Sorex longirostris	Shrew, southeastern
Sorex palustris	Shrew, water
Mephitis mephitis	Skunk, striped
Scurius niger	Squirrel, eastern fox
Scurius carolinensis	Squirrel, eastern gray
Tamiasciurus hudsonicus	Squirrel, eastern red
Glaucomys volans	Squirrel, southern flying
Microtus chrotorrhinus	Vole, rock
Clethrionoms gapperi	Vole, southern red-backed
Microtus pinetorum	Vole, woodland
Microtus pennsylvanicus	Vole, meadow
Mustela frenata	Weasel, long-tailed
Marmota monax	Woodchuck
Reptile Species	
Agkistrodon contortrix mokason	Copperhead, northern
Sceloporus undulatus hyacinthinus	Lizard, northern fence
Coluber constrictor constrictor	Racer, northern black
Cnemidophorous sexlineatus	Racerunner, six-lined
Eumeces fasciatus	Skink, five-lined
Scincella lateralis	Skink, ground
Elaphe obsoleta obsoleta	Snake, black rat
Elaphe guttata guttata	Snake, corn
Virginia valeriae	Snake, eastern earth
Thamnophis sirtalis sirtalis	Snake, eastern garter
Thamnophis sauritus sauritus	Snake, eastern ribbon
Carphophis amoenus amoenus	Snake, eastern worm
Pseudaspis cana	Snake, mole
Nerodia sipedon sipedon	Snake, northern water
Sternotherus odoratus	Stinkpot
Chelydra serpentina serpentina	Turtle, common snapping
Terrapene carolina carolina	Turtle, eastern box
Kinosternon subrubrum subrubrum	Turtle, eastern mud

Table 1. continued.

Species Name	Common Name
Reptile Species	
Chrysemys picta picta	Turtle, eastern painted
Pseudemys rubriventris	Turtle, red-bellied
Clemmys guttata	Turtle, spotted
Amphibian Species	
Rana catesbeiana	Bullfrog
Hyla chrysoscelis	Frog, Copes gray tree
Rana sylvatica	Frog, wood
Acris crepitans crepitans	Frog, eastern cricket
Rana palustris	Frog, pickeral
Rana sphenocephala utricularia	Frog, southern leopard
Pseudacris feriarum feriarum	Frog, upland chorus
Pseudacris brachyphona	Frog, mountain chorus
Rana clamitans melanota	Frog, northern green
Necturus maculosus maculosus	Mudpuppy, common
Notophthalmus viridescens viridescens	Newt, red-spotted
Pseudacris crucifer crucifer	Peeper, northern spring
Pseudotriton montanus montanus	Salamander, eastern mud
Eurycea longicauda longicauda	Salamander, long tailed
Ambystoma opacum	Salamander, marbled
Desmognathus fuscus fuscus	Salamander, northern dusky
Pseudotriton ruber ruber	Salamander, northern red
Plethodon glutinosus	Salamander, northern slimy
Eurycea bislineata	Salamander, northern two-lined
Ambystoma maculatum	Salamander, spotted
Plethodon wehrlei	Salamander, Wehrle's
Scaphiopus holbrooki holbrooki	Spadefoot, eastern
Bufo americanus	Toad, american
Bufo woodhousii fowleri	Toad, Fowler's
Hyla versicolor	Treefrog, gray
Hyla cinerea	Treefrog, green

Source: http://www.bcpl.net/~tross/baltreg.html; Gough et al., 1998; http://www.batcon.org/discover/species/md.html; http://www.dlia.org/atbi/index.html;

TABLE 2 ECOLOGICAL RISK SCREENING ASSESSMENT ENDPOINTS AT MARTIN STATE AIRPORT

Assessment Endpoint	Null Hypothesis	Measurement Endpoint	Specifics of Assessment
Ecological health of aquatic water column communities	Surface water does not exhibit a detrimental effect on aquatic plant and organism survival and growth	Evaluation of surface water chemistry with respect to water quality criteria	• Comparison of surface water concentrations to water quality criteria.
Ecological health of benthic invertebrate communities	Sediment does not exhibit a detrimental effect on invertebrate survival and growth	Evaluation of sediment chemistry with respect to sediment screening values	• Comparison of sediment concentrations to sediment screening values.
Long term health and reproductive capacity of omnivorous aquatic avian species (mallard duck)	Ingestion of COPC in prey does not have a negative impact on growth, survival, and reproductive success of the species	Evaluation of dose in prey based on sediment data and dietary exposure models	• Vegetation and invertebrate dose approximated by multiplying maximum sediment concentration by BCF or BAF for COPC. • The risk associated with the calculated dose will be evaluated by comparison to Toxicity Reference Values (TRVs).
Long term health and reproductive capacity of carnivorous aquatic avian species (blue heron)	Ingestion of COPC in prey does not have a negative impact on growth, survival, and reproductive success of the species	Evaluation of dose in prey based on sediment data and dietary exposure models	• Food dose approximated by multiplying maximum sediment concentration by BCF or BAF for COPC. • The risk associated with the calculated dose will be evaluated by comparison to Toxicity Reference Values (TRVs).
Long term health and reproductive capacity of piscivorous aquatic avian species (belted kingfisher)	Ingestion of COPC in prey does not have a negative impact on growth, survival, and reproductive success of the species	Evaluation of dose in prey based on sediment data and dietary exposure models	• Food dose approximated by multiplying maximum sediment concentration by BCF or BAF for COPC. • The risk associated with the calculated dose will be evaluated by comparison to Toxicity Reference Values (TRVs).
Long term health and reproductive capacity of omnivorous aquatic mammalian species (raccoon)	Ingestion of COPC in prey does not have a negative impact on growth, survival, and reproductive success of the species	Evaluation of dose in prey based sediment data and dietary exposure models	• Dose from food approximated by multiplying maximum sediment concentration by BAF or BCF for COPC. • The risk associated with the calculated dose will be evaluated by comparison to Toxicity Reference Values (TRVs).

TABLE MSA-2 (Continued)

Assessment Endpoint	Null Hypothesis	Measurement Endpoint	Specifics of Assessment
Ecological health of terrestrial plant communities	Soils are not exhibiting a detrimental effect on plant survival and growth	Evaluation of soil chemistry with respect to vegetation screening values	• Comparison of surface soil concentrations to vegetation screening values
Ecological health of terrestrial invertebrate communities	Soils are not exhibiting a detrimental effect on invertebrate survival and growth	Evaluation of soil chemistry with respect to soil invertebrate screening values	• Comparison of surface soil concentrations to soil invertebrate screening values
Long term health and reproductive capacity of omnivorous avian species (American robin)	Ingestion of COPC in food does not have a negative impact on growth, survival, and reproductive success of the species	Evaluation of dose in food based on surface soils data and dietary exposure models	• Vegetation and invertebrate dose approximated by multiplying surface soil concentration by BCF/BAF. • The risk associated with the calculated dose will be evaluated by comparison to Toxicity Reference Values (TRVs).
Long term health and reproductive capacity of herbivorous avian species (Morning Dove)	Ingestion of COPC in food does not have a negative impact on growth, survival, and reproductive success of the species	Evaluation of dose in food based on surface soils data and dietary exposure models	• Vegetation dose approximated by multiplying surface soil concentration by BAF • The risk associated with the calculated dose will be evaluated by comparison to Toxicity Reference Values (TRVs).
Long term health and reproductive capacity of carnivorous avian species (Red-Tailed Hawk)	Ingestion of COPC in prey does not have a negative impact on growth, survival, and reproductive success of the species.	Evaluation of does in prey based on surface soils data and dietary exposure models.	• Small mammal dose approximated by multiplying surface soil concentration by BAF. • The risk associated with the calculated dose will be evaluated by comparison to Toxicity Reference Values (TRVs).

TABLE MSA-2 (Continued)

Assessment Endpoint	Null Hypothesis	Measurement Endpoint	Specifics of Assessment
Long term health and reproductive capacity of small herbivorous mammalian species (Meadow vole)	Ingestion of COPC in food does not have a negative impact on growth, survival, and reproductive success of the species	Evaluation of dose in food based on surface soils data and dietary exposure models	• Vegetation dose approximated by multiplying surface soil concentration by BCF • The risk associated with the calculated dose will be evaluated by comparison to Toxicity Reference Values (TRVs).
Long term health and reproductive capacity of small invertivorous mammalian species (Short-tailed shrew)	Ingestion of COPC in food does not have a negative impact on growth, survival, and reproductive success of the species	Evaluation of dose in food based on surface soils data and dietary exposure models	• Soil invertebrate dose approximated by multiplying surface soil concentration by BAF • The risk associated with the calculated dose will be evaluated by comparison to Toxicity Reference Values (TRVs).
Long term health and reproductive capacity of small omnivorous mammalian species (white-footed mouse)	Ingestion of COPC in food does not have a negative impact on growth, survival, and reproductive success of the species	Evaluation of dose in food based surface soil data and dietary exposure models	• Dose from vegetation and invertebrates approximated by multiplying surface soil concentration by BCF/BAF. • The risk associated with the calculated dose will be evaluated by comparison to Toxicity Reference Values (TRVs).
Long term health and reproductive capacity of large carnivorous mammalian species (red fox)	Ingestion of COPC in prey does not have a negative impact on growth, survival, and reproductive success of the species	Evaluation of dose in prey based surface soil data and dietary exposure models	• Dose from prey approximated by multiplying surface soil concentration by BAF • The risk associated with the calculated dose will be evaluated by comparison to Toxicity Reference Values (TRVs).

TABLE 3 SUMMARY OF ECOLOGICAL RISK SOIL SCREENING VALUES			
Chemical	*Units*	*Ecological Screening Levels*	*Source*
Inorganics			
Antimony	mg/kg(dry)	0.48	EPA (1995)
Arsenic	mg/kg(dry)	328	EPA (1995)
Beryllium	mg/kg(dry)	0.02	EPA (1995)
Cadmium	mg/kg(dry)	2.5	EPA (1995)
Chromium	mg/kg(dry)	0.0075	EPA (1995)
Copper	mg/kg(dry)	15	EPA (1995)
Hexavalent Chromium	mg/kg(dry)	None	None
Lead	mg/kg(dry)	0.01	EPA (1995)
Mercury	mg/kg(dry)	0.058	EPA (1995)
Nickel	mg/kg(dry)	2	EPA (1995)
Selenium	mg/kg(dry)	1.8	EPA (1995)
Silver	mg/kg(dry)	2	Efroymson et al. (1997a)
Thallium	mg/kg(dry)	0.001	EPA (1995)
Zinc	mg/kg(dry)	10	EPA (1995)
Pesticides/PCBs			
4,4'-DDD	ug/kg(dry)	100	EPA (1995)
4,4'-DDE	ug/kg(dry)	100	EPA (1995)
4,4'-DDT	ug/kg(dry)	100	EPA (1995)
Aldrin	ug/kg(dry)	100	EPA (1995)
alpha-Chlordane	ug/kg(dry)	100	EPA (1995)
alpha-BHC	ug/kg(dry)	100	EPA (1995)
beta-BHC	ug/kg(dry)	100	EPA (1995)
delta-BHC	ug/kg(dry)	100	EPA (1995)
Dieldrin	ug/kg(dry)	100	EPA (1995)
Endosulfan I	ug/kg(dry)	None	None
Endosulfan II	ug/kg(dry)	None	None
Endosulfan Sulfate	ug/kg(dry)	None	None
Endrin	ug/kg(dry)	100	EPA (1995)
Endrin Aldehyde	ug/kg(dry)	100	EPA (1995)
Endrin Ketone	ug/kg(dry)	100	EPA (1995)
gamma-Chlordane	ug/kg(dry)	100	EPA (1995)
gamma-BHC (Lindane)	ug/kg(dry)	100	EPA (1995)
Heptachlor	ug/kg(dry)	100	EPA (1995)
Heptachlor Epoxide	ug/kg(dry)	100	EPA (1995)
Methoxychlor	ug/kg(dry)	100	EPA (1995)
Toxaphene	ug/kg(dry)	None	None
Semivolatile organics			
2,4,5-Trichlorophenol	ug/kg(dry)	100	EPA (1995)
2,4,6-Trichlorophenol	ug/kg(dry)	100	EPA (1995)
2,4-Dichlorophenol	ug/kg(dry)	100	EPA (1995)
2,4-Dimethylphenol	ug/kg(dry)	100	EPA (1995)
2,4-Dinitrophenol	ug/kg(dry)	100	EPA (1995)
2,4-Dinitrotoluene	ug/kg(dry)	None	None

TABLE 3 SUMMARY OF ECOLOGICAL RISK SOIL SCREENING VALUES			
Chemical	*Units*	*Ecological Screening Levels*	*Source*
2,6-Dinitrotoluene	ug/kg(dry)	None	None
2-Chloroethylvinyl ether	ug/kg(dry)	None	None
2-Chloronapthalene	ug/kg(dry)	None	None
2-Chlorophenol	ug/kg(dry)	100	EPA (1995)
2-Methylnaphthalene	ug/kg(dry)	None	None
2-Methylphenol (o-Cresol)	ug/kg(dry)	100	EPA (1995)
2-Nitroaniline	ug/kg(dry)	None	None
2-Nitrophenol	ug/kg(dry)	760	Efroymson et al. (1997a)
3,3'-Dichlorobenzidine	ug/kg(dry)	None	None
3-Nitroaniline	ug/kg(dry)	None	None
4,6-Dinitro-2-methylphenol	ug/kg(dry)	None	None
4-Bromophenyl phenyl ether	ug/kg(dry)	None	None
4-Chloro-3-methylphenol	ug/kg(dry)	None	None
4-Chloroaniline	ug/kg(dry)	1950	Efroymson et al. (1997a)
4-Chlorophenyl phenyl ether	ug/kg(dry)	None	None
4-Methylphenol (p-Cresol)	ug/kg(dry)	100	EPA (1995)
4-Nitroaniline	ug/kg(dry)	None	None
4-Nitrophenol	ug/kg(dry)	100	EPA (1995)
Acenaphthene	ug/kg(dry)	100	EPA (1995)
Acenaphthylene	ug/kg(dry)	100	EPA (1995)
Acrolein	ug/kg(dry)	None	None
Acrylonitrile	ug/kg(dry)	None	None
Anthracene	ug/kg(dry)	100	EPA (1995)
Benzo (a) anthracene	ug/kg(dry)	100	EPA (1995)
Benzo (a) pyrene	ug/kg(dry)	100	EPA (1995)
Benzo (b) fluoranthene	ug/kg(dry)	100	EPA (1995)
Benzo (g,h,i) perylene	ug/kg(dry)	100	EPA (1995)
Benzo (k) fluoranthene	ug/kg(dry)	100	EPA (1995)
Bis (2-chloroethoxy) methane	ug/kg(dry)	None	None
Bis (2-chloroethyl) ether	ug/kg(dry)	None	None
Bis (2-chloroisopropyl) ether	ug/kg(dry)	None	None
Bis (2-ethylhexyl) phthalate	ug/kg(dry)	None	None
Benzyl butyl phthalate	ug/kg(dry)	None	None
Carbazole	ug/kg(dry)	None	None
Chrysene	ug/kg(dry)	100	EPA (1995)
Dibenzo (a,h) anthracene	ug/kg(dry)	100	EPA (1995)
Dibenzofuran	ug/kg(dry)	None	None
Diethyl phthalate	ug/kg(dry)	26,800	Efroymson et al. (1997a)
Dimethyl phthalate	ug/kg(dry)	21,280	Efroymson et al. (1997a)
Di-n-butyl phthalate	ug/kg(dry)	40,000	Efroymson et al. (1997a)
Di-n-octyl phthalate	ug/kg(dry)	None	None
Fluoranthene	ug/kg(dry)	100	EPA (1995)
Fluorene	ug/kg(dry)	100	EPA (1995)
Hexachlorobenzene	ug/kg(dry)	2,300	Efroymson et al. (1997a)

TABLE 3 SUMMARY OF ECOLOGICAL RISK SOIL SCREENING VALUES			
Chemical	***Units***	***Ecological Screening Levels***	***Source***
Hexachlorobutadiene	ug/kg(dry)	None	None
Hexachlorocyclopentadiene	ug/kg(dry)	2,000	Efroymson et al. (1997a)
Hexachloroethane	ug/kg(dry)	None	None
Indeno (1,2,3-cd) pyrene	ug/kg(dry)	100	EPA (1995)
Isophorone	ug/kg(dry)	None	None
Naphthalene	ug/kg(dry)	100	EPA (1995)
Nitrobenzene	ug/kg(dry)	4,520	EPA (1995)
N-Nitroso-di-n-propylamine	ug/kg(dry)	None	None
N-Nitrosodiphenylamine	ug/kg(dry)	2,180	Efroymson et al. (1997a)
Pentachlorophenol	ug/kg(dry)	100	EPA (1995)
Phenanthrene	ug/kg(dry)	100	EPA (1995)
Phenol	ug/kg(dry)	100	EPA (1995)
Pyrene	ug/kg(dry)	100	EPA (1995)
Volatile Organics			
1,1,1,2-Tetrachloroethane	ug/kg(dry)	300	EPA (1995)
1,1,1-Trichloroethane	ug/kg(dry)	300	EPA (1995)
1,1,2,2-Tetrachloroethane	ug/kg(dry)	300	EPA (1995)
1,1,2-Trichloroethane	ug/kg(dry)	300	EPA (1995)
1,1-Dichloroethane	ug/kg(dry)	300	EPA (1995)
1,1-Dichloroethene	ug/kg(dry)	None	None
1,1-Dichloropropene	ug/kg(dry)	None	None
1,2,3-Trichlorobenzene	ug/kg(dry)	100	EPA (1995)
1,2,3-Trichloropropane	ug/kg(dry)	None	None
1,2,4-Trichlorobenzene	ug/kg(dry)	100	EPA (1995)
1,2,4-Trimethylbenzene	ug/kg(dry)	None	None
1,2-Dibromo-3-Chloropropane	ug/kg(dry)	None	None
1,2-Dibromoethane	ug/kg(dry)	5,000	EPA (1995)
1,2-Dichlorobenzene	ug/kg(dry)	100	EPA (1995)
1,2-Dichloroethane	ug/kg(dry)	870,000	EPA (1995)
1,2-Dichloropropane	ug/kg(dry)	300	EPA (1995)
1,3,5-Trimethylbenzene	ug/kg(dry)	None	None
1,3-Dichlorobenzene	ug/kg(dry)	None	None
1,3-Dichloropropane	ug/kg(dry)	None	None
1,4-Dichlorobenzene	ug/kg(dry)	100	EPA (1995)
2,2-Dichloropropane	ug/kg(dry)	None	None
2-Butanone	ug/kg(dry)	None	None
2-Chlorotoluene	ug/kg(dry)	None	None
2-Hexanone (MBK)	ug/kg(dry)	None	None
4-Chlorotoluene	ug/kg(dry)	None	None
4-Methyl-2-Pentanone	ug/kg(dry)	100,000	EPA (1995)
Acetone	ug/kg(dry)	None	None
Benzene	ug/kg(dry)	100	EPA (1995)
Bromobenzene	ug/kg(dry)	None	None
Bromochloromethane	ug/kg(dry)	3,000,000	EPA (1995)

TABLE 3 SUMMARY OF ECOLOGICAL RISK SOIL SCREENING VALUES			
Chemical	***Units***	***Ecological Screening Levels***	***Source***
Bromodichloromethane	ug/kg(dry)	450.000	EPA (1995)
Bromoform	ug/kg(dry)	1,147.000	EPA (1995)
Bromomethane	ug/kg(dry)	None	None
c-1,2-Dichloroethene	ug/kg(dry)	300	EPA (1995)
c-1,3-Dichloropropene	ug/kg(dry)	300	EPA (1995)
Carbon Disulfide	ug/kg(dry)	None	None
Carbon Tetrachloride	ug/kg(dry)	300	EPA (1995)
Chlorobenzene	ug/kg(dry)	100	EPA (1995)
Chloroethane	ug/kg(dry)	None	None
Chloroform	ug/kg(dry)	300	EPA (1995)
Chloromethane	ug/kg(dry)	None	None
Dibromochloromethane	ug/kg(dry)	None	None
Dibromomethane	ug/kg(dry)	None	None
Dichlorodifluoromethane	ug/kg(dry)	None	None
Ethylbenzene	ug/kg(dry)	100	EPA (1995)
Isopropylbenzene	ug/kg(dry)	None	None
Methylene chloride	ug/kg(dry)	300	EPA (1995)
Methyl-t-Butyl Ether (MTBE)	ug/kg(dry)	None	None
n-Butylbenzene	ug/kg(dry)	None	None
n-Propylbenzene	ug/kg(dry)	None	None
p-Isopropyltoluene	ug/kg(dry)	None	None
sec-Butylbenzene	ug/kg(dry)	None	None
Styrene	ug/kg(dry)	100	EPA (1995)
t-1,2-Dichloroethene	ug/kg(dry)	300	EPA (1995)
t-1,3-Dichloropropene	ug/kg(dry)	300	EPA (1995)
tert-Butylbenzene	ug/kg(dry)	None	None
Tetrachloroethene	ug/kg(dry)	300	EPA (1995)
Toluene	ug/kg(dry)	100	EPA (1995)
Total Xylene	ug/kg(dry)	100	EPA (1995)
Trichloroethene	ug/kg(dry)	300	EPA (1995)
Trichlorofluoromethane	ug/kg(dry)	None	None
Vinyl Acetate	ug/kg(dry)	None	None
Vinyl Chloride	ug/kg(dry)	300	EPA (1995)

TABLE 4 Martin State Airport - SURFACE SOIL COPC

CAS Number	Chemical	Minimum Concentration	Minimum Qualifier	Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Screening Toxicity Value	SVR	COPC Flag	Additional Considerations
INORGANICS													
7440-36-0	Antimony	1.25		12.5		mg/Kg	NA	0/15	2.5 - 25	0.48	26.0	Yes	Only COPC due to 1/2 RL > TRV
7440-38-2	Arsenic	1.1		29		mg/Kg	DANC	8/15	0.5 - 25	328	0.1	No	
7440-41-7	Beryllium	0.33		2.7		mg/Kg	DAES	4/15	2.5	0.02	135.0	Yes	
7440-43-9	Cadmium	0.71		13		mg/Kg	DAES	3/15	2.5 - 5	2.5	5.2	Yes	
7440-47-3	Chromium	3.9		480		mg/Kg	DANC	15/15	2.5 - 10	0.0075	64000.0	Yes	
7440-50-8	Copper	7.6		490		mg/Kg	DAES	14/15	2.5 - 5	15	32.7	Yes	
7440-47-3	Hexavalent Chromium	2		5		mg/Kg	NA	0/6	4 - 10	--	NA	Yes	Only COPC due to lack of TRV
7439-92-1	Lead	6.8		320		mg/Kg	DAES	12/15	2.5 - 50	0.01	32000.0	Yes	
7439-97-6	Mercury	0.07		0.72		mg/Kg	DAES	11/15	0.04 - 0.1	0.058	12.4	Yes	
7440-02-0	Nickel	4.3		89		mg/Kg	DAES	14/15	2.5 - 10	2	44.5	Yes	
7782-49-2	Selenium	3.9		5.7		mg/Kg	DA2	2/13	2.5 - 25	1.8	3.2	Yes	
7440-22-4	Silver	2.1		2.1		mg/Kg	EP2	1/15	1 - 2.5	2	1.05	Yes	
7440-28-0	Thallium	25		25		mg/Kg	EP2	1/15	2.5 - 25	0.001	25000.0	Yes	
7440-66-6	Zinc	14		600		mg/Kg	DANC	14/15	2.5 - 10	10	60.0	Yes	
PESTICIDES/PCBs													
72-54-8	4,4'-DDD	0.18		0.24		ug/kg	NA	0/9	0.36 - 0.48	100	0.0024	No	
72-55-9	4,4'-DDE	0.06		0.08		ug/kg	NA	0/9	0.12 - 0.166	100	0.0008	No	
50-29-3	4,4'-DDT	0.18		0.24		ug/kg	NA	0/9	0.36 - 0.48	100	0.0024	No	
309-00-2	Aldrin	0.03		0.04		ug/kg	NA	0/9	0.06 - 0.08	100	0.0004	No	
319-84-6	Alpha-BHC	0.03		0.04		ug/kg	NA	0/9	0.06 - 0.08	100	0.0004	No	
5103-71-9	Alpha-chlordane	0.06		0.08		ug/kg	NA	0/9	0.12 - 0.16	100	0.0008	No	
319-85-7	Beta-bhc	0.03		0.04		ug/kg	NA	0/9	0.06 - 0.08	100	0.0004	No	
319-86-8	Delta-bhc	0.03		0.04		ug/kg	NA	0/9	0.06 - 0.08	100	0.0004	No	
60-57-1	Dieldrin	0.06		0.08		ug/kg	NA	0/9	0.12 - 0.16	100	0.0008	No	
959-98-8	Endosulfan I	0.06		0.08		ug/kg	NA	0/9	0.12 - 0.16	--	NA	Yes	Only COPC due to lack of TRV
33213-65-9	Endosulfan II	0.18		0.24		ug/kg	NA	0/9	0.36 - 0.48	--	NA	Yes	Only COPC due to lack of TRV
1031-07-8	Endosulfan sulfate	0.18		0.24		ug/kg	NA	0/9	0.36 - 0.48	--	NA	Yes	Only COPC due to lack of TRV
72-20-8	Endrin	0.06		0.08		ug/kg	NA	0/9	0.12 - 0.16	100	0.0008	No	
7421-93-4	Endrin aldehyde	0.18		0.24		ug/kg	NA	0/9	0.36 - 0.48	100	0.0024	No	
53494-70-5	Endrin ketone	0.18		0.24		ug/kg	NA	0/9	0.36 - 0.48	100	0.0024	No	
5103-74-2	Gamma-chlordane	0.06		0.08		ug/kg	NA	0/9	0.12 - 0.16	100	0.0008	No	
58-89-9	Gamma-BHC	0.03		0.04		ug/kg	NA	0/9	0.06 - 0.08	100	0.0004	No	
76-44-8	Heptachlor	0.03		0.04		ug/kg	NA	0/9	0.06 - 0.08	100	0.0004	No	
1024-57-3	Heptachlor epoxide	0.03		0.04		ug/kg	NA	0/9	0.06 - 0.08	100	0.0004	No	
72-43-5	Methoxychlor	0.03		0.04		ug/kg	NA	0/9	0.06 - 0.08	100	0.0004	No	
8001-35-2	Toxaphene	1.8		2.4		ug/kg	NA	0/9	3.6 - 4.8	--	NA	Yes	Only COPC due to lack of TRV
SEMIVOLATILES													
95-95-4	2,4,5-Trichlorophenol	200		270		ug/kg	NA	0/9	400 - 540	100	2.7	Yes	Only COPC due to 1/2 RL > TRV
88-06-2	2,4,6-Trichlorophenol	200		270		ug/kg	NA	0/9	400 - 540	100	2.7	Yes	Only COPC due to 1/2 RL > TRV
120-83-2	2,4-Dichlorophenol	200		270		ug/kg	NA	0/9	400 - 540	100	2.7	Yes	Only COPC due to 1/2 RL > TRV
105-67-9	2,4-Dimethylphenol	200		270		ug/kg	NA	0/9	400 - 540	100	2.7	Yes	Only COPC due to 1/2 RL > TRV
51-28-5	2,4-Dinitrophenol	1000		1350		ug/kg	NA	0/9	2000 - 2700	100	13.5	Yes	Only COPC due to 1/2 RL > TRV
121-14-2	2,4-Dinitrotoluene	200		270		ug/kg	NA	0/9	400 - 540	--	NA	Yes	Only COPC due to lack of TRV
606202	2,6-Dinitrotoluene	200		270		ug/kg	NA	0/9	400 - 540	--	NA	Yes	Only COPC due to lack of TRV
91-58-7	2-Chloronaphthalene	200		270		ug/kg	NA	0/9	400 - 540	--	NA	Yes	Only COPC due to lack of TRV
95-57-8	2-Chlorophenol	200		270		ug/kg	NA	0/9	400 - 540	100	2.7	Yes	Only COPC due to 1/2 RL > TRV
110-75-8	2-Chloroethylvinyl ether	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV

TABLE 4 Martin State Airport - SURFACE SOIL COPC

CAS Number	Chemical	Minimum Concentration	Minimum Qualifier	Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Screening Toxicity Value	SVR	COPC Flag	Additional Considerations
							INORGANICS						
91-57-6	2-Methylnaphthalene	200		270		ug/kg	NA	0/9	400 - 540	--	NA	Yes	Only COPC due to lack of TRV
95-48-7	2-Methylphenol (o-Cresol)	200		270		ug/kg	NA	0/9	400 - 540	100	2.7	Yes	Only COPC due to 1/2 RL > TRV
88-74-4	2-Nitroaniline	1000		1350		ug/kg	NA	0/9	2000 - 2700	--	NA	Yes	Only COPC due to lack of TRV
88-75-5	2-Nitrophenol	200		270		ug/kg	NA	0/9	400 - 540	760	0.36	No	
91-94-1	3,3'-Dichlorobenzidine	200		270		ug/kg	NA	0/9	400 - 540	--	NA	Yes	Only COPC due to lack of TRV
99-09-2	3-Nitroaniline	1000		1350		ug/kg	NA	0/9	2000 - 2700	--	NA	Yes	Only COPC due to lack of TRV
534-52-1	4,6-Dinitro-2-methyphenol	1000		1350		ug/kg	NA	0/9	2000 - 2700	--	NA	Yes	Only COPC due to lack of TRV
101-55-3	4-Bromophenyl-phenylether	200		270		ug/kg	NA	0/9	400 - 540	--	NA	Yes	Only COPC due to lack of TRV
59-50-7	4-Chloro-3-methylphenol	400		550		ug/kg	NA	0/9	800 - 1100	--	NA	Yes	Only COPC due to lack of TRV
106-47-8	4-Chloroaniline	400		550		ug/kg	NA	0/9	800 - 1100	1950	0.28	No	
7005-72-3	4-Chlorophenyl-phenylether	200		270		ug/kg	NA	0/9	400 - 540	--	NA	Yes	Only COPC due to lack of TRV
106-44-5	4-Methylphenol (p-Cresol)	200		270		ug/kg	NA	0/9	400 - 540	100	2.7	Yes	Only COPC due to 1/2 RL > TRV
100-01-6	4-Nitroaniline	1000		1350		ug/kg	NA	0/9	2000 - 2700	--	NA	Yes	Only COPC due to lack of TRV
100-02-7	4-Nitrophenol	1000		1350		ug/kg	NA	0/9	2000 - 2700	100	13.5	Yes	Only COPC due to 1/2 RL > TRV
83-32-9	Acenaphthene	650		920		ug/kg	DAES	2/9	400 - 540	100	9.2	Yes	
208-96-8	Acenaphthylene	200		270		ug/kg	NA	0/9	400 - 540	100	2.7	Yes	Only COPC due to 1/2 RL > TRV
107-02-8	Acrolein	40		130		ug/kg	NA	0/9	80 - 260	--	NA	Yes	Only COPC due to lack of TRV
107-13-1	Acrylonitrile	40		130		ug/kg	NA	0/9	80 - 260	--	NA	Yes	Only COPC due to lack of TRV
120-12-7	Anthracene	870		9100		ug/kg	DANC	3/9	400 - 540	100	91	Yes	
56-55-3	Benzo[a]anthracene	990		31000		ug/kg	DANC	4/9	400 - 540	100	310	Yes	
50-32-8	Benzo[a]pyrene	1000		25000		ug/kg	DANC	4/9	400 - 540	100	250	Yes	
205-99-2	Benzo[b]fluoranthene	870		22000		ug/kg	DANC	4/9	400 - 540	100	220	Yes	
191-24-2	Benzo[g,h,i]perylene	550		13000		ug/kg	DANC	4/9	400 - 540	100	130	Yes	
207-08-9	Benzo[k]fluoranthene	870		20000		ug/kg	DANC	4/9	400 - 540	100	200	Yes	
111-91-1	bis(2-Chloroethoxy)methane	200		270		ug/kg	NA	0/9	400 - 540	--	NA	Yes	Only COPC due to lack of TRV
108-60-1	bis(2-Chloroisopropyl)ether	200		270		ug/kg	NA	0/9	400 - 540	--	NA	Yes	Only COPC due to lack of TRV
111-44-4	bis(2-Chloroethyl)ether	200		270		ug/kg	NA	0/9	400 - 540	--	NA	Yes	Only COPC due to lack of TRV
117-81-7	Bis(2-ethylhexyl) phthalate	13000		13000		ug/kg	DAES	1/9	400 - 540	--	NA	Yes	Only COPC due to lack of TRV
85-68-7	Benzyl butyl phthalate	200		270		ug/kg	NA	0/9	400 - 540	--	NA	Yes	Only COPC due to lack of TRV
86-74-8	Carbazole	830		8000		ug/kg	DANC	3/9	400 - 540	--	NA	Yes	Only COPC due to lack of TRV
218-01-9	Chrysene	1100		31000		ug/kg	DANC	4/9	400 - 540	100	310	Yes	
53-70-3	Dibenzo[a,h]anthracene	870		4100		ug/kg	DANC	3/9	400 - 540	100	41	Yes	
132-64-9	Dibenzofuran	200		270		ug/kg	NA	0/9	400 - 540	--	NA	Yes	Only COPC due to lack of TRV
84-66-2	Diethyl phthalate	200		270		ug/kg	NA	0/9	400 - 540	26800	0.01	No	
131-11-3	Dimethylphthalate	200		270		ug/kg	NA	0/9	400 - 540	21280	0.01	No	
84-74-2	Di-n-butyl phthalate	200		270		ug/kg	NA	0/9	400 - 540	40000	0.01	No	
117-84-0	Di-n-octyl phthalate	200		270		ug/kg	NA	0/9	400 - 540	--	NA	Yes	Only COPC due to lack of TRV
206-44-0	Fluoranthene	950		64000		ug/kg	DANC	4/9	400 - 540	100	640	Yes	
86-73-7	Fluorene	650		760		ug/kg	DANC	2/9	400 - 540	100	7.6	Yes	
118-74-1	Hexachlorobenzene	200		270		ug/kg	NA	0/9	400 - 540	2300	0.12	No	
87-68-3	Hexachlorobutadiene	2		270		ug/kg	NA	0/24	4 - 540	--	NA	Yes	Only COPC due to lack of TRV
77-47-4	Hexachlorocyclopentadiene	200		270		ug/kg	NA	0/9	400 - 540	2000	0.14	No	
67-72-1	Hexachloroethane	200		270		ug/kg	NA	0/9	400 - 540	--	NA	Yes	Only COPC due to 1/2 RL > TRV
193-39-5	Indeno[1,2,3-c,d]pyrene	580		13000		ug/kg	DANC	4/9	400 - 540	100	130	Yes	
78-59-1	Isophorone	200		270		ug/kg	NA	0/9	400 - 540	--	NA	Yes	Only COPC due to lack of TRV
91-20-3	Naphthalene	2		270		ug/kg	NA	0/24	4 - 540	100	2.7	Yes	Only COPC due to 1/2 RL > TRV
98-95-3	Nitrobenzene	200		270		ug/kg	NA	0/9	400 - 540	4520	0.06	No	
86-30-6	n-Nitrosodiphenylamine	200		270		ug/kg	NA	0/9	400 - 540	2180	0.12	No	

TABLE 4 Martin State Airport - SURFACE SOIL COPC

CAS Number	Chemical	Minimum Concentration	Minimum Qualifier	Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Screening Toxicity Value	SVR	COPC Flag	Additional Considerations
621-64-7	N-Nitroso-di-n-propylamine	200		270		ug/kg	NA	0/9	400 - 540	--	NA	Yes	Only COPC due to lack of TRV
87-86-5	Pentachlorophenol	1000		1350		ug/kg	NA	0/9	2000 - 2700	100	13.5	Yes	Only COPC due to 1/2 RL > TRV
85-01-8	Phenanthrene	560		25000		ug/kg	DANC	4/9	400 - 540	100	250	Yes	
109-95-2	Phenol	200		270		ug/kg	NA	0/9	400 - 540	100	2.7	Yes	Only COPC due to 1/2 RL > TRV
129-00-0	Pyrene	670		45000		ug/kg	DANC	5/9	400 - 540	100	450	Yes	
							VOLATILES						
630-20-6	1,1,1,2-Tetrachloroethane	2		6.5		ug/kg	NA	0/15	4 - 13	300	0.022	No	
71-55-6	1,1,1-Trichloroethane	2		6.5		ug/kg	NA	0/15	4 - 13	300	0.022	No	
79-34-5	1,1,2,2-Tetrachloroethane	2		6.5		ug/kg	NA	0/15	4 - 13	300	0.022	No	
79-00-5	1,1,2-Trichloroethane	2		6.5		ug/kg	NA	0/15	4 - 13	300	0.022	No	
75-34-3	1,1-Dichloroethane	2		6.5		ug/kg	NA	0/15	4 - 13	300	0.022	No	
75-35-4	1,1-Dichloroethene	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
563-58-6	1,1-Dichloropropene	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
87-61-6	1,2,3-Trichlorbenzene	2		6.5		ug/kg	NA	0/15	4 - 13	100	0.07	No	
96-18-4	1,2,3-Trichloropropane	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
120-82-1	1,2,4-Trichlorbenzene	2		270		ug/kg	NA	0/30	4 - 540	100	2.7	Yes	Only COPC due to 1/2 RL > TRV
95-63-6	1,2,4-Trimethylbenzene	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
96-12-8	1,2-Dibromo-3-chloropropane	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
106-93-4	1,2-Dibromoethane	2		6.5		ug/kg	NA	0/15	4 - 13	5000	0.001	No	
95-50-1	1,2-Dichlorobenzene	2		270		ug/kg	NA	0/30	4 - 540	100	2.7	Yes	Only COPC due to 1/2 RL > TRV
107-06-2	1,2-Dichloroethane	2		6.5		ug/kg	NA	0/15	4 - 13	870000	7.5E-06	No	
78-87-5	1,2-Dichlorpropane	2		6.5		ug/kg	NA	0/15	4 - 13	300	0.02	No	
108-67-8	1,3,5-Trimethylbenzene	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
541-73-1	1,3-Dichlorobenzene	2		270		ug/kg	NA	0/30	4 - 540	--	NA	Yes	Only COPC due to lack of TRV
142-28-9	1,3-Dichloropropane	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
106-46-7	1,4-Dichlorobenzene	2		270		ug/kg	NA	0/30	4 - 540	100	2.7	Yes	Only COPC due to 1/2 RL > TRV
594-20-7	2,2-Dichloropropane	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
95-49-8	2-Chlorotoluene	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
78-93-3	2-Butanone (MEK)	25		130		ug/kg	NA	0/15	50 - 260	--	NA	Yes	Only COPC due to lack of TRV
591-78-6	2-Hexanone (MBK)	20		65		ug/kg	NA	0/15	40 - 130	--	NA	Yes	Only COPC due to lack of TRV
106-43-4	4-Chlorotoluene	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
108-10-1	4-Methyl-2-pentanone	20		65		ug/kg	NA	0/15	40 - 130	100000	0.001	No	
67-64-1	Acetone	230		240		ug/kg	DAES	2/15	50 - 260	--	NA	Yes	Only COPC due to lack of TRV
71-43-2	Benzene	2		6.5		ug/kg	NA	0/15	4 - 13	100	0.07	No	
108-86-1	Bromobenzene	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
74-97-5	Bromochloromethane	2		6.5		ug/kg	NA	0/15	4 - 13	3000000	2.17E-06	No	
75-27-4	Bromodichloromethane	2		6.5		ug/kg	NA	0/15	4 - 13	450000	1.44E-05	No	
75-25-2	Bromoform (Tribromomethane)	2		6.5		ug/kg	NA	0/15	4 - 13	1147000	5.7E-06	No	
74-83-9	Bromomethane (methyl bromide)	2.5		13		ug/kg	NA	0/15	5 - 26	--	NA	Yes	Only COPC due to lack of TRV
75-15-0	Carbon disulfide	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
56-23-5	Carbon tetrachloride	2		6.5		ug/kg	NA	0/15	4 - 13	300	0.022	No	
108-90-7	Chlorobenzene	2		6.5		ug/kg	NA	0/15	4 - 13	100	0.065	No	
75-00-3	Chloroethane	2.5		13		ug/kg	NA	0/15	5 - 26	--	NA	Yes	Only COPC due to lack of TRV
67-66-3	Chloroform	2		6.5		ug/kg	NA	0/15	4 - 13	300	0.022	No	
74-87-3	Chloromethane	42		64		ug/kg	DAES	2/15	5 - 26	--	NA	Yes	Only COPC due to lack of TRV
156-59-2	cis-1,2-Dichloroethene	38		400		ug/kg	DANC	4/15	4 - 13	300	1.33	Yes	
10061-01-5	cis-1,3-Dichloropropene	2		6.5		ug/kg	NA	0/15	4 - 13	300	0.022	No	
124-48-1	Dibromochloromethane	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV

TABLE 4 Martin State Airport - SURFACE SOIL COPC

CAS Number	Chemical	Minimum Concentration	Minimum Qualifier	Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Screening Toxicity Value	SVR	COPC Flag	Additional Considerations
							INORGANICS						
74-95-3	Dibromomethane	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
75-71-8	Dichlorodifluoromethane	2.5		13		ug/kg	NA	0/15	5 - 26	--	NA	Yes	Only COPC due to lack of TRV
100-41-4	Ethylbenzene	2		6.5		ug/kg	NA	0/15	4 - 13	100	0.07	No	
98-82-8	Isopropylbenzene (Cumene)	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
75-09-2	Methylene Chloride	6		51	B	ug/kg	DAT1	10/15	4 - 13	300	0.17	No	
1634-04-4	methyl-tert-butyl ether (MTBE)	2.5		13		ug/kg	NA	0/15	5 - 26	--	NA	Yes	Only COPC due to lack of TRV
104-51-8	n-Butylbenzene	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
103-65-1	n-Propylbenzene	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
99-87-6	p-Isopropyltoluene	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
135-98-8	Sec-butylbenzene	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
100-42-5	Styrene (monomer)	2		6.5		ug/kg	NA	0/15	4 - 13	100	0.07	No	
127-18-4	Tetrachloroethene	12		34		ug/kg	DAES	4/15	4 - 13	300	0.11	No	
98-06-6	tert-Butylbenzene	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
108-88-3	Toluene	13		16		ug/kg	DAES	2/15	4 - 13	100	0.16	No	
156-60-5	trans-1,2-Dichloroethene	16		16		ug/kg	DANC	1/14	4 - 13	300	0.05	No	
10061-02-6	trans-1,3-Dichloropropene	2		6.5		ug/kg	NA	0/15	4 - 13	300	0.02	No	
79-01-6	Trichloroethene	2		6500		ug/kg	DANC	7/15	4 - 13	300	21.67	Yes	
75-69-4	Trichlorofluoromethane	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
108-05-4	Vinyl acetate	2		6.5		ug/kg	NA	0/15	4 - 13	--	NA	Yes	Only COPC due to lack of TRV
75-01-4	Vinyl chloride	2.5		13		ug/kg	NA	0/15	5 - 26	300	0.04	No	
1330-20-7	Xylenes, total	4		13		ug/kg	NA	0/15	8 - 26	100	0.13	No	

Notes:
N/A = Not Available
COPC = Chemical of Potential Concern
SVR = Screening Value Ratio (maximum detected concentration/screening toxicity value)
_ = No Qualifier
J = Indicates an estimated value
K = value biased high
L = biased low
U = below the detection limit

TABLE 5 SUMMARY OF ECOLOGICAL RISK SURFACE WATER SCREENING VALUES

Chemical	*CAS No.*	*Units*	*Ecological Screening Levels*	*Source*
		Inorganics		
Antimony	7440-36-0	ug/L	30	EPA (1995)
Antimony - Dissolved	7440-36-0	ug/L	30	EPA (1995)
Arsenic	7440-38-2	ug/L	150	EPA (2002)
Arsenic - Dissolved	7440-38-2	ug/L	150	EPA (2002)
Beryllium	7440-41-7	ug/L	5.3	EPA (1995)
Beryllium - Dissolved	7440-41-8	ug/L	5.3	EPA (1995)
Cadmium	7440-43-9	ug/L	0.1	EPA (2002)
Cadmium - Dissolved	7440-43-9	ug/L	0.09	EPA (2002)
Chromium	7440-47-3	ug/L	11.4	EPA (2002)
Chromium - Dissolved	7440-47-3	ug/L	11.4	EPA (2002)
Copper	7440-50-8	ug/L	2.85	EPA (2002)
Copper - Dissolved	7440-50-8	ug/L	2.74	EPA (2002)
Lead	7439-92-1	ug/L	0.54	EPA (2002)
Lead - Dissolved	7439-92-1	ug/L	0.54	EPA (2002)
Mercury	7439-97-6	ug/L	0.91	EPA (2002)
Mercury - Dissolved	7439-97-6	ug/L	0.77	EPA (2002)
Nickel	7440-02-0	ug/L	16.1	EPA (2002)
Nickel - Dissolved	7440-02-0	ug/L	16.1	EPA (2002)
Selenium	7782-49-2	ug/L	5	EPA (1995)
Selenium - Dissolved	7782-49-2	ug/L	4.6	EPA (2002)
Silver	7440-22-4	ug/L	0.0001	EPA (1995)
Silver - Dissolved	7440-22-4	ug/L	0.0001	EPA (1995)
Thallium	7440-28-0	ug/L	40	EPA (1995)
Thallium - Dissolved	7440-28-0	ug/L	40	EPA (1995)
Zinc	7440-66-6	ug/L	37	EPA (2002)
Zinc - Dissolved	7440-66-6	ug/L	36.5	EPA (2002)
		Volatile Organics		
1,1,1,2-Tetrachloroethane	630-20-6	ug/L	2,400	EPA (1995)
1,1,1-Trichloroethane	71-55-6	ug/L	9400	EPA (1995)
1,1,2,2-Tetrachloroethane	79-34-5	ug/L	2400	EPA (1995)
1,1,2-Trichloroethane	79-00-5	ug/L	9400	EPA (1995)
1,1-Dichloroethane	75-34-3	ug/L	160000	EPA (1995)
1,1-Dichloroethene	75-35-4	ug/L	11600	EPA (1995)
1,1-Dichloropropene	563-58-6	ug/L	48.8	EPA (1995)
1,2,3-Trichlorobenzene	87-61-6	ug/L	50	EPA (1995)
1,2,3-Trichloropropane	96-18-4	ug/L	None	None
1,2,4-Trichlorobenzene	120-82-1	ug/L	50	EPA (1995)
1,2,4-Trimethylbenzene	95-63-6	ug/L	None	None
1,2-Dibromo-3-chloropropane	96-12-8	ug/L	None	None
1,2-Dibromoethane	106-93-4	ug/L	18000	EPA (1995)
1,2-Dichlorobenzene	95-50-1	ug/L	763	EPA (1995)
1,2-Dichloroethane	107-06-2	ug/L	20000	EPA (1995)
1,2-Dichloropropane	78-87-5	ug/L	5700	EPA (1995)
1,3,5-Trimethylbenzene	108-67-8	ug/L	None	None
1,3-Dichlorobenzene	541-73-1	ug/L	763	EPA (1995)
1,3-Dichloropropane	142-28-9	ug/L	None	None
1,4-Dichlorobenzene	106-46-7	ug/L	763	EPA (1995)
2,2-Dichloropropane	594-20-7	ug/L	1140	EPA (1995)
2-Butanone (MEK)	78-93-3	ug/L	3220000	EPA (1995)
2-Chloroethylvinyl ether	110-75-8	ug/L	3540	Suter and Tsao (1996)
2-Chlorotoluene	95-49-8	ug/L	None	None
2-Hexanone (MBK)	591-78-6	ug/L	428000	EPA (1995)
4-Chlorotoluene	106-43-4	ug/L	None	None

Chemical	*CAS No.*	*Units*	*Ecological Screening Levels*	*Source*
4-Methyl-2-Pentanone	108-10-1	ug/L	460000	EPA (1995)
Acetone	67-64-1	ug/L	9000000	EPA (1995)
Benzene	71-43-2	ug/L	5300	EPA (1995)
Bromobenzene	108-86-1	ug/L	None	None
Bromochloromethane	74-97-5	ug/L	11000	EPA (1995)
Bromoform	75-25-2	ug/L	11000	EPA (1995)
Bromomethane	74-83-9	ug/L	110	EPA (2000)
Carbon Disulfide	75-15-0	ug/L	2	EPA (1995)
Carbon tetrachloride	56-23-5	ug/L	35200	EPA (1995)
Chlorobenzene	108-90-7	ug/L	50	EPA (1995)
Chloroethane	75-00-3	ug/L	None	None
Chloroform	67-66-3	ug/L	1240	EPA (1995)
Chloromethane	74-87-3	ug/L	5500	EPA (1995)
cis-1,2-Dichloroethene	156-59-2	ug/L	11600	EPA (1995)
cis-1,3-Dichloropropene	10061-01-5	ug/L	244	EPA (1995)
Dibromochloromethane	124-48-1	ug/L	11000	EPA (1995)
Dibromomethane	74-95-3	ug/L	11000	EPA (1995)
Dichlorodifluoromethane	75-71-8	ug/L	11000	EPA (1995)
Ethylbenzene	100-41-4	ug/L	32000	EPA (1995)
Isopropylbenzene	98-82-8	ug/L	None	None
m&p-Xylene	NA	ug/L	None	None
Methylene Chloride	75-09-2	ug/L	11000	EPA (1995)
Methyl-t-Butyl Ether (MTBE)	1634-04-4	ug/L	None	None
n-Butylbenzene	104-51-8	ug/L	None	None
n-Propylbenzene	103-65-1	ug/L	None	None
o-Xylene	95-47-6	ug/L	None	None
p-Isopropyltoluene	99-87-6	ug/L	None	None
sec-Butylbenzene	135-98-8	ug/L	None	None
Styrene	100-42-5	ug/L	None	None
tert-Butylbenzene	98-06-6	ug/L	None	None
Tetrachloroethene	127-18-4	ug/L	840	EPA (1995)
Toluene	108-88-3	ug/L	17000	EPA (1995)
trans-1,2-Dichloroethene	156-60-5	ug/L	11600	EPA (1995)
trans-1,3-Dichloropropene	10061-02-6	ug/L	244	EPA (1995)
Trichloroethene	79-01-6	ug/L	21900	EPA (1995)
Trichlorofluoromethane	75-69-4	ug/L	11000	EPA (1995)
Vinyl acetate	108-05-4	ug/L	None	None
Vinyl chloride	75-01-4	ug/L	11600	EPA (1995)
Semi-Volatile Organics				
1,1'-Biphenyl	92-52-4	ug/L	14	EPA (1996)
2,4,5-Trichlorophenol	95-95-4	ug/L	63	EPA (1995)
2,4,6-Trichlorophenol	88-06-2	ug/L	970	EPA (1995)
2,4-Dichlorophenol	120-83-2	ug/L	365	EPA (1995)
2,4-Dimethylphenol	105-67-9	ug/L	2120	EPA (1995)
2,4-Dinitrophenol	51-28-5	ug/L	150	EPA (1995)
2,6-Dinitrotoluene	60620-2	ug/L	None	None
2-Chloronaphthalene	91-58-7	ug/L	620	EPA (1995)
2-Chlorophenol	95-57-8	ug/L	970	EPA (1995)
2-Methylnaphthalene	91-57-6	ug/L	None	None
2-Methylphenol (o-Cresol)	95-48-7	ug/L	13	Suter and Tsao (1996)
2-Nitroaniline	88-74-4	ug/L	None	None
2-Nitrophenol	88-75-5	ug/L	3500	EPA (2000)
3,3-Dichlorobenzidine	91-94-1	ug/L	None	None
3,4-Methylphenol	NA	ug/L	None	None
3-Nitroaniline	99-09-2	ug/L	None	None
4,6-Dinitro-2-methylphenol	534-52-1	ug/L	2.3	EPA (2000)

Chemical	*CAS No.*	*Units*	*Ecological Screening Levels*	*Source*
4-Bromophenyl phenyl ether	101-55-3	ug/L	1.5	EPA (1996)
4-Chloro-3-methylphenol	59-50-7	ug/L	0.3	EPA (2000)
4-Chloroaniline	106-47-8	ug/L	50	Buchman (1999)
4-Chlorophenyl phenyl ether	7005-72-3	ug/L	None	None
4-Nitroaniline	100-01-6	ug/L	None	None
4-Nitrophenol	100-02-7	ug/L	150	EPA (1995)
Acenaphthene	83-32-9	ug/L	520	EPA (1995)
Acenaphthylene	208-96-8	ug/L	520	EPA (1995)
Acetophenone	98-86-2	ug/L	None	None
Anthracene	120-12-7	ug/L	0.1	EPA (1995)
Atrazine	1912-24-9	ug/L	None	None
Benzo[a]anthracene	56-55-3	ug/L	6.3	EPA (1995)
Benzo[a]pyrene	50-32-8	ug/L	0.014	Suter and Tsao (1996)
Benzo (b) fluoranthene	205-99-2	ug/L	None	None
Benzo (g,h,i) perylene	191-24-2	ug/L	None	None
Benzo (k) fluoranthene	207-08-9	ug/L	None	None
Bis (2-chloroethoxy) methane	111-91-1	ug/L	11000	EPA (1995)
Bis (2-chloroethyl) ether	111-44-4	ug/L	2380	EPA (1995)
Bis (2-chloroisopropyl) ether	108-60-1	ug/L	None	None
Bis (2-ethylhexyl) phthalate	117-81-7	ug/L	30	EPA (1995)
Butyl benzyl phthalate	85-68-7	ug/L	3	EPA (1995)
Caprolactam	105-60-2	ug/L	None	None
Carbazole	86-74-8	ug/L	None	None
Chrysene	218-01-9	ug/L	None	None
Dibenzo (a,h) anthracene	53-70-3	ug/L	None	None
Dibenzofuran	132-64-9	ug/L	20	EPA (1996)
Diethyl phthalate	84-66-2	ug/L	3	EPA (1995)
Dimethyl phthalate	131-11-3	ug/L	3	EPA (1995)
Di-n-butyl phthalate	84-74-2	ug/L	0.3	EPA (1995)
Di-n-octyl phthalate	117-84-0	ug/L	0.3	EPA (1995)
Fluoranthene	206-44-0	ug/L	3980	EPA (1995)
Fluorene	86-73-7	ug/L	430	EPA (1995)
Hexachlorobenzene	118-74-1	ug/L	3.68	EPA (1995)
Hexachlorobutadiene	87-68-3	ug/L	9.3	EPA (1995)
Hexachlorocyclopentadiene	77-47-4	ug/L	5.2	EPA (1995)
Hexachloroethane	67-72-1	ug/L	540	EPA (1995)
Indeno (1,2,3-cd) pyrene	193-39-5	ug/L	None	None
Isophorone	78-59-1	ug/L	117000	EPA (1995)
Naphthalene	91-20-3	ug/L	100	EPA (1995)
Nitrobenzene	98-95-3	ug/L	27000	EPA (1995)
N-Nitroso-di-n-propylamine	621-64-7	ug/L	None	None
N-Nitrosodiphenylamine	86-30-6	ug/L	5850	EPA (1995)
Pentachlorophenol	87-86-5	ug/L	15	EPA (2002)
Phenanthrene	85-01-8	ug/L	6.3	EPA (1995)
Phenol	109-95-2	ug/L	79	EPA (1995)
Pyrene	129-00-0	ug/L	None	None

TABLE 6 Martin State Airport - SURFACE WATER COPC

CAS Number	Chemical	Minimum Concentration	Minimum Qualifier	Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Screening Toxicity Value	SVR	COPC Flag	Additional Considerations
INORGANICS													
7440-36-0	Total Antimony	2.5		2.5		µg/L	NA	0/4	5	30	0.08	No	
7440-38-2	Total Arsenic	2.5		2.5		µg/L	NA	0/4	5	150	0.02	No	
7440-41-7	Total Beryllium	2		2		µg/L	NA	0/4	4	5.3	0.38	No	
7440-43-9	Total Cadmium	2.5		2.5		µg/L	NA	0/4	5	0.1	25.00	Yes	COPC due to 1/2 RL > TRV
7440-47-3	Total Chromium	2.5		2.5		µg/L	NA	0/4	5	11.4	0.22	No	
7440-50-8	Total Copper	13		15		µg/L	FMC-2	2/4	5	2.85	5.26	Yes	
7439-92-1	Total Lead	2.5		2.5		µg/L	NA	0/4	5	0.54	4.63	Yes	COPC due to 1/2 RL > TRV
7439-97-6	Total Mercury	0.5		0.5		µg/L	NA	0/4	1	0.91	0.55	No	
7440-02-0	Total Nickel	2.5		2.5		µg/L	NA	0/4	5	16	0.16	No	
7782-98-7	Total Selenium	2.5		2.5		µg/L	NA	0/4	5	5	0.50	No	
7440-22-4	Total Silver	2.5		2.5		µg/L	NA	0/4	5	0.0001	25000.00	Yes	COPC due to 1/2 RL > TRV
7440-28-0	Total Thallium	1		1		µg/L	NA	0/4	2	40	0.03	No	
7440-66-6	Total Zinc	25		25		µg/L	NA	0/4	50	37	0.68	No	
7440-36-0	Dissolved Antimony	2.5		2.5		µg/L	NA	0/4	5	30	0.08	No	
7440-38-2	Dissolved Arsenic	2.5		2.5		µg/L	NA	0/4	5	150	0.02	No	
7440-41-7	Dissolved Beryllium	2		2		µg/L	NA	0/4	4	5.3	0.38	No	
7440-43-9	Dissolved Cadmium	2.5		2.5		µg/L	NA	0/4	5	0.1	25.00	Yes	COPC due to 1/2 RL > TRV
7440-47-3	Dissolved Chromium	2.5		2.5		µg/L	NA	0/4	5	11.4	0.22	No	
7440-50-8	Dissolved Copper	17		17		µg/L	FMC-1, FMC-2	2/2	5	2.85	5.96	Yes	
7439-92-1	Dissolved Lead	2.5		2.5		µg/L	NA	0/4	5	0.54	4.63	Yes	COPC due to 1/2 RL > TRV
7439-97-6	Dissolved Mercury	0.5		0.5		µg/L	NA	0/4	1	0.91	0.55	No	
7440-02-0	Dissolved Nickel	2.5		2.5		µg/L	NA	0/4	5	16	0.16	No	
7782-98-7	Dissolved Selenium	2.5		2.5		µg/L	NA	0/4	5	5	0.50	No	
7440-22-4	Dissolved Silver	2.5		2.5		µg/L	NA	0/4	5	0.0001	25000.00	Yes	COPC due to 1/2 RL > TRV
7440-28-0	Dissolved Thallium	1		1		µg/L	NA	0/4	2	40	0.03	No	
7440-66-6	Dissolved Zinc	95		95		µg/L	Pond-2	1/4	50	37	2.57	Yes	
SVOCs													
92-52-4	1,1-Biphenyl	0.5		0.5		ug/L	NA	0/4	1	14	0.04	No	
95-95-4	2,4,5-Trichlorophenol	12.5		12.5		ug/L	NA	0/4	25	63	0.20	No	
88-06-2	2,4,6-Trichlorophenol	5		5		ug/L	NA	0/4	10	970	0.01	No	
120-83-2	2,4-Dichlorophenol	5		5		ug/L	NA	0/4	10	365	0.01	No	
105-67-9	2,4-Dimethylphenol	5		5		ug/L	NA	0/4	10	2120	0.00	No	
51-28-5	2,4-Dinitrophenol	12.5		12.5		ug/L	NA	0/4	25	150	0.08	No	
606-20-2	2,6-Dinitrotoluene	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
91-58-7	2-Chloronaphthalene	5		5		ug/L	NA	0/4	10	620	0.01	No	
95-57-8	2-Chlorophenol	5		5		ug/L	NA	0/4	10	970	0.01	No	
91-57-6	2-Methylnaphthalene	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
95-48-7	2-Methylphenol (o-Cresol)	5		5		ug/L	NA	0/4	10	13	0.38	No	
88-74-4	2-Nitroaniline	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
88-75-5	2-Nitrophenol	5		5		ug/L	NA	0/4	10	3500	0.00	No	
91-94-1	3,3-Dichlorobenzidine	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
NA	3,4-Methylphenol	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
99-09-2	3-Nitroaniline	12.5		12.5		ug/L	NA	0/4	25	NA	NA	Yes	Only COPC due to lack of TRV
534-52-1	4,6-Dinitro-2-methylphenol	12.5		12.5		ug/L	NA	0/4	25	2.3	5.43	Yes	COPC due to 1/2 RL > TRV
101-55-3	4-Bromophenyl phenyl ether	5		5		ug/L	NA	0/4	10	1.5	3.33	Yes	COPC due to 1/2 RL > TRV
59-50-7	4-Chloro-3-methylphenol	5		5		ug/L	NA	0/4	10	0.3	16.67	Yes	COPC due to 1/2 RL > TRV
106-47-8	4-Chloroaniline	5		5		ug/L	NA	0/4	10	50	0.10	No	
7005-72-3	4-Chlorophenyl phenyl ether	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
100-01-6	4-Nitroaniline	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
100-02-7	4-Nitrophenol	12.5		12.5		ug/L	NA	0/4	25	150	0.08	No	
83-32-9	Acenaphthene	5		5		ug/L	NA	0/4	10	520	0.01	No	
208-96-8	Acenaphthylene	5		5		ug/L	NA	0/4	10	520	0.01	No	
98-86-2	Acetophenone	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
120-12-7	Anthracene	5		5		ug/L	NA	0/4	10	0.1	50.00	Yes	COPC due to 1/2 RL > TRV
1912-24-9	Atrazine	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV

TABLE 6 Martin State Airport - SURFACE WATER COPC

CAS Number	Chemical	Minimum Concentration	Minimum Qualifier	Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Screening Toxicity Value	SVR	COPC Flag	Additional Considerations
56-55-3	Benzo(a)anthracene	5		5		ug/L	NA	0/4	10	6.3	0.79	No	
50-32-8	Benzo(a)pyrene	5		5		ug/L	NA	0/4	10	0.014	357.14	Yes	COPC due to 1/2 RL > TRV
205-99-2	Benzo(b)fluoranthene	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
191-24-2	Benzo(g,h,i)perylene	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
207-08-9	Benzo(k)fluoranthene	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
108-60-1	Bis (2-chloroisopropyl) ether	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
111-44-4	Bis(2-chlorethyl)ether	5		5		ug/L	NA	0/4	10	2380	0.00	No	
111-91-1	Bis(2-chloroethoxy)methane	5		5		ug/L	NA	0/4	10	11000	0.00	No	
117-81-7	Bis(2-ethylhexyl)phthalate	5		5		ug/L	NA	0/4	10	30	0.17	No	
85-68-7	Butyl benzyl phthalate	5		5		ug/L	NA	0/4	10	3	1.67	Yes	COPC due to 1/2 RL > TRV
105-60-2	Caprolactam	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
86-74-8	Carbazole	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
218-01-9	Chrysene	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
53-70-3	Dibenzo(a,h)anthracene	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
132-64-9	Dibenzofuran	5		5		ug/L	NA	0/4	10	20	0.25	No	
84-66-2	Diethyl phthalate	5		5		ug/L	NA	0/4	10	3	1.67	Yes	COPC due to 1/2 RL > TRV
131-11-3	Dimethyl phthalate	5		5		ug/L	NA	0/4	10	3	1.67	Yes	COPC due to 1/2 RL > TRV
84-74-2	Di-n-butyl-phthalate	5		5		ug/L	NA	0/4	10	0.3	16.67	Yes	COPC due to 1/2 RL > TRV
117-84-0	Di-n-octyl phthalate	5		5		ug/L	NA	0/4	10	0.3	16.67	Yes	COPC due to 1/2 RL > TRV
206-44-0	Fluoranthene	5		5		ug/L	NA	0/4	10	3980	0.00	No	
86-73-7	Fluorene	5		5		ug/L	NA	0/4	10	430	0.01	No	
118-74-1	Hexachlorobenzene	5		5		ug/L	NA	0/4	10	3.68	1.36	Yes	COPC due to 1/2 RL > TRV
87-68-3	Hexachlorobutadiene	5		5		ug/L	NA	0/4	10	9.3	0.54	No	
77-47-4	Hexachlorocyclopentadiene	5		5		ug/L	NA	0/4	10	5.2	0.96	No	
67-72-1	Hexachloroethane	5		5		ug/L	NA	0/4	10	540	0.01	No	
193-39-5	Indeno(1,2,3-cd)pyrene	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
78-59-1	Isophrone	5		5		ug/L	NA	0/4	10	117000	0.00	No	
91-20-3	Napthalene	0.5		5		ug/L	NA	0/8	10	100	0.05	No	
98-95-3	Nitrobenzene	5		5		ug/L	NA	0/4	10	27000	0.00	No	
621-64-7	n-Nitroso-di-n-propylamine	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
86-30-6	n-Nitrosodiphenylamine	5		5		ug/L	NA	0/4	10	5850	0.00	No	
87-86-5	Pentachlorophenol	12.5		12.5		ug/L	NA	0/4	25	15	0.83	No	
85-01-8	Phenanthrene	5		5		ug/L	NA	0/4	10	6.3	0.79	No	
108-95-2	Phenol	5		5		ug/L	NA	0/4	10	79	0.06	No	
129-00-0	Pyrene	5		5		ug/L	NA	0/4	10	NA	NA	Yes	Only COPC due to lack of TRV
							VOCs						
630-20-6	1,1,1,2-Tetrachloroethane	0.5		0.5		ug/L	NA	0/4	1	2400	0.00	No	
71-55-6	1,1,1-Trichloroethane	0.5		0.5		ug/L	NA	0/4	1	9400	0.00	No	
79-34-5	1,1,2,2-Tetrachloroethane	0.5		0.5		ug/L	NA	0/4	1	2400	0.00	No	
79-00-5	1,1,2-Trichloroethane	0.5		0.5		ug/L	NA	0/4	1	9400	0.00	No	
75-34-3	1,1-Dichloroethane	0.5		0.5		ug/L	NA	0/4	1	160000	0.00	No	
75-35-4	1,1-Dichloroethene	0.5		0.5		ug/L	NA	0/4	1	11600	0.00	No	
563-58-6	1,1-Dichloropropene	0.5		0.5		ug/L	NA	0/4	1	48.8	0.01	No	
87-61-6	1,2,3-Trichlorobenzene	0.5		0.5		ug/L	NA	0/4	1	50	0.01	No	
96-18-4	1,2,3-Trichloropropane	0.5		0.5		ug/L	NA	0/4	1	NA	NA	Yes	Only COPC due to lack of TRV
120-82-1	1,2,4-Trichlorobenzene	0.5		0.5		ug/L	NA	0/4	1	50	0.01	No	
95-63-6	1,2,4-Trimethylbenzene	0.5		0.5		ug/L	NA	0/4	1	NA	NA	Yes	Only COPC due to lack of TRV
96-12-8	1,2-Dibromo-3-Chloropropane	0.5		0.5		ug/L	NA	0/4	1	NA	NA	Yes	Only COPC due to lack of TRV
106-93-4	1,2-Dibromoethane	0.5		0.5		ug/L	NA	0/4	1	18000	0.00	No	
95-50-1	1,2-Dichlorobenzene	0.5		0.5		ug/L	NA	0/4	1	763	0.00	No	
107-06-2	1,2-Dichloroethane	0.5		0.5		ug/L	NA	0/4	1	20000	0.00	No	
78-87-5	1,2-Dichloropropane	0.5		0.5		ug/L	NA	0/4	1	5700	0.00	No	
108-67-8	1,3,5-Trimethylbenzene	0.5		0.5		ug/L	NA	0/4	1	NA	NA	Yes	Only COPC due to lack of TRV
541-73-1	1,3-Dichlorobenzene	0.5		0.5		ug/L	NA	0/4	1	763	0.00	No	
142-28-9	1,3-Dichloropropane	0.5		0.5		ug/L	NA	0/4	1	NA	NA	Yes	Only COPC due to lack of TRV
106-46-7	1,4-Dichlorobenzene	0.5		0.5		ug/L	NA	0/4	1	763	0.00	No	

TABLE 6 Martin State Airport - SURFACE WATER COPC

CAS Number	Chemical	Minimum Concentration	Minimum Qualifier	Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Screening Toxicity Value	SVR	COPC Flag	Additional Considerations
594-20-7	2,2-Dichloropropane	0.5		0.5		ug/L	ORGANICS	0/4	1	1140	0.00	No	
78-93-3	2-Butanone (MEK)	5		5		ug/L	NA	0/4	10	3220000	0.00	No	
110-75-8	2-Chloroethylvinyl ether	0.5		0.5		ug/L	NA	0/4	1	3540	0.00	No	Only COPC due to lack of TRV
95-49-8	2-Chlorotoluene	0.5		0.5		ug/L	NA	0/4	1	NA	NA	Yes	Only COPC due to lack of TRV
591-78-6	2-Hexanone (MBK)	5		5		ug/L	NA	0/4	10	428000	0.00	No	
106-43-4	4-Chlorotoluene	0.5		0.5		ug/L	NA	0/4	1	NA	NA	Yes	Only COPC due to lack of TRV
108-10-1	4-Methyl-2-Pentanone	5		5		ug/L	NA	0/4	10	460000	0.00	No	
67-64-1	Acetone	5		5		ug/L	NA	0/4	10	9000000	0.00	No	
71-43-2	Benzene	0.5		0.5		ug/L	NA	0/4	1	5300	0.00	No	
108-86-2	Bromobenzene	0.5		0.5		ug/L	NA	0/4	1	NA	NA	Yes	Only COPC due to lack of TRV
74-97-5	Bromochloromethane	0.5		0.5		ug/L	NA	0/4	1	11000	0.00	No	
75-25-2	Bromoform	0.5		0.5		ug/L	NA	0/4	1	11000	0.00	No	
74-83-9	Bromomethane	0.5		0.5		ug/L	NA	0/4	1	110	0.00	No	
156-59-2	c-1,2-Dichloroethene	3		3		ug/L	FMC-1, FMC-2	2/4		11600	0.00	No	
10061-01-5	c-1,3-Dichloropropene	0.5		0.5		ug/L	NA	0/4	1	244	0.00	No	
75-15-0	Carbon Disulfide	0.5		0.5		ug/L	NA	0/4	1	2	0.25	No	
56-23-5	Carbon Tetrachloride	0.5		0.5		ug/L	NA	0/4	1	35200	0.00	No	
108-90-7	Chlorobenzene	0.5		0.5		ug/L	NA	0/4	1	50	0.01	No	
75-00-3	Chloroethane	0.5		0.5		ug/L	NA	0/4	1	NA	NA	Yes	Only COPC due to lack of TRV
67-66-3	Chloroform	0.5		0.5		ug/L	NA	0/4	1	1240	0.00	No	
74-87-3	Chloromethane	0.5		0.5		ug/L	NA	0/4	1	5500	0.00	No	
98-82-8	Cumene (Isopropylbenzene)	0.5		0.5		ug/L	NA	0/4	1	NA	NA	Yes	Only COPC due to lack of TRV
124-48-1	Dibromochloromethane	0.5		0.5		ug/L	NA	0/4	1	11000	0.00	No	
74-95-3	Dibromomethane	0.5		0.5		ug/L	NA	0/4	1	11000	0.00	No	
75-71-8	Dichlorodifluoromethane	0.5		0.5		ug/L	NA	0/4	1	11000	0.00	No	
100-41-4	Ethylbenzene	0.5		0.5		ug/L	NA	0/4		32000	0.00	No	
75-09-2	Methylene Chloride	0.5		0.5		ug/L	NA	0/4	1	11000	0.00	No	
1634-04-4	Methyl-t-Butyl Ether (MTBE)	7		7		ug/L	FMC-1, FMC-2	2/2	1	NA	NA	Yes	Only COPC due to lack of TRV
NA	m&p xylenes	1.5		1.5		ug/L	NA	0/4	3	NA	NA	Yes	Only COPC due to lack of TRV
104-51-8	n-Butylbenzene	0.5		0.5		ug/L	NA	0/4	1	NA	NA	Yes	Only COPC due to lack of TRV
103-65-1	n-Propylbenzene	0.5		0.5		ug/L	NA	0/4	1	NA	NA	Yes	Only COPC due to lack of TRV
99-87-6	p-Isopropyltoluene	0.5		0.5		ug/L	NA	0/4	1	NA	NA	Yes	Only COPC due to lack of TRV
95-47-6	o xylenes	1.5		1.5		ug/L	NA	0/4	3	NA	NA	Yes	Only COPC due to lack of TRV
135-98-8	sec-Butylbenzene	0.5		0.5		ug/L	NA	0/4	1	NA	NA	Yes	Only COPC due to lack of TRV
1001-42-5	Styrene	0.5		0.5		ug/L	NA	0/4	1	NA	NA	Yes	Only COPC due to lack of TRV
156-60-5	t-1,2-Dichloroethene	0.5		0.5		ug/L	NA	0/4	1	11600	0.00	No	
10061-02-6	t-1,3-Dichloropropene	0.5		0.5		ug/L	NA	0/4	1	244	0.00	No	
98-26-6	tert-Butylbenzene	0.5		0.5		ug/L	NA	0/4	1	NA	NA	Yes	Only COPC due to lack of TRV
127-18-4	Tetrachloroethene	0.5		0.5		ug/L	NA	0/4	1	840	0.00	No	
108-88-3	Toluene	0.5		0.5		ug/L	NA	0/4	1	17000	0.00	No	
79-01-6	Trichloroethene	3		4		ug/L	FMC-1, FMC-2	2/4	1	21900	0.00	No	
75-69-4	Trichlorofluoromethane	2.5		2.5		ug/L	NA	0/4	5	11000	0.00	No	
108-05-4	Vinyl Acetate	0.5		0.5		ug/L	NA	0/4	1	NA	NA	Yes	Only COPC due to lack of TRV
75-01-4	Vinyl Chloride	0.5		0.5		ug/L	NA	0/4	1	11600	0.00	No	

N/A = Not Available
COPC = Chemical of Potential Concern
SVR = Screening Value Ratio (maximum detected concentration/screening toxicity value)
J = Indicates an estimated value
K = Estimated high value

TABLE 7 SUMMARY OF ECOLOGICAL RISK SEDIMENT SCREENING VALUES

Chemical	*CAS No.*	*Units*	*Ecological Screening Levels*	*Source*
		Inorganics		
Antimony	7440-36-0	mg/kg(dry)	150	EPA (1995)
Arsenic	7440-38-2	mg/kg(dry)	8.2	EPA (1995)
Beryllium	7440-41-7	mg/kg(dry)	None	None
Cadmium	7440-43-9	mg/kg(dry)	1.2	EPA (1995)
Chromium	7440-47-3	mg/kg(dry)	81	EPA (1995)
Copper	7440-50-8	mg/kg(dry)	34	EPA (1995)
Lead	7439-92-1	mg/kg(dry)	46.7	EPA (1995)
Mercury	7439-97-6	mg/kg(dry)	0.15	EPA (1995)
Nickel	7440-02-0	mg/kg(dry)	20.9	EPA (1995)
Selenium	7782-49-2	mg/kg(dry)	1	Buchman (1999)
Silver	7440-22-4	mg/kg(dry)	1	EPA (1995)
Thallium	7440-28-0	mg/kg(dry)	None	None
Zinc	7440-66-6	mg/kg(dry)	150	EPA (1995)
		Pesticides		
4,4'-DDD	72-54-8	ug/kg(dry)	16	EPA (1995)
4,4'-DDE	75-55-9	ug/kg(dry)	2.2	EPA (1995)
4,4'-DDT	50-29-3	ug/kg(dry)	1.58	EPA (1995)
Aldrin	309-00-2	ug/kg(dry)	9.5	Buchman (1999)
alpha-BHC	319-84-6	ug/kg(dry)	6	Jones et al. (1997)
alpha-Chlordane	5103-71-9	ug/kg(dry)	4.5	Buchman (1999)
beta-BHC	319-85-7	ug/kg(dry)	5	Jones et al. (1997)
delta-BHC	319-86-8	ug/kg(dry)	5	Jones et al. (1997)
Dieldrin	60-57-1	ug/kg(dry)	2.85	Buchman (1999)
Endosulfan I	959-98-8	ug/kg(dry)	None	None
Endosulfan II	33213-65-9	ug/kg(dry)	None	None
Endosulfan sulfate	1031-07-8	ug/kg(dry)	None	None
Endrin	72-20-8	ug/kg(dry)	2.67	Buchman (1999)
Endrin Aldehyde	7421-93-4	ug/kg(dry)	2.67	Buchman (1999)
Endrin Ketone	53494-70-5	ug/kg(dry)	2.67	Buchman (1999)
gamma-BHC (Lindane)	58-89-9	ug/kg(dry)	0.94	Buchman (1999)
gamma-Chlordane	5103-71-9	ug/kg(dry)	4.5	Buchman (1999)
Heptachlor	76-44-8	ug/kg(dry)	0.6	Buchman (1999)
Hepatchlor epoxide	1024-57-3	ug/kg(dry)	0.6	Buchman (1999)
Methoxychlor	72-43-5	ug/kg(dry)	None	None
Toxaphene	8001-35-2	ug/kg(dry)	None	None
		Semivolatiles		
2,4,5-Trichlorophenol	95-95-4	ug/kg(dry)	None	None
2,4,6-Trichlorophenol	88-06-2	ug/kg(dry)	None	None
2,4-Dichlorophenol	120-83-2	ug/kg(dry)	None	None
2,4-Dimethylphenol	105-67-9	ug/kg(dry)	29	EPA (1995)
2,4-Dinitrophenol	51-28-5	ug/kg(dry)	None	None
2,4-Dinitrotoluene	121-14-2	ug/kg(dry)	None	None
2,6-Dinirtoluene	606-20-2	ug/kg(dry)	None	None
2-Chloronaphthalene	91-58-7	ug/kg(dry)	None	None
2-Chlorphenol	95-57-8	ug/kg(dry)	None	None
2-Methylnaphthalene	91-57-6	ug/kg(dry)	70	EPA (1995)
2-Methylphenol (o-Cresol)	95-48-7	ug/kg(dry)	63	EPA (1995)
2-Nitroaniline	88-74-4	ug/kg(dry)	None	None
2-Nitrophenol	88-75-5	ug/kg(dry)	None	None
3,3-Dichlorobenzidine	91-94-1	ug/kg(dry)	None	None
3-Nitroaniline	99-09-2	ug/kg(dry)	None	None
4,6-Dinitro-2-methylphenol	534-52-1	ug/kg(dry)	None	None
4-Bromophenyl phenyl ether	101-55-3	ug/kg(dry)	None	None
4-Chloro-3-methylphenol	59-50-7	ug/kg(dry)	None	None
4-Chloroaniline	106-47-8	ug/kg(dry)	None	None
4-Chlorphenyl phenyl ether	7005-72-3	ug/kg(dry)	None	None

TABLE 7 SUMMARY OF ECOLOGICAL RISK SEDIMENT SCREENING VALUES

Chemical	*CAS No.*	*Units*	*Ecological Screening Levels*	*Source*
4-Methylphenol (p-Cresol)	106-44-5	ug/kg(dry)	670	EPA (1995)
4-Nitroaniline	100-01-6	ug/kg(dry)	None	None
4-Nitrophenol	100-02-7	ug/kg(dry)	None	None
Acenaphthene	83-32-9	ug/kg(dry)	16	EPA (1995)
Acenaphthylene	208-96-8	ug/kg(dry)	44	EPA (1995)
Acrolein	107-02-8	ug/kg(dry)	None	None
Acrylonitrile	107-13-1	ug/kg(dry)	None	None
Anthracene	120-12-7	ug/kg(dry)	85.3	EPA (1995)
Benzo(a)anthracene	56-55-3	ug/kg(dry)	261	EPA (1995)
Benzo(a)pyrene	50-32-8	ug/kg(dry)	430	EPA (1995)
Benzo(b)fluoranthene	205-99-2	ug/kg(dry)	3,200	EPA (1995)
Benzo(g,h,I)perylene	191-24-2	ug/kg(dry)	670	EPA (1995)
Benzo(k)fluoranthene	207-08-9	ug/kg(dry)	240	Jones et al. (1997)
Bis (2-chloroisopropyl)ether	108-60-1	ug/kg(dry)	None	None
Bis(2-chloroethoxy)methane	111-91-1	ug/kg(dry)	None	None
Bis(2-chlorethyl)ether	111-44-4	ug/kg(dry)	None	None
Bis(2-ethylhexyl)phthalate	117-81-7	ug/kg(dry)	1,300	EPA (1995)
Butyl benzyl phthalate	85-68-7	ug/kg(dry)	63	EPA (1995)
Carbazole	86-74-8	ug/kg(dry)	None	None
Chrysene	218-01-9	ug/kg(dry)	384	EPA (1995)
Dibenzo(a,h)anthracene	53-70-3	ug/kg(dry)	63.4	EPA (1995)
Dibenzofuran	132-64-9	ug/kg(dry)	540	EPA (1995)
Diethyl phthalate	84-66-2	ug/kg(dry)	200	EPA (1995)
Dimethyl phthalate	131-11-3	ug/kg(dry)	71	EPA (1995)
Di-n-butyl-phthalate	84-74-2	ug/kg(dry)	1,400	EPA (1995)
Di-n-octyl phthalate	117-84-0	ug/kg(dry)	6,200	EPA (1995)
Fluoranthene	206-44-0	ug/kg(dry)	600	EPA (1995)
Fluorene	86-73-7	ug/kg(dry)	19	EPA (1995)
Hexachlorobenzene	118-74-1	ug/kg(dry)	22	EPA (1995)
Hexachlorobutadiene	87-68-3	ug/kg(dry)	11	EPA (1995)
Hexachlorocylcopentadiene	77-47-4	ug/kg(dry)	None	None
Hexachloroethane	67-72-1	ug/kg(dry)	None	None
Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg(dry)	600	EPA (1995)
Isophrone	78-59-1	ug/kg(dry)	None	None
Napthalene	91-20-3	ug/kg(dry)	160	EPA (1995)
Nitrobenzene	98-95-3	ug/kg(dry)	None	None
n-Nitrosodiphenylamine	86-30-6	ug/kg(dry)	28	EPA (1995)
n-Nitroso-di-n-propylamine	621-64-7	ug/kg(dry)	None	None
Pentachlorophenol	87-86-5	ug/kg(dry)	360	EPA (1995)
Phenanthrene	85-01-8	ug/kg(dry)	240	EPA (1995)
Phenol	108-95-2	ug/kg(dry)	420	EPA (1995)
Pyrene	129-00-0	ug/kg(dry)	665	EPA (1995)
Volatile Organics				
1,1,1,2-Tetrachloroethane	630-20-6	ug/kg(dry)	None	None
1,1,1-Trichloroethane	71-55-6	ug/kg(dry)	31	EPA (1995)
1,1,2,2-Tetrachloroethane	79-34-5	ug/kg(dry)	None	None
1,1,2-Trichloroethane	79-00-5	ug/kg(dry)	31	EPA (1995)
1,1-Dichloroethane	75-34-3	ug/kg(dry)	None	None
1,1-Dichloroethene	75-35-4	ug/kg(dry)	None	None
1,1-Dichloropropene	563-58-6	ug/kg(dry)	None	None
1,2,3-Trichlorobenzene	87-61-6	ug/kg(dry)	40	EPA (1995)
1,2,3-Trichloropropane	96-18-4	ug/kg(dry)	None	None
1,2,4-Trichlorobenzene	120-82-1	ug/kg(dry)	40	EPA (1995)
1,2,4-Trimethylbenzene	95-63-6	ug/kg(dry)	None	None
1,2-Dibromo-3-chloropropane	96-12-8	ug/kg(dry)	None	None
1,2-Dibromomethane	106-93-4	ug/kg(dry)	None	None
1,2-Dichlorobenzene	95-50-1	ug/kg(dry)	35	EPA (1995)
1,2-Dichloroethane	107-06-2	ug/kg(dry)	None	None

TABLE 7 SUMMARY OF ECOLOGICAL RISK SEDIMENT SCREENING VALUES

Chemical	*CAS No.*	*Units*	*Ecological Screening Levels*	*Source*
1,2-Dichloropropane	78-87-5	ug/kg(dry)	None	None
1,3,5-Trimethylbenzene	108-67-8	ug/kg(dry)	None	None
1,3-Dichlorobenzene	541-73-1	ug/kg(dry)	None	None
1,3-Dichlorpropane	142-28-9	ug/kg(dry)	None	None
1,4-Dichlorobenzene	106-46-7	ug/kg(dry)	110	EPA (1995)
2,2-Dichloropropane	594-20-7	ug/kg(dry)	None	None
2-Chlorotoluene	95-49-8	ug/kg(dry)	None	None
2-Butanone	78-93-3	ug/kg(dry)	None	None
2-Hexanone	591-78-6	ug/kg(dry)	None	None
4-Chlorotoluene	106-43--4	ug/kg(dry)	None	None
4-Methyl-2-pentanone	108-10-1	ug/kg(dry)	None	None
Acetone	67-64-1	ug/kg(dry)	None	None
Benzene	71-43-2	ug/kg(dry)	None	None
Bromobenzene	108-86-2	ug/kg(dry)	None	None
Bromochloromethane	74-97-5	ug/kg(dry)	None	None
Bromodichloromethane	75-27-4	ug/kg(dry)	None	None
Bromoform(Tribromomethane)	75-25-2	ug/kg(dry)	None	None
Bromomethane (methyl bromide)	74-83-9	ug/kg(dry)	None	None
Caron disulfide	75-15-0	ug/kg(dry)	None	None
Carbon tetrachloride	56-23-5	ug/kg(dry)	None	None
Chlorobenzene	108-90-7	ug/kg(dry)	None	None
Chloroethane	75-00-3	ug/kg(dry)	None	None
Chloroform	67-66-3	ug/kg(dry)	None	None
Chloromethane (methyl chloride)	74-87-3	ug/kg(dry)	None	None
cis-1,2-Dichloroethene	156-59-2	ug/kg(dry)	None	None
cis-1,3-Dichloropropene	10061-01-5	ug/kg(dry)	None	None
Cumene (isopropylbenzene)	98-82-8	ug/kg(dry)	None	None
Dibromochloromethane	124-48-1	ug/kg(dry)	None	None
Dibromomethane	74-95-3	ug/kg(dry)	None	None
Dichlorodifluoromethane	75-71-8	ug/kg(dry)	None	None
Ethylbenzene	100-41-4	ug/kg(dry)	10	EPA (1995)
Methylene Chloride	75-09-2	ug/kg(dry)	None	None
Methyl-tert-butyl ether (MTBE)	1634-04-4	ug/kg(dry)	None	None
n-Butylbenzene	104-51-8	ug/kg(dry)	None	None
n-Propylbenzene	103-65-1	ug/kg(dry)	None	None
p-Isopropyltoluene (cymene)	99-87-6	ug/kg(dry)	None	None
Sec-butybenzene	135-98-8	ug/kg(dry)	None	None
Styrene	1001-42-5	ug/kg(dry)	None	None
Tetrachloroethene	127-18-4	ug/kg(dry)	57	EPA (1995)
tert-Butylbenzene	98-26-6	ug/kg(dry)	None	None
Toluene	108-88-3	ug/kg(dry)	None	None
trans-1,2-Dichloroethene	156-60-5	ug/kg(dry)	None	None
trans-1,3-Dichloropropene	10061-02-6	ug/kg(dry)	None	None
Trichloroethene	79-01-6	ug/kg(dry)	41	Buchman (1999)
Trichlorofluoromethane	75-69-4	ug/kg(dry)	None	None
Vinyl acetate	108-05-4	ug/kg(dry)	None	None
Vinyl chloride	75-01-4	ug/kg(dry)	None	None
Xylene, total	1330-20-7	ug/kg(dry)	40	EPA (1995)

TABLE 8 MARTIN STATE AIRPORT - SEDIMENT COPC

CAS Number	Chemical	Minimum Concentration	Minimum Qualifier	Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Screening Toxicity Value	SVR	COPC Flag	Additional Considerations
							INORGANICS						
7440-36-0	Antimony	1.35		12.5		mg/kg	NA	0/6	2.7 - 25	150	0.08	No	
7440-38-2	Arsenic	1.9		6		mg/kg	FMC-1	2/6	0.53 - 25	8.2	0.73	No	
7440-41-7	Beryllium	1.25		1.45		mg/kg	NA	0/6	2.5 - 2.9	NA	NA	Yes	Only COPC due to lack of TRV
7440-43-9	Cadmium	5.2		600		mg/kg	EP1	3/6	2.7 - 5	1.2	500.00	Yes	
7440-47-3	Chromium	7.4		12000		mg/kg	EP1	6/6	2.7 - 10	81	148.15	Yes	
7440-50-8	Copper	9.5		200		mg/kg	EP1	6/6	2.7 - 5	34	5.88	Yes	
7439-92-1	Lead	2.5		210		mg/kg	EP1	4/6	2.7 - 50	46.7	4.50	Yes	
7439-97-6	Mercury	0.2		0.33		mg/kg	EP1	2/6	0.04 - 0.11	0.15	2.20	Yes	
7440-02-0	Nickel	25		92		mg/kg	EP1	3/6	2.7 - 10	20.9	4.40	Yes	
7782-98-7	Selenium	1.35		12.5		mg/kg	NA	0/6	2.7 - 25	1	12.50	Yes	COPC due to 1/2 RL > TRV
7440-22-4	Silver	1.3		1.3		mg/kg	EP1	1/6	1 - 2.9	1	1.30	Yes	
7440-28-0	Thallium	1.05		12.5		mg/kg	NA	0/6	2.1 - 25	NA	NA	Yes	Only COPC due to lack of TRV
7440-66-6	Zinc	63		790		mg/kg	EP1	4/6	10 - 29	150	5.27	Yes	
							SVOCs						
95-95-4	2,4,5-Trichlorophenol	210		550		ug/kg	NA	0/6	420 - 1100	NA	NA	Yes	Only COPC due to lack of TRV
88-06-2	2,4,6-Trichlorophenol	210		440		ug/kg	NA	0/6	420 - 880	NA	NA	Yes	Only COPC due to lack of TRV
120-83-2	2,4-Dichlorophenol	210		440		ug/kg	NA	0/6	420 - 880	NA	NA	Yes	Only COPC due to lack of TRV
105-67-9	2,4-Dimethylphenol	210		440		ug/kg	NA	0/6	420 - 880	29	15.17	Yes	COPC due to 1/2 RL > TRV
51-28-5	2,4-Dinitrophenol	210		2200		ug/kg	NA	0/6	420 - 4400	NA	NA	Yes	Only COPC due to lack of TRV
121-14-2	2,4-Dinitrotoluene	210		440		ug/kg	NA	0/6	420 - 880	NA	NA	Yes	Only COPC due to lack of TRV
606-20-2	2,6-Dinirtoluene	210		440		ug/kg	NA	0/6	420 - 880	NA	NA	Yes	Only COPC due to lack of TRV
91-58-7	2-Chloronaphthalene	210		440		ug/kg	NA	0/6	420 - 880	NA	NA	Yes	Only COPC due to lack of TRV
95-57-8	2-Chlorphenol	210		440		ug/kg	NA	0/6	420 - 880	NA	NA	Yes	Only COPC due to lack of TRV
91-57-6	2-Methylnaphthalene	210		440		ug/kg	NA	0/6	420 - 880	70	6.29	Yes	COPC due to 1/2 RL > TRV
95-48-7	2-Methylphenol (o-Cresol)	210		440		ug/kg	NA	0/6	420 - 880	63	6.98	Yes	
88-74-4	2-Nitroaniline	210		2200		ug/kg	NA	0/6	420 - 4400	NA	NA	Yes	Only COPC due to lack of TRV
88-75-5	2-Nitrophenol	210		440		ug/kg	NA	0/6	420 - 880	NA	NA	Yes	Only COPC due to lack of TRV
91-94-1	3,3-Dichlorobenzidine	300		440		ug/kg	NA	0/4	600 - 880	NA	NA	Yes	Only COPC due to lack of TRV
99-09-2	3-Nitroaniline	210		2200		ug/kg	NA	0/6	420 - 4400	NA	NA	Yes	Only COPC due to lack of TRV
534-52-1	4,6-Dinitro-2-methylphenol	210		2200		ug/kg	NA	0/6	420 - 4400	NA	NA	Yes	Only COPC due to lack of TRV
101-55-3	4-Bromophenyl phenyl ether	210		440		ug/kg	NA	0/6	420 - 880	NA	NA	Yes	Only COPC due to lack of TRV
59-50-7	4-Chloro-3-methylphenol	210		900		ug/kg	NA	0/6	420 - 1800	NA	NA	Yes	Only COPC due to lack of TRV
106-47-8	4-Chloroaniline	210		900		ug/kg	NA	0/6	420 - 1800	NA	NA	Yes	Only COPC due to lack of TRV
7005-72-3	4-Chlorphenyl phenyl ether	210		440		ug/kg	NA	0/6	420 - 880	NA	NA	Yes	Only COPC due to lack of TRV
106-44-5	4-Methylphenol (p-Cresol)	210		440		ug/kg	NA	0/6	420 - 880	670	0.66	No	
100-01-6	4-Nitroaniline	210		2200		ug/kg	NA	0/6	420 - 4400	NA	NA	Yes	Only COPC due to lack of TRV
100-02-7	4-Nitrophenol	210		2200		ug/kg	NA	0/6	420 - 4400	NA	NA	Yes	Only COPC due to lack of TRV
83-32-9	Acenaphthene	210		440		ug/kg	NA	0/6	420 - 880	16	27.50	Yes	COPC due to 1/2 RL > TRV
208-96-8	Acenaphthylene	300		440		ug/kg	NA	0/4	600 - 880	44	10.00	Yes	COPC due to 1/2 RL > TRV
107-02-8	Acrolein	150		2400		ug/kg	NA	0/4	300 - 4800	NA	NA	Yes	Only COPC due to lack of TRV
107-13-1	Acrylonitrile	150		2400		ug/kg	NA	0/4	300 - 4800	NA	NA	Yes	Only COPC due to lack of TRV
120-12-7	Anthracene	210		440		ug/kg	NA	0/6	420 - 880	85.3	5.16	Yes	COPC due to 1/2 RL > TRV
56-55-3	Benzo(a)anthracene	1500		1500		ug/kg	EP1	1/6	420 - 880	261	5.75	Yes	
50-32-8	Benzo(a)pyrene	1700		1700		ug/kg	EP1	1/6	420 - 880	430	3.95	Yes	
205-99-2	Benzo(b)fluoranthene	1600		1600		ug/kg	EP1	1/6	420 - 880	3200	0.50	No	
191-24-2	Benzo(g,h,i)perylene	1300		1300		ug/kg	EP1	1/6	420 - 880	670	1.94	Yes	
207-08-9	Benzo(k)fluoranthene	1500		1500		ug/kg	EP1	1/6	420 - 880	240	6.25	Yes	
108-60-1	Bis (2-chloroisopropyl) ether	210		440		ug/kg	NA	0/6	420 - 880	NA	NA	Yes	Only COPC due to lack of TRV

TABLE 8 MARTIN STATE AIRPORT - SEDIMENT COPC

CAS Number	Chemical	Minimum Concentration	Minimum Qualifier	Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Screening Toxicity Value	SVR	COPC Flag	Additional Considerations
111-44-4	Bis(2-chlorethyl)ether	210		440		ug/kg	INORGANICS	0/6	420 - 880	NA	NA	Yes	Only COPC due to lack of TRV
111-91-1	Bis(2-chloroethoxy)methane	210		440		ug/kg	NA	0/6	420 - 880	NA	NA	Yes	Only COPC due to lack of TRV
117-81-7	Bis(2-ethylhexyl)phthalate	5000		5000		ug/kg	EPT	1/6	420 - 880	1300	3.85	Yes	
85-68-7	Butyl benzyl phthalate	210		440		ug/kg	NA	0/6	420 - 880	63	6.98	Yes	COPC due to 1/2 RL > TRV
86-74-8	Carbazole	210		440		ug/kg	NA	0/6	420 - 880	NA	NA	Yes	Only COPC due to lack of TRV
218-01-9	Chrysene	1700		1700		ug/kg	EPT	1/6	420 - 880	384	4.43	Yes	
53-70-3	Dibenzo(a,h)anthracene	300		440		ug/kg	NA	0/4	600 - 880	63.4	6.94	Yes	COPC due to 1/2 RL > TRV
132-64-9	Dibenzofuran	210		440		ug/kg	NA	0/6	420 - 880	540	0.81	No	
84-66-2	Diethyl phthalate	210		440		ug/kg	NA	0/6	420 - 880	200	2.20	Yes	COPC due to 1/2 RL > TRV
131-11-3	Dimethyl phthalate	210		440		ug/kg	NA	0/6	420 - 880	71	6.20	Yes	COPC due to 1/2 RL > TRV
84-74-2	Di-n-butyl-phthalate	210		440		ug/kg	NA	0/6	420 - 880	1400	0.31	No	
117-84-0	Di-n-octyl phthalate	210		440		ug/kg	NA	0/6	420 - 880	6200	0.07	No	
206-44-0	Fluoranthene	2900		2900		ug/kg	EPT	1/6	420 - 880	600	4.83	Yes	
86-73-7	Fluorene	210		440		ug/kg	NA	0/6	420 - 880	19	23.16	Yes	COPC due to 1/2 RL > TRV
118-74-1	Hexachlorobenzene	210		440		ug/kg	NA	0/6	420 - 880	22	20.00	Yes	COPC due to 1/2 RL > TRV
87-68-3	Hexachlorobutadiene	7.5		440		ug/kg	NA	0/10	15 - 880	11	40.00	Yes	COPC due to 1/2 RL > TRV
77-47-4	Hexachlorocyclopentadiene	210		440		ug/kg	NA	0/6	420 - 880	NA	NA	Yes	Only COPC due to lack of TRV
67-72-1	Hexachloroethane	210		440		ug/kg	NA	0/6	420 - 880	NA	NA	Yes	Only COPC due to lack of TRV
193-39-5	Indeno(1,2,3-cd)pyrene	1400		1400		ug/kg	EPT	1/4	600 - 880	600	2.33	Yes	
78-59-1	Isophrone	210		440		ug/kg	NA	0/6	420 - 880	NA	NA	Yes	Only COPC due to lack of TRV
91-20-3	Napthalene	340	J	3600	J	ug/kg	EPT	3/12	6 - 880	160	22.50	Yes	
98-95-3	Nitrobenzene	210		440		ug/kg	NA	0/6	420 - 880	NA	NA	Yes	Only COPC due to lack of TRV
621-64-7	n-Nitroso-di-n-propylamine	210		440		ug/kg	NA	0/6	420 - 880	NA	NA	Yes	Only COPC due to lack of TRV
86-30-6	n-Nitrosodiphenylamine	210		440		ug/kg	NA	0/6	420 - 880	28	15.71	Yes	COPC due to 1/2 RL > TRV
87-86-5	Pentachlorophenol	210		2200		ug/kg	NA	0/6	420 - 4400	360	6.11	Yes	COPC due to 1/2 RL > TRV
85-01-8	Phenanthrene	1800		1800		ug/kg	EPT	1/6	420 - 880	240	7.50	Yes	
108-95-2	Phenol	210		440		ug/kg	NA	0/6	420 - 880	420	1.05	Yes	COPC due to 1/2 RL > TRV
129-00-0	Pyrene	2900		2900		ug/kg	EPT	1/6	420 - 880	665	4.36	Yes	
							PESTICIDES						
319-84-6	alpha-BHC	0.045		0.065		ug/kg	NA	0/4	0.09 - 0.13	6	0.01	No	
319-85-7	beta-BHC	0.045		0.065		ug/kg	NA	0/4	0.09 - 0.13	5	0.01	No	
315-86-8	delta-BHC	0.045		0.065		ug/kg	NA	0/4	0.09 - 0.13	5	0.01	No	
58-89-9	gamma-BHC (Lindane)	0.045		0.065		ug/kg	NA	0/4	0.09 - 0.13	0.94	0.07	No	
76-44-8	Heptachlor	0.045		0.065		ug/kg	NA	0/4	0.09 - 0.13	0.6	0.11	No	
309-00-2	Aldrin	0.045		0.065		ug/kg	NA	0/4	0.09 - 0.13	9.5	0.01	No	
1024-57-3	Heptachlor epoxide	0.045		0.065		ug/kg	NA	0/4	0.09 - 0.13	0.6	0.11	No	
959-98-8	Endosulfan I	0.09		0.13		ug/kg	NA	0/4	0.18 - 0.26	NA	NA	Yes	Only COPC due to lack of TRV
60-57-1	Dieldrin	0.09		0.13		ug/kg	NA	0/4	0.18 - 0.26	2.85	0.05	No	
72-55-9	4,4'-DDE	0.09		0.13		ug/kg	NA	0/4	0.18 - 0.26	2.2	0.06	No	
72-20-8	Endrin	0.09		0.13		ug/kg	NA	0/4	0.18 - 0.26	2.67	0.05	No	
33213-65-9	Endosulfan II	0.27		0.39		ug/kg	NA	0/4	0.54 - 0.78	NA	NA	Yes	Only COPC due to lack of TRV
72-54-8	4,4'-DDD	0.27		0.39		ug/kg	NA	0/4	0.54 - 0.78	16	0.02	No	
1031-07-8	Endosulfan Sulfate	0.27		0.39		ug/kg	NA	0/4	0.54 - 0.78	NA	NA	Yes	Only COPC due to lack of TRV
50-29-3	4,4'-DDT	0.27		0.39		ug/kg	NA	0/4	0.54 - 0.78	1.58	0.25	No	
72-43-5	Methoxychlor	0.45		0.65		ug/kg	NA	0/4	0.9 - 1.3	NA	NA	Yes	Only COPC due to lack of TRV
5103-71-9	alpha-Chlordane	0.09		0.13		ug/kg	NA	0/4	0.18 - 0.26	4.5	0.03	No	
5103-74-2	gamma-Chlordane	0.09		0.13		ug/kg	NA	0/4	0.18 - 0.26	4.5	0.03	No	
8001-35-2	Toxaphene	2.7		3.9		ug/kg	NA	0/4	5.4 - 7.8	NA	NA	Yes	Only COPC due to lack of TRV
53494-70-5	Endrin Ketone	0.27		0.39		ug/kg	NA	0/4	0.54 - 0.78	2.67	0.15	No	

TABLE 8 MARTIN STATE AIRPORT - SEDIMENT COPC

CAS Number	Chemical	Minimum Concentration	Minimum Qualifier	Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Screening Toxicity Value	SVR	COPC Flag	Additional Considerations
7421-93-4	Endrin aldehyde	0.27		0.39		ug/kg	INORGANICS	0/4	0.54 - 0.78	2.67	0.15	No	
							VOCs						
630-20-6	1,1,1,2-Tetrachloroethane	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
71-55-6	1,1,1-Trichloroethane	3		120		ug/kg	NA	0/6	6 - 240	31	3.87	Yes	COPC due to 1/2 RL > TRV
79-34-5	1,1,2,2-Tetrachloroethane	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
79-00-5	1,1,2-Trichloroethane	3		120		ug/kg	NA	0/6	6 - 240	31	3.87	Yes	COPC due to 1/2 RL > TRV
75-34-3	1,1-Dichloroethane	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
75-35-4	1,1-Dichloroethene	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
563-58-6	1,1-Dichloropropene	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
87-61-6	1,2,3-Trichlorobenzene	3		120		ug/kg	NA	0/6	6 - 240	40	3.00	Yes	COPC due to 1/2 RL > TRV
96-18-4	1,2,3-Trichloropropane	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
120-82-1	1,2,4-Trichlorobenzene	3		120		ug/kg	NA	0/6	6 - 240	40	3.00	Yes	COPC due to 1/2 RL > TRV
95-63-6	1,2,4-Trimethylbenzene	91	J	14000	J	ug/kg	EP1	2/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
96-12-8	1,2-Dibromo-3-Chloropropane	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
106-93-4	1,2-Dibromoethane	7.5		120		ug/kg	NA	0/4	15 - 240	NA	NA	Yes	Only COPC due to lack of TRV
95-50-1	1,2-Dichlorobenzene	3		440		ug/kg	NA	0/10	6 - 440	35	12.57	Yes	COPC due to 1/2 RL > TRV
107-06-2	1,2-Dichloroethane	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
78-87-5	1,2-Dichloropropane	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
108-67-8	1,3,5-Trimethylbenzene	27	J	5200	J	ug/kg	EP1	2/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
541-73-1	1,3-Dichlorobenzene	3		440		ug/kg	NA	0/10	6 - 880	NA	NA	Yes	Only COPC due to lack of TRV
142-28-9	1,3-Dichloropropane	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
106-46-7	1,4-Dichlorobenzene	3		440		ug/kg	NA	0/10	6 - 880	110	4.00	Yes	COPC due to 1/2 RL > TRV
594-20-7	2,2-Dichloropropane	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
78-93-3	2-Butanone (MEK)	31.5		2400		ug/kg	NA	0/6	73 - 4800	NA	NA	Yes	Only COPC due to lack of TRV
95-49-8	2-Chlorotoluene	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
591-78-6	2-Hexanone (MBK)	31.5		1200		ug/kg	NA	0/6	73 - 2400	NA	NA	Yes	Only COPC due to lack of TRV
106-43-4	4-Chlorotoluene	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
108-10-1	4-Methyl-2-Pentanone	31.5		1200		ug/kg	NA	0/6	73 - 2400	NA	NA	Yes	Only COPC due to lack of TRV
67-64-1	Acetone	7	J	510	J	ug/kg	EP1	3/6	63 - 4800	NA	NA	Yes	Only COPC due to lack of TRV
71-43-2	Benzene	44	J	44	J	ug/kg	EP-1	1/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
108-86-2	Bromobenzene	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
74-97-5	Bromochloromethane	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
75-27-4	Bromodichloromethane	7.5		120		ug/kg	NA	0/4	15 - 240	NA	NA	Yes	Only COPC due to lack of TRV
75-25-2	Bromoform	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
74-83-9	Bromomethane	3		240		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
156-59-2	c-1,2-Dichloroethene	6		34000	J	ug/kg	EP1	3/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
10061-01-5	c-1,3-Dichloropropene	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
75-15-0	Carbon Disulfide	23	J	65	J	ug/kg	EP1	2/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
56-23-5	Carbon Tetrachloride	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
108-90-7	Chlorobenzene	16	J	1300	J	ug/kg	EP1	3/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
75-00-3	Chloroethane	3		240		ug/kg	NA	0/6	6 - 480	NA	NA	Yes	Only COPC due to lack of TRV
67-66-3	Chloroform	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
74-87-3	Chloromethane	3		240		ug/kg	NA	0/6	6 - 480	NA	NA	Yes	Only COPC due to lack of TRV
124-48-1	Dibromochloromethane	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
74-95-3	Dibromomethane	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
75-71-8	Dichlorodifluoromethane	3		240		ug/kg	NA	0/6	6 - 480	NA	NA	Yes	Only COPC due to lack of TRV
100-41-4	Ethylbenzene	20	J	15000	J	ug/kg	EP1	2/6	6 - 240	10	1500.00	Yes	
98-82-8	Isopropylbenzene (Cumene)	220	J	870	J	ug/kg	EP1	2/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
75-09-2	Methylene Chloride	38		40		ug/kg	FMC-2	2/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV

TABLE 8 MARTIN STATE AIRPORT - SEDIMENT COPC

CAS Number	Chemical	Minimum Concentration	Minimum Qualifier	Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Screening Toxicity Value	SVR	COPC Flag	Additional Considerations
1634-04-4	Methyl-t-Butyl Ether (MTBE)	3		240		ug/kg	INORGANICS	0/6	6 - 480	NA	NA	Yes	Only COPC due to lack of TRV
104-51-8	n-Butylbenzene	1600	J	1600	J	ug/kg	EP1	1/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
103-65-1	n-Propylbenzene	320	J	1700	J	ug/kg	EP1	2/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
99-87-6	p-Isopropyltoluene	1600	J	1600	J	ug/kg	EP1	1/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
135-98-8	sec-Butylbenzene	130	J	940	J	ug/kg	EP1	2/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
1001-42-5	Styrene	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
156-60-5	t-1,2-Dichloroethene	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
10061-02-6	t-1,3-Dichloropropene	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
98-26-6	tert-Butylbenzene	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
127-18-4	Tetrachloroethene	3300	J	3300	J	ug/kg	EP1	1/6	6 - 240	57	57.89	Yes	
108-88-3	Toluene	29	J	350000	J	ug/kg	EP1	3/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
1330-20-7	Total Xylenes	310	J	46000	J	ug/kg	EP1	2/4	30 - 480	40	1150.00	Yes	
79-01-6	Trichloroethene	320		69000	J	ug/kg	EP1	2/6	6 - 240	41	1682.93	Yes	
75-69-4	Trichlorofluoromethane	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
108-05-4	Vinyl Acetate	3		120		ug/kg	NA	0/6	6 - 240	NA	NA	Yes	Only COPC due to lack of TRV
75-01-4	Vinyl Chloride	9		900	J	ug/kg	EP1	2/6	6 - 480	NA	NA	Yes	Only COPC due to lack of TRV

N/A = Not Available
COPC = Chemical of Potential Concern
SVR = Screening Value Ratio (maximum detected concentration/screening toxicity value)
J = Indicates an estimated value

TABLE MSA-9 SUMMARY OF ECOLOGICAL COPC IDENTIFIED IN STEP 1 SCREEN

Chemical	IDENTIFIED COPC		
	Surface Soil	Sediment	Surface Water
Inorganics			
Total Antimony	X		
Total Arsenic			
Total Beryllium	X	X	
Total Cadmium	X	X	X
Total Chromium	X	X	
Total Copper	X	X	X
Total Hexavalent Chromium	X	NM	NM
Total Lead	X	X	X
Total Mercury	X	X	
Total Nickel	X	X	
Total Selenium	X	X	
Total Silver	X	X	X
Total Thallium	X	X	
Total Zinc	X	X	
Dissolved Antimony	NA	NA	
Dissolved Arsenic	NA	NA	
Dissolved Beryllium	NA	NA	
Dissolved Cadmium	NA	NA	X
Dissolved Chromium	NA	NA	
Dissolved Copper	NA	NA	X
Dissolved Hexavalent Chromium	NA	NA	
Dissolved Lead	NA	NA	X
Dissolved Mercury	NA	NA	
Dissolved Nickel	NA	NA	
Dissolved Selenium	NA	NA	
Dissolved Silver	NA	NA	X
Dissolved Thallium	NA	NA	
Dissolved Zinc	NA	NA	X
Pesticides/PCBs			
4,4'-DDD			NM
4,4'-DDE			NM
4,4'-DDT			NM
Aldrin			NM
alpha-BHC			NM
alpha-Chlordane			NM
beta-BHC			NM
delta-BHC			NM
Dieldrin			NM
Endosulfan I	X	X	NM
Endosulfan II	X	X	NM
Endosulfan sulfate	X	X	NM
Endrin			NM
Endrin Aldehyde			NM
Endrin Ketone			NM
gamma-BHC (Lindane)			NM
gamma-Chlordane			NM
Heptachlor			NM
Heptachlor epoxide			NM
Methoxychlor		X	NM
Toxaphene	X	X	NM
Semivolatile organics			
1,1-Biphenyl	NM	NM	
2,4,5-Trichlorophenol	X	X	
2,4,6-Trichlorophenol	X	X	
2,4-Dichlorophenol	X	X	
2,4-Dimethylphenol	X	X	
2,4-Dinitrophenol	X	X	
2,4-Dinitrotoluene	X	X	NM
2,6-Dinitrotoluene	X	X	X
2-Chloronaphthalene	X	X	
2-Chlorphenol	X	X	
2-Chloroethyvinyl ether	X	NM	

Chemical	IDENTIFIED COPC		
	Surface Soil	Sediment	Surface Water
2-Methylnaphthalene	X	X	X
2-Methylphenol	X	X	
2-Nitroaniline	X	X	X
2-Nitrophenol		X	
3,3-Dichlorobenzidine	X	X	X
3,4-Methylphenol	NM	NM	X
3-Nitroaniline	X	X	X
4,6-Dinitro-2-methylphenol	X	X	X
4-Bromophenyl phenyl ether	X	X	X
4-Chloro-3-methylphenol	X	X	X
4-Chloroaniline		X	
4-Chlorphenyl phenyl ether	X	X	X
4-Methylphenol	X		NM
4-Nitroaniline	X	X	X
4-Nitrophenol	X	X	
Acenaphthene	X	X	
Acenaphthylene	X	X	
Acetophenone	NM	NM	X
Acrolein	X	X	NM
Acrylonitrile	X	X	NM
Anthracene	X	X	X
Atrazine	NM	NM	X
Benzo(a)anthracene	X	X	
Benzo(a)pyrene	X	X	X
Benzo(b)fluoranthene	X		X
Benzo(g,h,i)perylene	X	X	X
Benzo(k)fluoranthene	X	X	X
Bis(2-chloroethoxy)methane	X	X	X
Bis(2-chloroisopropyl)ether	X	X	
Bis(2-chloroethyl)ether	X	X	
Bis(2-ethylhexyl)phthalate	X	X	
Butyl benzyl phthalate	X	X	X
Caprolactam	NM	NM	X
Carbazole	X	X	X
Chrysene	X	X	X
Dibenz(a,h)anthracene	X	X	X
Dibenzofuran	X		
Diethyl phthalate		X	X
Dimethyl phthalate		X	X
Di-n-butyl-phthalate			X
Di-n-octyl phthalate	X		X
Fluoranthene	X	X	
Fluorene	X	X	
Hexachlorobenzene		X	X
Hexachlorobutadiene	X	X	
Hexachlorocyclopentadiene		X	
Hexachloroethane	X	X	
Indeno(1,2,3-cd)pyrene	X	X	X
Isophrone	X	X	
Napthalene	X	X	
Nitrobenzene		X	
n-Nitrosodiphenylamine		X	
n-Nitroso-di-n-propylamine	X	X	X
Pentachlorophenol	X	X	
Phenanthrene	X	X	
Phenol	X	X	
Pyrene	X	X	X
Volatile Organics			
1,1,1,2-Tetrachloroethane		X	
1,1,1-Trichloroethane		X	
1,1,2,2-Tetrachloroethane		X	
1,1,2-Trichloroethane		X	
1,1-Dichloroethane		X	
1,1-Dichloroethene	X	X	
1,1-Dichloropropene	X	X	

Chemical	IDENTIFIED COPC		
	Surface Soil	Sediment	Surface Water
1,2,3-Trichlorobenzene		X	
1,2,3-Trichloropropane	X	X	X
1,2,4-Trichlorobenzene	X	X	
1,2,4-Trimethylbenzene	X	X	X
1,2-Dibromo-3-chloropropane	X	X	X
1,2-Dibromomethane		X	
1,2-Dichlorobenzene	X	X	
1,2-Dichloroethane		X	
1,2-Dichloropropane		X	
1,3,5-Trimethylbenzene	X	X	X
1,3-Dichlorobenzene	X	X	
1,3-Dichlorpropane	X	X	X
1,4-Dichlorobenzene	X	X	
2,2-Dichloropropane	X	X	
2-Chlorotoluene	X	X	X
2-Butanone	X	X	
2-Hexanone	X	X	
4-Chlorotoluene	X	X	X
4-Methyl-2-pentanone		X	
Acetone	X	X	
Benzene		X	
Bromobenzene	X	X	X
Bromochloromethane		X	
Bromodichloromethane		X	NM
Bromoform(Tribromomethane)		X	
Bromomethane (methyl bromide)	X	X	
Caron disulfide	X	X	
Carbon tetrachloride		X	
Chlorobenzene		X	
Chloroethane	X	X	X
Chloroform		X	
Chloromethane (methyl chloride)	X	X	
cis-1,2-Dichloroethene	X	X	
cis-1,3-Dichloropropene		X	
Cumeme (Isopropylbenzene)	X	X	X
Dibromochloromethane	X	X	
Dibromomethane	X	X	
Dichlorodifluoromethane	X	X	
Ethylbenzene		X	
Methylene Chloride		X	
Methyl-tert-butyl ether (MTBE)	X	X	X
m&p xylenes	NM	NM	X
n-Butylbenzene	X	X	X
n-Propylbenzene	X	X	X
p-Isopropyltoluene (cymene)	X	X	X
o xylenes	NM	NM	X
Sec-butybenzene	X	X	X
Styrene		X	X
Tetrachloroethene		X	
tert-Butylbenzene	X	X	X
Toluene		X	
trans-1,2-Dichloroethene		X	
trans-1,3-Dichloropropene		X	
Trichloroethene	X	X	
Trichlorofluoromethane	X	X	
Vinyl acetate	X	X	X
Vinyl chloride		X	
Xylene, total		X	

X - COPC

x - only COPC because 1/2 the reporting unit is > screening value (SV) or no SV exists.

NM - Not Measured

NA - Not Applicable

TABLE 10 BIOACCUMULATION FACTORS FOR THE STEP 2 TERRESTRIAL FOOD WEB

COPC	Invertebrate Bioaccumulation Factors (dw)	Plant Bioconcentration Factors (dw)	Small Mammal Bioaccumulation Factors (dw)		
			Omnivores	Herbivores	Insectivores
Cadmium	40.7	3.250	0.462	0.448	7.017
Chromium	3.16	0.084	0.349	0.309	0.333
Copper	1.53	0.625	0.554	1.290	1.117
Lead	1.52	0.468	0.286	0.187	0.339
Mercury	20.6	5.000	0.130	0.192	0.192
Nickel	4.73	1.411	0.589	0.898	0.578
Selenium	1.34	3.012	1.263	1.187	1.187
Silver	15.3	0.037	0.810	0.007	0.501
Zinc	12.9	1.820	2.782	2.317	2.901
Endosulfan I	6	0.3436	1	1	1
Endosulfan II	6	0.3131	1	1	1
Toxaphene	6	0.1217	1	1	1
4-Bromophenyl phenyl ether	1	0.0578	1	1	1
4-Chlorphenyl phenyl ether	1	0.1697	1	1	1
Acenaphthene	0.3	0.2564	1	1	1
Acenaphthylene	0.22	0.1653	1	1	1
Anthracene	0.32	0.1051	1	1	1
Benzo(a)anthracene	0.48	0.0222	1	1	1
Benzo(a)pyrene	1.09	0.0135	1	1	1
Benzo(b)fluoranthene	1.35	0.0174	1	1	1
Benzo(g,h,I)perylene	0.45	0.0061	1	1	1
Benzo(k)fluoranthene	1.21	0.0112	1	1	1
Chrysene	0.73	0.0289	1	1	1
Dibenz(a,h)anthracene	0.75	0.0068	1	1	1
Fluoranthene	0.37	0.0617	1	1	1
Fluorene	0.20	0.1790	1	1	1
Hexachlorobenzene	1.69	0.0367	1	1	1
Hexachlorobutadiene	1	0.0705	1	1	1
Hexachlorocylcopentadiene	1	0.0467	1	1	1
Hexachloroethane	1	0.2399	1	1	1
Indeno(1,2,3-cd)pyrene	0.93	0.0061	1	1	1
Pentachlorophenol	8	0.0492	1	1	1
Phenanthrene	0.33	0.1154	1	1	1
Pyrene	1.1	0.0687	1	1	1
1,2,4-Trichlorobenzene	0.56	0.2186	1	1	1
1,2-Dichlorobenzene	1	0.5475	1	1	1
1,3-Dichlorobenzene	1	0.3673	1	1	1
1,4-Dichlorobenzene	1	0.5055	1	1	1

Note: When no BAF data were available, default value = 1.0.

TABLE 11 BIOACCUMULATION FACTORS FOR THE STEP 2 AQUATIC FOOD WEB

COPC	Aquatic Invertebrate Bioaccumulation Factors (dw)	Plant Bioconcentration Factors (dw)	Fish Bioconcentration Factors from Surface Water (dw)	Fish Bioaccumulation Factors from Sediment (dw)
Total Cadmium	3.07	3.25	3628	0.16
Dissolved Cadmium	3.07	3.25	3628	0.16
Total Chromium	0.19	0.084	76	0.04
Total Copper	7.96	0.625	2840	0.10
Dissolved Copper	7.96	0.625	2840	0.10
Total Lead	0.33	0.468	640	0.07
Dissolved Lead	0.33	0.468	640	0.07
Total Mercury	2.87	5	44672	4.58
Total Nickel	0.21	1.411	312	1
Total Selenium	1	3.012	516	1
Total Silver	0.18	0.037	112	1
Dissolved Silver	0.18	0.037	112	1
Total Zinc	4.76	1.820	2556	1
Dissolved Zinc	4.76	1.820	2556	1
Endosulfan I	1	0.3436	1960	11.3
Endosulfan II	1	0.3131	10469	11.3
Methoxychlor	1	0.1447	59803	11.3
Toxaphene	1	0.1217	220814	11.3
4-Bromophenyl phenyl ether	1	0.0578	45145	1
4-Chlorophenyl phenyl ether	1	0.1697	41226	1
Acenaphthene	2.04	0.2564	1875	1
Acenapthylene	2.04	0.1653	3629	1
Anthracene	0.27	0.1051	3900	1
Benzo(a)anthracene	1.40	0.0222	15924	1
Benzo(b)fluoranthene	0.16	0.0174	24128	1
Benzo(g,h,i)perylene	0.30	0.0061	28446	1
Benzo(k)fluoranthene	0.42	0.0112	24128	1
Chrysene	0.34	0.0289	15924	1
Dibenz(a,h)anthracene	0.27	0.0068	28446	1
Fluoranthene	0.31	0.0617	5537	1
Fluorene	1.13	0.1790	9936	1
Hexachlorobenzene	0.86	0.0367	9833	0.94
Hexachlorobutadiene	0.61	0.0705	7680	0.38
Hexachlorocyclopentadiene	1	0.0467	3631	1
Hexachloroethane	1	0.2399	702	1
Indeno(1,2,3-cd)pyrene	0.36	0.0061	28446	1
Pentachlorophenol	1	0.0492	1588	1
Phenanthrene	0.65	0.1154	39780	1
Pyrene	0.80	0.0687	7286	1
1,1,1,2-Tetrachloroethane	1	1.1691	194	1
1,1,2,2-Tetrachloroethane	1	1.7899	32	1
1,2,4-Trichlorobenzene	0.48	0.2186	902	0.07
1,2-Dichlorobenzene	1	0.5475	380	0.09
1,3-Dichlorobenzene	1	0.3673	286	0.09
1,4-Dichlorobenzene	1	0.5044	256	0.09

TABLE 12 STEP 2 EXPOSURE FACTORS FOR MARTIN STATE AIRPORT TERRESTRIAL AND AQUATIC ECOLOGICAL RECEPTORS OF CONCERN

Exposure Factor	Receptor						
	American Robin	Morning Dove	Red-Tailed Hawk	Meadow Vole	Short-Tailed Shrew	White-Footed Mouse	Red Fox
Body Weight (kg)	0.0635 (USEPA 1993)	0.1050 (Tomlinson et al. 1994)	0.9570 (USEPA 1993)	.0300 (Silva and Downing 1995)	0.0133 (USEPA 1993)	0.0141 (Silva and Downing 1995)	3.17 (Silva and Downing 1995)
Food Ingestion Rate (kg/day - dry)	0.0074 (Levey and Karasov 1989)	0.0179 (allometric equation)	0.0395 (Sample and Suter 1994)	0.0031 (USEPA 1993)	0.0019 (USEPA 1993)	0.0007 (Sample and Suter 1994)	0.1476 (Sample and Suter 1994)
Water Ingestion Rate (L/day)	0.0129 (allometric equation)	0.0175 (allometric equation)	0.0680 (allometric equation)	0.0133 (USEPA 1993)	0.0048 (USEPA 1993)	0.0092 (Sample and Suter 1994)	0.4115 (allometric equation)
Soil Ingestion Rate (kg/day - dry)	0.0127 (allometric equation)	0.021 (allometric equation)	0 (allometric equation)	0.000252 (allometric equation)	0.00082 (allometric equation)	0.0001184 (allometric equation)	0.0124 (allometric equation)

TABLE MSA-12. CONTINUED.

Exposure Factor	Receptor			
	Raccoon	**Mallard Duck**	**Belted Kingfisher**	**Great Blue Heron**
Body Weight (kg)	4.23 (Silva and Downing 1995)	0.612 (Bellrose 1980)	0.125 (Dunning 1993)	2.1000 (Butler 1992)
Food Ingestion Rate (kg/day - dry)	0.1268 (Conover 1989)	0.0830 (allometric equation)	0.0245 (EPA 1993a)	0.4389 (allometric equation)
Water Ingestion Rate (L/day)	0.6092 (allometric equation)	0.0850 (allometric equation)	0.0211 (allometric equation)	0.1090 (allometric equation)
Sediment Ingestion Rate (kg/day – dry)	0.0204 (allometric equation)	0.0007038 (allometric equation)	0.000 (allometric equation)	0.000 (allometric equation)

TABLE 13 LIST OF NOAEL TOXICITY REFERENCE VALUES (TRVs)
FOR USE IN FOOD-WEB MODELING
(using Estimated Wildlife NOAEL (mg/kg-bw/day))

COPC	Dove	American Robin	Red-Tailed Hawk	Vole	Shrew	White-Footed Mouse	Red Fox	Raccoon	Mallard	Kingfisher	Great Blue Heron
INORGANICS											
Cadmium	1.45	1.45	1.45	1.63	2.06	1.95	0.94	0.85	1.45	1.45	1.45
Chromium	1	1	1	5.55	7	6.64	1.78	NA	NA	NA	NA
Copper	47	47	47	71.4	90.1	85.5	8.24	7.49	47	47	47
Lead	1.13	3.85	3.85	13.5	17.1	16.2	4.33	3.94	1.13	3.85	3.85
Mercury	0.45	0.45	0.49	12.1	15.2	14.5	0.7	0.64	0.026	0.026	0.026
Nickel	77.4	77.4	77.4	67.6	85.4	81	31.3	28.5	77.4	77.4	77.4
Selenium	0.44	0.44	0.44	0.34	0.43	0.41	0.11	0.1	0.44	1.8	1.8
Silver	7	7	7	15.3	19.3	18.3	4.91	4.46	35.6	35.6	35.6
Zinc	14.5	14.5	14.5	271	341	324	14.7	13.3	14.5	14.5	14.5
PESTICIDES											
Endosulfan I	10	10	10	2.54	3.2	3.04	1.25	1.14	10	10	10
Endosulfan II	10	10	10	2.54	3.2	3.04	1.25	1.14	10	10	10
Methoxychlor	NA	NA	NA	NA	NA	NA	NA	1.97	355	355	355
Toxaphene	1	1	1	13.5	17.1	16.2	4.33	3.94	1	1	1
SEMIVOLATILES											
4-Bromophenyl-phenylether	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl-phenylether	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	7.1	7.1	7.1	320	404	384	103	93.3	7.1	7.1	7.1
Acenaphthylene	7.1	7.1	7.1	320	404	384	103	NA	NA	NA	NA
Anthracene	7.1	7.1	7.1	915	1155	1096	293	267	7.1	7.1	7.1
Benzo(a)anthracene	7.1	7.1	7.1	1.83	2.31	2.19	0.59	0.53	7.1	7.1	7.1
Benzo(a)pyrene	7.1	7.1	7.1	1.83	2.31	2.19	0.59	NA	NA	NA	NA
Benzo(b)fluoranthene	7.1	7.1	7.1	1.83	2.31	2.19	0.59	0.53	7.1	7.1	7.1
Benzo(g,h,I)perylene	7.1	7.1	7.1	1.83	2.31	2.19	0.59	0.53	7.1	7.1	7.1
Benzo(k)fluoranthene	7.1	7.1	7.1	1.83	2.31	2.19	0.59	0.53	7.1	7.1	7.1
Chrysene	7.1	7.1	7.1	1.83	2.31	2.19	0.59	0.53	7.1	7.1	7.1
Dibenzo(a,h)anthracene	7.1	7.1	7.1	1.83	2.31	2.19	0.59	0.53	7.1	7.1	7.1
Fluoranthene	7.1	7.1	7.1	457	577	548	147	133	7.1	7.1	7.1
Fluorene	7.1	7.1	7.1	457	577	548	147	133	7.1	7.1	7.1
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	1.37	0.11	0.11	0.11
Hexachlorobutadiene	3.39	3.39	3.39	3.38	4.27	4.05	1.08	0.99	3.39	3.39	3.39
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	20	--	--	--
Hexachloroethane	NA	--	NA	68.6	213	203	54.2	49.3	--	--	--
Indeno(1,2,3-cd)pyrene	7.1	7.1	7.1	1.83	2.31	2.19	0.59	0.53	7.1	7.1	7.1
Pentachlorophenol	4.26	4.26	4.26	8.46	10.7	10.1	2.71	2.46	4.26	4.26	4.26
Phenanthrene	7.1	7.1	7.1	457	577	548	147	NA	NA	NA	NA
Pyrene	7.1	7.1	7.1	1.83	2.31	2.19	0.59	0.53	7.1	7.1	7.1
VOLATILES											
1,1,1,2-Tetrachloroethane	--	--	--	--	--	--	NA	37.4	NA	NA	NA
1,1,2,2-Tetrachloroethane	--	--	--	--	--	--	NA	37.4	NA	NA	NA
1,2,4-Trichlorbenzene	32.2	32.2	32.2	89.6	113	107	28.7	26.1	32.2	32.2	32.2
1,2-Dichlorobenzene	32.2	32.2	32.2	145	183	174	46.4	123	32.2	32.2	32.2
1,3-Dichlorobenzene	32.2	32.2	32.2	145	183	174	46.4	42.2	32.2	32.2	32.2
1,4-Dichlorobenzene	32.2	32.2	32.2	423	534	506	135	42.2	32.2	32.2	32.2

NA = Not Applicable

TABLE 14 LIST OF LOAEL TOXICITY REFERENCE VALUES (TRVs) FOR USE IN FOOD-WEB MODELING

(using Estimated Wildlife LOAEL (mg/kg-bw/day))

COPC	Dove	American Robin	Red-Tailed Hawk	Vole	Shrew	White-Footed Mouse	Red Fox	Raccoon	Mallard	Kingfisher	Great Blue Heron
INORGANICS											
Cadmium	20	7.38	20	16.3	20.6	19.5	4.7	4.27	20	20	20
Chromium	5	5	5	27.7	35	33.2	8.89	NA	NA	NA	NA
Copper	61.7	61.7	61.7	95.2	120	114	10.7	9.7	61.7	61.7	61.7
Lead	11.3	19.3	11.3	135	171	162	43.3	39.4	11.3	19.3	19.3
Mercury	0.9	0.9	0.9	60.4	76.2	0.32	3.52	3.2	0.078	0.078	0.078
Nickel	107	107	107	135	171	162	78.3	71.2	107	107	107
Selenium	1.5	1.5	1.5	0.56	0.7	0.67	0.18	0.16	0.8	9	9
Silver	35	35	35	76.6	96.7	91.7	24.5	22.3	178	178	178
Zinc	131	131	131	541	683	648	73.3	66.6	131	131	131
PESTICIDES											
Endosulfan I	50	50	50	12.7	16	15.2	6.26	5.7	50	50	50
Endosulfan II	50	50	50	12.7	16	15.2	6.26	5.7	50	50	50
Methoxychlor	1775	1775	1775	13.5	17.1	16.2	4.33	3.94	1775	1775	1775
Toxaphene	5	5	5	67.6	85.4	81	21.7	19.7	5	5	5
SEMIVOLATILES											
4-Bromophenyl-phenylether	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl-phenylether	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	35.5	35.5	35.5	640	808	767	205	187	35.5	35.5	35.5
Acenaphthylene	35.5	35.5	35.5	640	808	767	205	NA	NA	NA	NA
Anthracene	35.5	35.5	35.5	4575	5774	5479	1466	1333	35.5	35.5	35.5
Benzo(a)anthracene	35.5	35.5	35.5	9.15	11.5	11	2.93	2.67	35.5	35.5	35.5
Benzo(a)pyrene	35.5	35.5	35.5	9.15	11.5	11	2.93	2.67	35.5	35.5	35.5
Benzo(b)fluoranthene	35.5	35.5	35.5	9.15	11.5	11	2.93	2.67	35.5	35.5	35.5
Benzo(g,h,I)perylene	35.5	35.5	35.5	9.15	11.5	11	2.93	2.67	35.5	35.5	35.5
Benzo(k)fluoranthene	35.5	35.5	35.5	9.15	11.5	11	2.93	2.67	35.5	35.5	35.5
Chrysene	35.5	35.5	35.5	9.15	11.5	11	2.93	2.67	35.5	35.5	35.5
Dibenzo(a,h)anthracene	35.5	35.5	35.5	9.15	11.5	11	2.93	2.67	35.5	35.5	35.5
Fluoranthene	35.5	35.5	35.5	9.15	11.5	2740	2.93	666	35.5	35.5	35.5
Fluorene	35.5	35.5	35.5	9.15	11.5	2740	2.93	666	35.5	35.5	35.5
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	13.7	0.57	0.57	0.57
Hexachlorobutadiene	17	17	17	33.8	42.7	40.5	10.8	9.85	17	17	17
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	100	--	--	--
Hexachloroethane	--	--	--	846	1067	1013	271	246	--	--	--
Indeno(1,2,3-cd)pyrene	35.5	35.5	35.5	9.15	11.5	11	2.93	2.67	35.5	35.5	35.5
Pentachlorophenol	8.52	8.52	8.52	42.3	53.4	50.6	13.5	12.3	8.52	8.52	8.52
Phenanthrene	35.5	35.5	35.5	2287	2887	2740	733	NA	NA	NA	NA
Pyrene	35.5	35.5	35.5	9.15	11.5	11	2.93	2.67	35.5	35.5	35.5
VOLATILES											
1,1,1,2-Tetrachloroethane	--	--	--	--	--	--	--	187	NA	NA	NA
1,1,2,2-Tetrachloroethane	--	--	--	--	--	--	--	187	NA	NA	NA
1,2,4-Trichlorbenzene	161	161	161	179	226	215	57.4	52.5	161	161	161
1,2-Dichlorobenzene	161	161	161	725	915	868	232	211	161	161	161
1,3-Dichlorobenzene	161	161	161	725	915	915	232	211	161	161	161
1,4-Dichlorobenzene	161	161	161	846	1067	1068	271	246	161	161	161

NA = Not Applicable

TABLE 15 STEP 2 ECOLOGICAL QUOTIENTS SOIL INVERTEBRATES FOR COPCs AT MARTIN STATE AIRPORT, MARYLAND

COPC	Surface Soil Maximum	Toxicity Reference Value	Ecological Quotient (EQ_{max})
Inorganics (mg/kg)			
Antimony	12.5	None	NA
Beryllium	2.7	None	NA
Cadmium	13	20	0.65
Chromium	480	0.4	**1200**
Copper	490	50	**10**
Hexavalent Chromium	5	None	NA
Lead	320	500	0.64
Mercury	0.72	0.1	7
Nickel	89	200	0.445
Selenium	5.7	70	0.1
Silver	2.1	None	NA
Thallium	25	None	NA
Zinc	600	200	**3**
Pesticides (ug/kg)			
Endosulfan I	0.08	None	NA
Endosulfan II	0.24	None	NA
Endosulfan sulfate	0.24	None	NA
Toxaphene	2.4	None	NA
Semivolatile organics (ug/kg)			
2,4,5-Trichlorophenol	270	9000	0.03
2,4,6-Trichlorophenol	270	10000	0.027
2,4-Dichlorophenol	270	None	NA
2,4-Dimethylphenol	270	None	NA
2,4-Dinitrophenol	1350	None	NA
2,4-Dinitrotoluene	270	None	NA
2,6-Dinitrotoluene	270	None	NA
2-Chloronaphthalene	270	None	NA
2-Chlorophenol	270	None	NA
2-Chloroethylvinyl ether	6.5	None	NA
2-Methylnaphthalene	270	None	NA
2-Methylphenol (o-Cresol)	270	None	NA
2-Nitroaniline	1350	None	NA
3,3'-Dichlorobenzidine	270	None	NA
3-Nitroaniline	1350	None	NA
4,6-Dinitro-2-methyphenol	1350	None	NA
4-Bromophenyl phenyl ether	270	None	NA
4-Chloro-3-methylphenol	550	None	NA
4-Chlorphenyl phenyl ether	270	None	NA
4-Methylphenol (p-Cresol)	270	None	NA
4-Nitroaniline	1350	None	NA
4-Nitrophenol	1350	7000	0.193
Acenaphthene	920	None	NA
Acenaphthylene	270	None	NA
Acrolein	130	None	NA
Acrylonitrile	130	None	NA
Anthracene	9100	None	NA
Benzo(a)anthracene	31000	None	NA
Benzo(a)pyrene	25000	None	NA
Benzo(b)fluoranthene	22000	None	NA
Benzo(g,h,i)perylene	13000	None	NA
Benzo(k)fluoranthene	20000	None	NA
bis(2-Chloroethoxy)methane	270	None	NA
bis(2-Chloroisopropyl)ether	270	None	NA
bis(2-Chloroethyl)ether	270	None	NA
Bis(2-ethylhexyl) phthalate	13000	None	NA
Benzyl butyl phthalate	270	None	NA

COPC	Surface Soil Maximum	Toxicity Reference Value	Ecological Quotient (EQ_{max})
Carbazole	8000	None	NA
Chrysene	31000	None	NA
Dibenz(a,h)anthracene	4100	None	NA
Dibenzofuran	270	None	NA
Di-n-octyl phthalate	270	None	NA
Fluoranthene	64000	None	NA
Fluorene	760	30000	0.025
Hexachlorobutadiene	270	None	NA
Hexachloroethane	270	None	NA
Indeno(1,2,3-cd)pyrene	13000	None	NA
Isophorone	270	None	NA
Naphthalene	270	None	NA
N-Nitroso-di-n-propylamine	270	None	NA
Pentachlorophenol	1350	6000	0.225
Phenanthrene	25000	None	NA
Phenol	270	30000	0.009
Pyrene	45000	None	NA
Volatile Organics (ug/kg)			
1,1-Dichloroethene	6.5	None	NA
1,1-Dichloropropene	6.5	None	NA
1,2,3-Trichloropropane	6.5	None	NA
1,2,4-Trichlorobenzene	270	20000	0.0135
1,2,4-Trimethylbenzene	6.5	None	NA
1,2-Dibromo-3-chloropropane	6.5	None	NA
1,2-Dichlorobenzene	270	None	NA
1,3,5-Trimethylbenzene	6.5	None	NA
1,3-Dichlorobenzene	270	None	NA
1,3-Dichloropropane	6.5	None	NA
1,4-Dichlorobenzene	270	20000	0.0135
2,2-Dichloropropane	6.5	None	NA
2-Chlorotoluene	6.5	None	NA
2-Butanone (MEK)	130	None	NA
2-Hexanone (MBK)	65	None	NA
4-Chlorotoluene	6.5	None	NA
Acetone	240	None	NA
Bromobenzene	6.5	None	NA
Bromomethane (methyl bromide)	13	None	NA
Carbon disulfide	6.5	None	NA
Chloroethane	13	None	NA
Chloromethane	64	None	NA
cis-1,2-Dichloroethene	400	None	NA
Dibromochloromethane	6.5	None	NA
Dibromomethane	6.5	None	NA
Dichlorodifluoromethane	13	None	NA
Isopropylbenzene (Cumene)	6.5	None	NA
methyl-tert-butyl ether (MTBE)	13	None	NA
n-Butylbenzene	6.5	None	NA
n-Propylbenzene	6.5	None	NA
p-Isopropyltoluene	6.5	None	NA
Sec-butylbenzene	6.5	None	NA
tert-Butylbenzene	6.5	None	NA
Trichloroethene	6500	None	NA
Trichlorofluoromethane	6.5	None	NA
Vinyl acetate	6.5	None	NA

Toxicity Reference Values from Efroymson et al. 1997b
* Value for 1,2-Dichlorobenzene used for 1,3-Dichlorobenzene
N/A = Not Available

TABLE 16 STEP 2 ECOLOGICAL QUOTIENTS TERRESTRIAL PLANTS FOR COPCs AT MARTIN STATE AIRPORT, MARYLAND

COPC	Surface Soil Maximum	Toxicity Reference Value	Ecological Quotient (EQ_{max})
Inorganics (mg/kg)			
Antimony	12.5	5	**2.5**
Beryllium	2.7	10	0.3
Cadmium	13	4	3.3
Chromium	480	1	**480.0**
Copper	490	100	**4.9**
Hexavalent Chromium	5	None	NA
Lead	320	50	**6.4**
Mercury	0.72	0.3	**2.4**
Nickel	89	30	**3.0**
Selenium	5.7	1	5.7
Silver	2.1	2	NA
Thallium	25	1	NA
Zinc	600	50	**12**
Pesticides (ug/kg)			
Endosulfan I	0.08	None	NA
Endosulfan II	0.24	None	NA
Endosulfan sulfate	0.24	None	NA
Toxaphene	2.4	None	NA
Semivolatile organics (ug/kg)			
2,4,5-Trichlorophenol	270	4000	0.0675
2,4,6-Trichlorophenol	270	None	NA
2,4-Dichlorophenol	270	None	NA
2,4-Dimethylphenol	270	None	NA
2,4-Dinitrophenol	1350	20000	0.0675
2,4-Dinitrotoluene	270	None	NA
2,6-Dinitrotoluene	270	None	NA
2-Chloronaphthalene	270	None	NA
2-Chlorophenol	270	None	NA
2-Chloroethylvinyl ether	6.5	None	NA
2-Methylnaphthalene	270	None	NA
2-Methylphenol (o-Cresol)	270	None	NA
2-Nitroaniline	1350	None	NA
3,3'-Dichlorobenzidine	270	None	NA
3-Nitroaniline	1350	None	NA
4,6-Dinitro-2-methyphenol	1350	None	NA
4-Bromophenyl phenyl ether	270	None	NA
4-Chloro-3-methylphenol	550	None	NA
4-Chlorphenyl phenyl ether	270	None	NA
4-Methylphenol (p-Cresol)	270	None	NA
4-Nitroaniline	1350	None	NA
4-Nitrophenol	1350	None	NA
Acenaphthene	920	20000	0.046
Acenaphthylene	270	None	NA
Acrolein	130	None	NA
Acrylonitrile	130	None	NA
Anthracene	9100	None	NA
Benzo(a)anthracene	31000	None	NA
Benzo(a)pyrene	25000	None	NA
Benzo(b)fluoranthene	22000	None	NA
Benzo(g,h,i)perylene	13000	None	NA
Benzo(k)fluoranthene	20000	None	NA
bis(2-Chloroethoxy)methane	270	None	NA
bis(2-Chloroisopropyl)ether	270	None	NA
bis(2-Chloroethyl)ether	270	None	NA
Bis(2-ethylhexyl) phthalate	13000	None	NA
Benzyl butyl phthalate	270	None	NA

COPC	Surface Soil Maximum	Toxicity Reference Value	Ecological Quotient (EQ_{max})
Carbazole	8000	None	NA
Chrysene	31000	None	NA
Dibenz(a,h)anthracene	4100	None	NA
Dibenzofuran	270	None	NA
Di-n-octyl phthalate	270	None	NA
Fluoranthene	64000	None	NA
Fluorene	760	None	NA
Hexachlorobutadiene	270	None	NA
Hexachloroethane	270	None	NA
Indeno(1,2,3-cd)pyrene	13000	None	NA
Isophorone	270	None	NA
Naphthalene	270	None	NA
N-Nitroso-di-n-propylamine	270	None	NA
Pentachlorophenol	1350	3000	0.45
Phenanthrene	25000	None	NA
Phenol	270	70000	0.004
Pyrene	45000	None	NA
Volatile Organics (ug/kg)			
1,1-Dichloroethene	6.5	None	NA
1,1-Dichloropropene	6.5	None	NA
1,2,3-Trichloropropane	6.5	None	NA
1,2,4-Trichlorobenzene	270	None	NA
1,2,4-Trimethylbenzene	6.5	None	NA
1,2-Dibromo-3-chloropropane	6.5	None	NA
1,2-Dichlorobenzene	270	None	NA
1,3,5-Trimethylbenzene	6.5	None	NA
1,3-Dichlorobenzene	270	None	NA
1,3-Dichloropropane	6.5	None	NA
1,4-Dichlorobenzene	270	None	NA
2,2-Dichloropropane	6.5	None	NA
2-Chlorotoluene	6.5	None	NA
2-Butanone (MEK)	130	None	NA
2-Hexanone (MBK)	65	None	NA
4-Chlorotoluene	6.5	None	NA
Acetone	240	None	NA
Bromobenzene	6.5	None	NA
Bromomethane (methyl bromide)	13	None	NA
Carbon disulfide	6.5	None	NA
Chloroethane	13	None	NA
Chloromethane	64	None	NA
cis-1,2-Dichloroethene	400	None	NA
Dibromochloromethane	6.5	None	NA
Dibromomethane	6.5	None	NA
Dichlorodifluoromethane	13	None	NA
Isopropylbenzene (Cumene)	6.5	None	NA
methyl-tert-butyl ether (MTBE)	13	None	NA
n-Butylbenzene	6.5	None	NA
n-Propylbenzene	6.5	None	NA
p-Isopropyltoluene	6.5	None	NA
Sec-butylbenzene	6.5	None	NA
tert-Butylbenzene	6.5	None	NA
Trichloroethene	6500	None	NA
Trichlorofluoromethane	6.5	None	NA
Vinyl acetate	6.5	None	NA

Toxicity Reference Values from Efroymson et al. 1997a

* Value for 1,2-Dichlorobenzene used for 1,3-Dichlorobenzene

N/A = Not Available

TERRESTRIAL SPECIES
STEP 2 HAZARD QUOTIENT VALUES
MARTIN STATE AIRPORT

Ecological Contaminants of Concern	Vole		Shrew		Robin		Red fox		Mourning Dove		White-Footed Mouse		Red-Tailed Hawk	
	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l
Cadmium	33.61	3.36	37.08	3.71	44.32	3.21	26.26	5.25	6.76	0.49	17.82	1.78	2.60	0.19
Chromium	28.97	5.80	35.18	7.04	272.76	54.55	40.73	8.16	102.87	20.57	58.51	11.70	6.91	1.38
Copper	1.14	0.86	1.52	1.14	3.94	3.00	4.47	3.44	3.20	2.43	4.17	3.13	0.48	0.37
Lead	3.92	0.39	5.22	0.52	31.35	6.25	5.52	0.55	79.23	7.92	14.38	1.44	1.16	0.23
Mercury	0.13	0.03	0.14	0.03	4.16	2.08	0.99	0.20	1.68	0.84	0.08	0.02	0.01	0.00
Nickel	0.65	0.33	0.77	0.38	0.86	0.62	0.64	0.25	0.51	0.37	0.97	0.49	0.03	0.02
Selenium	11.75	7.14	14.30	8.79	15.65	4.59	16.38	10.01	20.27	5.95	24.46	14.97	1.48	0.43
Silver	0.22	0.04	0.24	0.05	0.60	0.12	0.31	0.06	0.06	0.01	0.16	0.03	0.01	0.00
Zinc	2.90	1.45	3.28	1.64	69.04	7.64	24.11	4.83	21.11	2.34	2.37	1.18	4.95	0.55
Endosulfan I	0.02	0.00	0.02	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.03	0.01	0.00	0.00
Endosulfan II	0.06	0.01	0.07	0.01	0.02	0.00	0.05	0.01	0.01	0.00	0.08	0.02	0.00	0.00
Toxaphene	0.11	0.02	0.13	0.03	2.16	0.43	0.16	0.03	0.53	0.11	0.14	0.03	0.10	0.02
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorphenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.00	0.03	0.01	0.00	0.00	0.01	0.00
Acenaphthylene	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Anthracene	0.00	0.00	0.00	0.00	0.30	0.06	0.00	0.00	0.28	0.06	0.01	0.00	0.05	0.01
Benzo(a)anthracene	0.98	0.20	1.75	0.35	1.12	0.22	2.65	0.53	0.89	0.18	9.57	1.91	0.18	0.04
Benzo(a)pyrene	1.65	0.33	2.35	0.47	1.15	0.23	2.32	0.47	0.71	0.14	8.07	1.61	0.15	0.03
Benzo(b)fluoranthene	1.78	0.36	2.42	0.49	1.11	0.22	2.49	0.50	0.63	0.13	7.23	1.44	0.13	0.03
Benzo(g,h,i)perylene	0.39	0.08	0.71	0.14	0.46	0.09	1.11	0.22	0.37	0.07	4.01	0.80	0.08	0.02
Benzo(k)fluoranthene	1.46	0.29	2.03	0.41	0.96	0.19	2.04	0.41	0.57	0.11	6.51	1.30	0.12	0.02
Chrysene	1.42	0.28	2.23	0.45	1.34	0.25	2.65	0.53	0.89	0.18	9.75	1.94	0.18	0.04
Dibenz(a,h)anthracene	0.19	0.04	0.30	0.06	0.17	0.03	0.35	0.07	0.12	0.02	1.29	0.26	0.02	0.00
Fluoranthene	0.01	0.00	0.01	0.00	2.19	0.44	0.02	0.00	1.90	0.38	0.08	0.02	0.37	0.07
Fluorene	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Hexachlorobutadiene	0.01	0.00	0.01	0.00	0.03	0.01	0.01	0.00	0.02	0.00	0.05	0.00	0.00	0.00
Hexachloroethane	0.00	0.00	0.00	0.00	NA	NA	0.00	0.00	NA	NA	0.00	0.00	NA	NA
Indeno(1,2,3-cd)pyrene	0.74	0.15	1.10	0.22	0.56	0.11	1.11	0.22	0.37	0.07	4.15	0.83	0.08	0.02
Pentachlorophenol	0.13	0.03	0.15	0.03	0.36	0.18	0.19	0.04	0.07	0.03	0.14	0.03	0.01	0.01
Phenanthrene	0.00	0.00	0.00	0.00	0.84	0.17	0.01	0.00	0.77	0.15	0.03	0.01	0.15	0.03
Pyrene	3.00	0.60	4.26	0.86	2.08	0.42	4.21	0.85	1.34	0.27	14.53	2.89	0.26	0.05
1,2,4-Trichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,2-Dichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,3-Dichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,4-Dichlorobenzene	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TABLE 18 STEP 2 ECOLOGICAL QUOTIENTS FOR BENTHIC INVERTEBRATES FOR COPCs AT MARTIN STATE AIRPORT, MARYLAND

COPC	Sediment Maximum	Toxicity Reference Value	Ecological Quotient (EQ_{max})
Inorganics (mg/kg)			
Beryllium	1.45	NA	**NA**
Cadmium	600	1.2	**500**
Chromium	12000	81	**148.15**
Copper	200	34	**6**
Lead	210	46.7	**4.50**
Mercury	0.33	0.15	**2**
Nickel	92	20.9	**4.40**
Selenium	12.5	1	**12.5**
Silver	1.3	1	**1**
Thallium	12.5	NA	**NA**
Zinc	790	150	**5.3**
Pesticides (ug/kg)			
Endosulfan I	0.13	None	**NA**
Endosulfan II	0.39	None	**NA**
Endosulfan sulfate	0.39	None	**NA**
Methoxychlor	0.65	None	**NA**
Toxaphene	3.9	None	**NA**
Semivolatile organics (ug/kg)			
2,4,5-Trichlorophenol	550	None	**NA**
2,4,6-Trichlorophenol	440	None	**NA**
2,4-Dichlorophenol	440	None	**NA**
2,4-Dimethylphenol	440	29	**15.2**
2,4-Dinitrophenol	2200	None	**NA**
2,4-Dinitrotoluene	440	None	**NA**
2,6-Dinitrotoluene	440	None	**NA**
2-Chloronaphthalene	440	None	**NA**
2-Chlorophenol	440	None	**NA**
2-Methylnaphthalene	440	70	**NA**
2-Methylphenol (o-Cresol)	440	63	**6.98**
2-Nitroaniline	2200	None	**NA**
2-Nitrophenol	440	None	**NA**
3,3'-Dichlorobenzidine	440	None	**NA**
3-Nitroaniline	2200	None	**NA**
4,6-Dinitro-2-methyphenol	2200	None	**NA**
4-Bromophenyl phenyl ether	440	None	**NA**
4-Chloro-3-methylphenol	900	None	**NA**
4-Chlorphenyl phenyl ether	440	None	**NA**
4-Nitroaniline	2200	None	**NA**
4-Nitrophenol	2200	100	**22**
Acenaphthene	440	16	**27.5**
Acenaphthylene	440	44	**10**
Acrolein	2400	None	**NA**
Acrylonitrile	2400	None	**NA**
Anthracene	440	85.3	**5.2**
Benzo(a)anthracene	1500	261	**5.7**
Benzo(a)pyrene	1700	430	**3.95**
Benzo(g,h,I)perylene	1300	670	**1.9**
Benzo(k)fluoranthene	1500	240	**6.25**
bis(2-Chloroethoxy)methane	440	None	**NA**

COPC	Sediment Maximum	Toxicity Reference Value	Ecological Quotient (EQ_{max})
bis(2-Chloroisopropyl)ether	440	None	NA
bis(2-Chloroethyl)ether	440	None	NA
Bis(2-ethylhexyl) phthalate	5000	1300	NA
Benzyl butyl phthalate	440	63	NA
Carbazole	440	None	NA
Chrysene	1700	384	4.4
Dibenz(a,h)anthracene	440	63.4	6.94
Diethyl phthalate	440	200	2.20
Dimethyl phthalate	440	71	6.20
Fluoranthene	2900	600	4.83
Fluorene	440	19	23.16
Hexachlorobenzene	440	22	NA
Hexachlorobutadiene	440	11	NA
Hexachlorocyclopentadiene	440	None	NA
Hexachloroethane	440	None	NA
Indeno(1,2,3-cd)pyrene	1400	600	2.3
Isophorone	440	None	NA
Naphthalene	3600	160	22.5
Nitrobenzene	440	None	NA
N-Nitroso-di-n-propylamine	440	None	NA
N-Nitrosodiphenylamine	440	28	15.7
Pentachlorophenol	2200	360	6.1
Phenanthrene	1800	240	7.5
Phenol	440	420	1.05
Pyrene	2900	665	4.4
Volatile Organics (ug/kg)			
1,1-Dichloroethene	120	None	NA
1,1-Dichloropropene	120	None	NA
1,2,3-Trichlorbenzene	120	40	3
1,2,3-Trichloropropane	120	None	NA
1,2,4-Trichlorobenzene	120	40	3
1,2,4-Trimethylbenzene	14000	None	NA
1,2-Dibromo-3-chloropropane	120	None	NA
1,2-Dichlorobenzene	120	35	3.4
1,3,5-Trimethylbenzene	5200	None	NA
1,3-Dichlorobenzene	440	None	NA
1,3-Dichloropropane	120	None	NA
1,4-Dichlorobenzene	440	110	4
2,2-Dichloropropane	120	None	NA
2-Chlorotoluene	120	None	NA
2-Butanone (MEK)	2400	None	NA
2-Hexanone (MBK)	1200	None	NA
4-Chlorotoluene	120	None	NA
Acetone	510	None	NA
Benzene	44	None	NA
Bromobenzene	120	None	NA
Bromomethane (methyl bromi	240	None	NA
Carbon disulfide	65	None	NA
Chloroethane	240	None	NA
Chloromethane	240	None	NA
cis-1,2-Dichloroethene	34000	None	NA
Dibromochloromethane	120	None	NA
Dibromomethane	120	None	NA

COPC	Sediment Maximum	Toxicity Reference Value	Ecological Quotient (EQ_{max})
Dichlorodifluoromethane	240	None	NA
Ethylbenzene	15000	10	1500
Isopropylbenzene (Cumene)	870	None	NA
Methylene Chloride	40	None	NA
methyl-tert-butyl ether (MTBE	240	None	NA
n-Butylbenzene	1600	None	NA
n-Propylbenzene	1700	None	NA
p-Isopropyltoluene	1600	None	NA
Sec-butylbenzene	940	None	NA
Styrene (monomer)	120	None	NA
tert-Butylbenzene	120	None	NA
Toluene	350000	None	NA
Trichloroethene	69000	41	1682.9
Trichlorofluoromethane	120	None	NA
Vinyl acetate	120	None	NA
Vinyl chloride	900	None	NA
Xylenes, total	46000	40	1150

Toxicity Reference Values from Efroymson et al. 1997b

* Value for 1,2-Dichlorobenzene used for 1,3-Dichlorobenzene

N/A = Not Available

TABLE 19 STEP 2 ECOLOGICAL QUOTIENTS FOR AQUATIC COMMUNITIES FOR COPCs AT MARTIN STATE AIRPORT, MARYLAND

COPC	Surface Water Maximum	Toxicity Reference Value	Ecological Quotient (EQ_{max})
Inorganics (ug/L)			
Total Cadmium	2.5	0.1	**25**
Total Copper	15	2.85	**5.26**
Total Lead	2.5	0.54	**4.63**
Total Silver	2.5	0.0001	**25000**
Dissolved Cadmium	2.5	0.1	**25**
Dissolved Copper	17	2.85	**5.96**
Dissolved Lead	2.5	0.54	**4.63**
Dissolved Silver	2.5	0.0001	**25000.00**
Dissolved Zinc	95	37	**2.57**
Semivolatile organics (ug/L)			
2,6-Dinitrotoluene	5	None	NA
2-Methylnaphthalene	5	None	NA
2-Nitroaniline	5	None	NA
3,3'-Dichlorobenzidine	5	None	NA
3,4-Methylphenol	5	None	NA
3-Nitroaniline	12.5	None	NA
4,6-Dinitro-2-methyphenol	12.5	2.3	**5.4**
4-Bromophenyl phenyl ether	5	1.5	**3.3**
4-Chloro-3-methylphenol	5	0.3	**16.7**
4-Chlorphenyl phenyl ether	5	None	NA
4-Nitroaniline	5	None	NA
Acetophenone	5	None	NA
Anthracene	5	0.1	**50.0**
Benzo(a)pyrene	5	0.014	**357.14**
Benzo(b)fluoranthene	5	None	NA
Benzo(g,h,I)perylene	5	None	NA
Benzo(k)fluoranthene	5	None	NA
bis(2-Chloroisopropyl)ether	5	None	NA
Benzyl butyl phthalate	5	3	**1.67**
Carbazole	5	None	NA
Chrysene	5	None	NA
Dibenz(a,h)anthracene	5	None	NA
Diethyl phthalate	5	3	**1.67**
Dimethyl phthalate	5	3	**1.67**
Hexachlorobenzene	5	3.68	**1.36**
Indeno(1,2,3-cd)pyrene	5	None	NA
N-Nitroso-di-n-propylamine	5	None	NA
Pyrene	5	None	NA
Volatile Organics (ug/L)			
1,2,3-Trichloropropane	0.5	None	NA
1,2,4-Trimethylbenzene	0.5	None	NA
1,2-Dibromo-3-chloropropane	0.5	None	NA
1,3,5-Trimethylbenzene	0.5	None	NA
1,3-Dichloropropane	0.5	None	NA
2-Chlorotoluene	0.5	None	NA
4-Chlorotoluene	0.5	None	NA
Bromobenzene	0.5	None	NA
Chloroethane	0.5	None	NA
Isopropylbenzene (Cumene)	0.5	None	NA

COPC	Surface Water Maximum	Toxicity Reference Value	Ecological Quotient (EQ_{max})
methyl-tert-butyl ether (MTBE)	7	None	NA
n-Butylbenzene	0.5	None	NA
n-Propylbenzene	0.5	None	NA
p-Isopropyltoluene	0.5	None	NA
o xylene	1.5	None	NA
Sec-butylbenzene	0.5	None	NA
Styrene (monomer)	0.5	None	NA
tert-Butylbenzene	0.5	None	NA
Vinyl acetate	0.5	None	NA

N/A = Not Available

AQUATIC SPECIES
MAXIMUM CONCENTRATION HAZARD QUOTIENT VALUES
MARTIN STATE AIRPORT

	Raccoon		Mallard		Belted Kingfisher		Great Blue Heron	
Ecological Contaminants	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
of Concern	HQ_n	HQ_l	HQ_n	HQ_l	HQ_n	HQ_l	HQ_n	HQ_l
Total Cadmium	**403.80**	**80.38**	**182.86**	**13.26**	**14.20**	**1.03**	**15.14**	**1.10**
Dissolved Cadmium	**10.71**	**2.13**	0.00	0.00	**1.23**	0.09	**1.31**	0.09
Total Chromium	**4347.33**	**871.62**	**323.02**	**64.60**	**94.12**	**18.82**	**100.36**	**20.07**
Total Copper	**18.98**	**14.66**	**4.60**	**3.50**	0.26	0.20	0.28	0.21
Dissolved Copper	**6.47**	**5.00**	0.00	0.00	0.20	0.15	0.21	0.16
Total Lead	**25.30**	**2.53**	**12.01**	**1.20**	0.83	0.17	0.88	0.18
Dissolved Lead	0.41	0.04	0.00	0.00	0.08	0.02	0.09	0.02
Total Mercury	**37.48**	**7.50**	**8.62**	**2.87**	**179.78**	**59.93**	**191.70**	**63.90**
Total Nickel	**4.54**	**1.82**	0.23	0.17	0.23	0.17	0.25	0.18
Total Selenium	**187.81**	**117.38**	**11.64**	**6.40**	**1.50**	0.30	**1.60**	0.32
Total Silver	0.48	0.10	0.00	0.00	0.01	0.00	0.01	0.00
Dissolved Silver	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Total Zinc	**87.80**	**17.53**	**35.23**	**3.90**	**11.54**	**1.28**	**12.31**	**1.36**
Dissolved Zinc	**18.34**	**3.66**	0.00	0.00	**3.28**	0.36	**3.50**	0.39
Endosulfan I	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Endosulfan II	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Methoxychlor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Toxaphene	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA
Acenapthene	0.11	0.05	0.02	0.00	0.27	0.05	0.29	0.06
Acenapthylene	0.20	0.10	0.02	0.00	0.51	0.10	0.55	0.11
Anthracene	0.08	0.02	0.00	0.00	0.55	0.11	0.59	0.12
Benzo(a)anthracene	**154.29**	**30.63**	0.04	0.01	**2.24**	0.45	**2.39**	0.48
Benzo(b)fluoranthene	**231.95**	**46.04**	0.01	0.00	**3.37**	0.67	**3.60**	0.72
Benzo(g,h,I)perylene	**271.90**	**53.97**	0.01	0.00	**3.96**	0.79	**4.23**	0.85
Benzo(k)fluoranthene	**231.69**	**45.99**	0.01	0.00	**3.37**	0.67	**3.60**	0.72
Chrysene	**154.82**	**30.73**	0.01	0.00	**2.25**	0.45	**2.39**	0.48
Dibenz(a,h)anthracene	**269.63**	**53.52**	0.00	0.00	**3.94**	0.79	**4.20**	0.84
Fluoranthene	0.24	0.05	0.02	0.00	0.84	0.17	0.90	0.18
Fluorene	0.38	0.08	0.01	0.00	**1.38**	0.28	**1.48**	0.30
Hexachlorobenzene	**36.36**	**3.64**	0.48	0.09	**88.35**	**17.05**	**94.20**	**18.18**
Hexachlorobutadiene	**39.47**	**3.97**	0.01	0.00	**2.25**	0.45	**2.39**	0.48
Hexachlorocyclopentadiene	0.94	0.19	NA	NA	NA	NA	NA	NA
Hexachloroethane	0.08	0.02	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	**272.16**	**54.02**	0.01	0.00	**3.97**	0.79	**4.23**	0.85
Pentachlorophenol	**9.38**	**1.88**	0.07	0.04	**1.02**	0.51	**1.08**	0.54
Phenanthrene	**1.51**	0.30	0.02	0.00	**5.54**	1.11	**5.91**	**1.18**
Pyrene	**76.49**	**15.18**	0.04	0.01	**1.09**	0.22	**1.16**	0.23
1,1,1,2-Tetrachloroethane	0.01	0.00	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachlorethane	0.01	0.00	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00
1,2-Dichlorobenzene	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,3-Dichlorobenzene	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,4-Dichlorobenzene	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TABLE 21 SUMMARY OF ECOLOGICAL COPC REMAINING AFTER STEP 2 RISK ASSESSMENT

Chemical	Surface Soil								Surface Water					Sediment				
	Invertebrates & Plants	Vole	Shrew	White-Footed Mouse	Red Fox	American Robin	Mourning Dove	Red-Tailed Hawk	Water Column Communities	Raccoon	Mallard	Great Blue Heron	Belted Kingfisher	Benthic Inverts.	Raccoon	Mallard	Great Blue Heron	Belted Kingfisher
Inorganics																		
Total Antimony	x																	
Total Beryllium	X													x				
Total Cadmium	X	X	X	X	X	X	X	X	x	x	x	x	x	X	X	X	X	X
Dissolved Cadmium									x	x		x	x					
Total Chromium	X	X	X	X	X	X	X	X						X	X	X	X	X
Total Copper	X	X	X	X	X	X	X		X	X	X			X	X	X		
Dissolved Copper									X	X								
Hexavalent Chromium	x																	
Total Lead	X	X	X	X	X	X	X	X	x	x	x			X	X	X		
Dissolved Lead									x	x								
Total Mercury	X					X	X							X	X	X	X	X
Total Nickel	X													X	X			
Total Selenium	X	X	X	X	X	X	X	X						x	x	x	x	x
Total Silver	X								x					X				
Dissolved Silver									x									
Total Thallium	X													x				
Total Zinc	X	X	X	X	X	X	X	X						X	X	X	X	X
Dissolved Zinc									X	X		X	X					
Pesticides																		
Endosulfan I	x													x				
Endosulfan II	x													x				
Endosulfan sulfate	x													x				
Methoxychlor														x				
Toxaphene	x					x								x				
Semivolatile Organics																		
2,4,5-Trichlorophenol	x													x				
2,4,6-Trichlorophenol	x													x				
2,4-Dichlorophenol	x													x				
2,4-Dimethylphenol	x													x				
2,4-Dinitrophenol	x													x				
2,4-Dinitrotoluene	x													x				
2,6-Dinitrotoluene	x								x					x				
2-Chloronaphthalene	x													x				
2-Chlorophenol	x													x				
2-Chloroethyl vinyl ether	x																	
2-Methylnapthalene	x								x					x				
2-Methyl phenol (o-Cresol)	x													X				
2-Nitroaniline	x								x					x				
2-Nitrophenol														x				

TABLE 21 SUMMARY OF ECOLOGICAL COPC REMAINING AFTER STEP 2 RISK ASSESSMENT

Chemical	Surface Soil								Surface Water					Sediment				
	Invertebrates & Plants	Vole	Shrew	White-Footed Mouse	Red Fox	American Robin	Mourning Dove	Red-Tailed Hawk	Water Column Communities	Raccoon	Mallard	Great Blue Heron	Belted Kingfisher	Benthic Inverts.	Raccoon	Mallard	Great Blue Heron	Belted Kingfisher
3,3'-Dichlorobenzidine	x								x					x				
3,4-Methylphenol									x									
3-Nitroaniline	x								x					x				
4,6-Dinitro-2-methylphenol	x								x					x				
4-Bromophenyl-phenylether									x					x				
4-Chloro-3-methylphenol	x								x					x				
4-Chlorophenyl-phenylether									x					x				
4-Methylphenol (p-Cresol)	x																	
4-Nitroaniline	x								x					x				
4-Nitrophenol	X													x				
Acenaphthene	X													x				
Acenaphthylene	x													x				
Acetophenone									x									
Acrolein	x													x				
Acrylonitrile	x													x				
Anthracene	X								x					X				
Benzo(a)anthracene	X		X	X	X	X								X	X		X	X
Benzo(a)pyrene	X	X	X	X	X	X			x					X				
Benzo(b)fluoranthene	X	X	X	X	X	X			x	x		x	x					
Benzo(g,h,i)perylene	X			X	X				x	x		x	x	X	X		X	X
Benzo(k)fluoranthene	X	X	X	X	X				x	x		x	x	X			X	X
bis(2-Chloroethoxy)methane	x													x				
bis(2-Chloroisopropyl)ether	x								x					x				
bis(2-Chloroethyl)ether	x													x				
bis(2-ethylhexyl)phthalate	x													x				
Benzyl butyl phthalate	x								x					x				
Carbazole	x								x					x				
Chrysene	X	X	X	X	X	X			x	x		x	x	X	X		X	X
Dibenzo(a,h)anthracene	X			X					x	x		x	x	X	X		X	X
Dibenzofuran	x																	
Diethyl phthalate									x					x				
Dimethyl phthalate									x					x				
Di-n-octyl phthalate	x																	
Fluoranthene	X					X	X							X				
Fluorene	X													x			X	x
Hexachlorobenzene									x	x		x	x	x	x		x	x
Hexachlorobutadiene	x													x	x		x	x
Hexachlorocyclopentadiene														x				
Hexachloroethane	x													x				
Indeno(1,2,3-c,d)pyrene	X		X	X	X				x	x		x	x	X	X		X	X
Isophorone	x													x				

TABLE 21 SUMMARY OF ECOLOGICAL COPC REMAINING AFTER STEP 2 RISK ASSESSMENT

Chemical	Surface Soil								Surface Water					Sediment				
	Invertebrates & Plants	Vole	Shrew	White-Footed Mouse	Red Fox	American Robin	Mourning Dove	Red-Tailed Hawk	Water Column Communities	Raccoon	Mallard	Great Blue Heron	Belted Kingfisher	Benthic Invers.	Raccoon	Mallard	Great Blue Heron	Belted Kingfisher
Naphthalene	x													X				
Nitrobenzene														x				
N-Nitroso-di-n-propylamine	x								x					x				
N-Nitrosodiphenylamine														x				
Pentachlorphenol	x													x	x		x	x
Phenanthrene	X													X	X		X	X
Phenol	x													x				
Pyrene	X	X	X	X	X	X	X		x	x		x	x	X	X		X	X
Volatile Organics																		
1,1,1,2-Tetrachloroethane																		
1,1,2,2-Tetrachloroethane																		
1,1-Dichloroethene	x													x				
1,1-Dichloropropene	x													x				
1,2,3-Trichlorobenzene														x				
1,2,3-Trichloropropane	x								x					x				
1,2,4-Trichlorobenzene	x													x				
1,2,4-Trimethylbenzene	x								x					x				
1,2-Dibromo-3-chloropropane	x								x					x				
1,2-Dichlorobenzene	x													x				
1,3,5-Trimethylbenzene	x								x					x				
1,3-Dichlorobenzene	x													x				
1,3-Dichloropropane	x								x					x				
1,4-Dichlorobenzene	x													x				
2,2-Dichloropropane	x													x				
2-Chlorotoluene	x								x					x				
2-Butanone (MEK)	x													x				
2-Hexanone (MBK)	x													x				
4-Chlorotoluene	x								x					x				
Acetone	x													x				
Benzene														x				
Bromobenzene	x								x					x				
Bromomethane (methyl bromide)	x													x				
Carbon Disulfide	x													x				
Chloroethane	x								x					x				
Chloromethane	x													x				
cis-1,2-Dichloroethene	X													x				
Dibromochloromethane	x													x				
Dibromomethane	x													x				
Dichlorodifluoromethane	x													x				
Ethylbenzene														X				
Isopropylbenzene (Cumene)	x								x					x				

TABLE 21 SUMMARY OF ECOLOGICAL COPC REMAINING AFTER STEP 2 RISK ASSESSMENT

Chemical	Surface Soil								Surface Water					Sediment				
	Invertebrates & Plants	Vole	Shrew	White-Footed Mouse	Red Fox	American Robin	Mourning Dove	Red-Tailed Hawk	Water Column Communities	Raccoon	Mallard	Great Blue Heron	Belted Kingfisher	Benthic Invers.	Raccoon	Mallard	Great Blue Heron	Belted Kingfisher
Methylene Chloride														x				
methyl-tert-butyl-ether (MTBE)	x								x					x				
n-Butylbenzene	x								x					x				
n-Propylbenzene	x								x					x				
p-Isopropylbenzene	x								x					x				
o xylene									x									
Sec-Butylbenzene	x								x					x				
Styrene (monomer)									x					x				
tert-Butylbenzene	x								x					x				
Toluene														x				
Trichloroethene	X													X				
Trichlorofluoromethane	x													x				
Vinyl acetate	x								x					x				
Vinyl chloride														x				
Xylenes, (ota)														X				

X - COPC remaining after Step 2

x - COPC remaining after Step 2 (only COPC because 1/2 RL greater than SRV or No SRV available)

Not Measured or not a COPC in this media.

No Toxicological Data Available

TABLE 22 STEP 3 SURFACE SOIL MEAN EXPOSURE POINT CONCENTRATIONS (EPC) FOR ECOLOGICAL FOOD WEB RISK CALCULATIONS

Identified COPCs			
Chemical	**N**	**Units**	**Mean**
Inorganics			
Cadmium	3	mg/kg	2.8
Chromium	15	mg/kg	67.8
Copper	14	mg/kg	75.9
Lead	12	mg/kg	73.9
Mercury	11	mg/kg	0.186
Selenium	2	mg/kg	8.5
Zinc	14	mg/kg	164.9
Pesticides			
Toxaphene	0	mg/kg	2
Semi-volatiles			
4-Bromophenyl-phenylether	0	mg/kg	0.23
4-Chlorophenyl-phenylether	0	mg/kg	0.23
Benzo(a)anthracene	4	mg/kg	4.9
Benzo(a)pyrene	4	mg/kg	4.3
Benzo(b)fluoranthene	4	mg/kg	3.8
Benzo(g,h,I)perylene	4	mg/kg	2.4
Benzo(k)fluoranthene	4	mg/kg	3.2
Chrysene	4	mg/kg	5
Dibenzo(a,h)anthracene	3	mg/kg	0.89
Fluoranthene	5	mg/kg	15.9
Hexachloroethane	0	mg/kg	0.23
Indeno(1,2,3-cd)pyrene	4	mg/kg	2.3
Pyrene	5	mg/kg	6.9

TABLE 23 STEP 3 SURFACE WATER AND SEDIMENT MEAN EXPOSURE POINT CONCENTRATIONS (EPC) FOR ECOLOGICAL RISK CALCULATIONS

Chemical	N	Surface Water Mean (mg/L)	N	Sediment Mean (mg/kg)
Total Cadmium	0	0.0025	3	102.75
Dissolved Cadmium	0	0.0025	NA	NA
Total Chromium	0	0.0025	6	2047.5
Total Copper	2	0.00825	6	50.92
Dissolved Copper	2	0.00975	NA	NA
Total Lead	0	0.0025	4	53.6
Dissolved Lead	0	0.0025	NA	NA
Total Mercury	0	0.0005	2	0.114
Total Nickel	0	0.0025	3	25.8
Total Selenium	0	0.0025	0	8.8
Total Zinc	0	0.025	4	190.2
Dissolved Zinc	1	0.0425	NA	NA
4-Bromophenyl-phenylether	0	0.005	0	0.312
4-Chlorophenyl-phenylether	0	0.005	0	0.312
Benzo(a)anthracene	0	0.005	1	0.495
Benzo(b)fluoranthene	0	0.005	1	0.511
Benzo(g,h,I)perylene	0	0.005	1	0.462
Benzo(k)fluoranthene	0	0.005	1	0.495
Chrysene	0	0.005	1	0.528
Dibenz(a,h)anthracene	0	0.005	0	0.312
Fluorene	0	0.005	0	0.312
Hexachlorobenzene	0	0.005	0	0.312
Hexachlorobutadiene	0	0.005	0	0.202
Hexachlorocyclopentadiene	0	0.005	0	0.312
Hexachlorethane	0	0.005	0	0.312
Indeno(1,2,3-cd)pyrene	0	0.005	1	0.478
Pentachlorophenol	0	0.0125	0	1.335
Phenanthrene	0	0.005	1	0.545
Pyrene	0	0.005	1	0.728
1,1,1,2-Tetrachloroethane	0	0.0005	0	0.0253
1,1,2,2-Tetrachloroethane	0	0.0005	0	0.0253

TABLE 24 STEP 3 EXPOSURE FACTORS FOR MARTIN STATE AIRPORT TERRESTRIAL AND AQUATIC ECOLOGICAL RECEPTORS OF CONCERN

Exposure Factor		Receptor						
		Mourning Dove	**American Robin**	**Red-Tailed Hawk**	**Meadow Vole**	**Short-Tailed Shrew**	**White-Footed Mouse**	**Red Fox**
Body Weight (kg)		0.1265 (Tomlinson et al. 1994)	0.0773 (USEPA 1993)	1.1260 (Sample and Suter 1994)	0.0428 (Silva and Downing 1995)	0.0169 (USEPA 1993)	0.0208 (Silva and Downing 1995)	4.06 (Silva and Downing 1995)
Food Ingestion Rate (kg/day)		0.0151 (allometric equation)	0.0055 (USEPA 1993)	0.0360 (Sample and Suter 1994)	0.0021 (USEPA 1993)	0.0015 (USEPA 1993)	0.0005 (Sample and Suter 1994)	0.1231 (Sample and Suter 1994)
Water Ingestion Rate (L/day)		0.0148 (allometric equation)	0.0106 (allometric equation)	0.0639 (allometric equation)	0.0090 (USEPA 1993)	0.0038 (USEPA 1993)	0.0062 (Sample and Suter 1994)	0.3494 (allometric equation)
Soil Ingestion Rate (kg/day)		0.0253 (allometric equation)	0.01546 (allometric equation)	0.000 (allometric equation)	0.000036 (allometric equation)	0.00104 (allometric equation)	0.000175 (allometric equation)	0.03 (allometric equation)
Dietary Composition (percent)	Terr. Plants	95.0 (Tomlinson et al. 1994)	0 (USEPA 1993)	0 (USEPA 1993; Sample and Suter 1994)	95.6 (USEPA 1993)	4.7 (USEPA 1993; Sample and Suter 1994)	51.0 (Martin et al., 1951; Sample and Suter 1994)	7.0 (USEPA 1993)
	Soil Invert.	0 (Tomlinson et al. 1994)	38.0 (USEPA 1993)	0 (USEPA 1993; Sample and Suter 1994)	2.0 (USEPA 1993)	82.3 (USEPA 1993; Sample and Suter 1994)	47.0 (Martin et al., 1951; Sample and Suter 1994)	2.8 (USEPA 1993)
	Small Mammals	0 (Tomlinson et al. 1994)	60.0 (USEPA 1993)	100 (USEPA 1993; Sample and Suter 1994)	0 (USEPA 1993)	0 (USEPA 1993; Sample and Suter 1994)	0 (Martin et al., 1951; Sample and Suter 1994)	87.4 (USEPA 1993)

TABLE MSA-24. CONTINUED.

Exposure Factor		Receptor			
		Raccoon	**Mallard Duck**	**Belted Kingfisher**	**Great Blue Heron**
Body Weight (kg)		5.94 (Silva and Downing 1995)	1.1770 (Bellrose 1980)	0.1480 (Dunning 1993)	2.2300 (Butler 1992)
Food Ingestion Rate (kg/day)		0.1000 (Conover 1989)	0.0647 (allometric equation)	0.0168 (USEPA 1993)	0.3931 (allometric equation)
Water Ingestion Rate (L/day)		0.4921 (allometric equation)	0.0658 (allometric equation)	0.0164 (allometric equation)	0.1010 (allometric equation)
Sediment Ingestion Rate (kg/day)		0.0286 (allometric equation)	0.00135 (allometric equation)	0.00 (allometric equation)	0.00 (allometric equation)
Dietary Composition (percent)	**Fish**	7.0 (USEPA 1993)	0 (Palmer 1976)	84.0 (USEPA 1993)	100 (USEPA 1993; Quincy and Smith 1980)
	Aquatic Plants	40.0 (USEPA 1993)	86.7 (Palmer 1976)	0 (USEPA 1993)	0 (USEPA 1993; Quincy and Smith 1980)
	Benthic Invert.	43.6 (USEPA 1993)	10.0 (Palmer 1976)	16.0 (USEPA 1993)	0 (USEPA 1993; Quincy and Smith 1980)

TABLE 25 STEP 3 ECOLOGICAL QUOTIENTS FOR SOIL INVERTEBRATES FOR COPCs AT MARTIN STATE AIRPORT, MARYLAND

COPC	Surface Soil Mean	Toxicity Reference Value	Ecological Quotient (EQ_{mean})
Inorganics (mg/kg)			
Antimony	8	None	NA
Beryllium	1.19	None	NA
Chromium	67.8	0.4	169.5
Copper	75.9	50	2
Hexavalent Chromium	4	None	NA
Mercury	0.186	0.1	2
Silver	0.91	None	NA
Thallium	8.8	None	NA
Zinc	164.9	200	0.8245
Pesticides (ug/kg)			
Endosulfan I	0.068	None	NA
Endosulfan II	0.203	None	NA
Endosulfan sulfate	0.203	None	NA
Toxaphene	2	None	NA
Semivolatile organics (ug/kg)			
2,4-Dichlorophenol	231	None	NA
2,4-Dimethylphenol	231	None	NA
2,4-Dinitrophenol	1155	None	NA
2,4-Dinitrotoluene	231	None	NA
2,6-Dinitrotoluene	231	None	NA
2-Chloronaphthalene	231	None	NA
2-Chlorophenol	231	None	NA
2-Chloroethylvinyl ether	3.9	None	NA
2-Methylnaphthalene	231	None	NA
2-Methylphenol (o-Cresol)	231	None	NA
2-Nitroaniline	1155	None	NA
3,3'-Dichlorobenzidine	231	None	NA
3-Nitroaniline	1155	None	NA
4,6-Dinitro-2-methyphenol	1155	None	NA
4-Bromophenyl phenyl ether	231	None	NA
4-Chloro-3-methylphenol	461	None	NA
4-Chlorphenyl phenyl ether	231	None	NA
4-Methylphenol (p-Cresol)	231	None	NA
4-Nitroaniline	1155	None	NA
Acenaphthene	354	None	NA
Acenaphthylene	231	None	NA
Acrolein	98.3	None	NA
Acrylonitrile	98.3	None	NA
Anthracene	1503.3	None	NA
Benzo(a)anthracene	4859	None	NA
Benzo(a)pyrene	4326	None	NA
Benzo(b)fluoranthene	3812	None	NA
Benzo(g,h,I)perylene	2398	None	NA
Benzo(k)fluoranthene	3245	None	NA
bis(2-Chloroethoxy)methane	231	None	NA
bis(2-Chloroisopropyl)ether	231	None	NA
bis(2-Chloroethyl)ether	231	None	NA
Bis(2-ethylhexyl) phthalate	1651	None	NA
Benzyl butyl phthalate	231	None	NA
Carbazole	1376	None	NA
Chrysene	5004	None	NA

COPC	Surface Soil Mean	Toxicity Reference Value	Ecological Quotient (EQ_{mean})
Dibenzo(a,h)anthracene	881	None	NA
Dibenzofuran	231	None	NA
Di-n-octyl phthalate	231	None	NA
Fluoranthene	15880	None	NA
Hexachlorobutadiene	89.1	None	NA
Hexachloroethane	231	None	NA
Indeno(1,2,3-cd)pyrene	2435	None	NA
Isophorone	231	None	NA
Naphthalene	89.1	None	NA
N-Nitroso-di-n-propylamine	231	None	NA
Phenanthrene	4152.2	None	NA
Pyrene	6.9	None	NA
Volatile Organics (ug/kg)			
1,1-Dichloroethene	3.9	None	NA
1,1-Dichloropropene	3.9	None	NA
1,2,3-Trichloropropane	3.9	None	NA
1,2,4-Trimethylbenzene	3.9	None	NA
1,2-Dibromo-3-chloropropane	3.9	None	NA
1,2-Dichlorobenzene	71.8	None	NA
1,3,5-Trimethylbenzene	3.9	None	NA
1,3-Dichlorobenzene	71.8	None	NA
1,3-Dichloropropane	3.9	None	NA
2,2-Dichloropropane	3.9	None	NA
2-Chlorotoluene	3.9	None	NA
2-Butanone (MEK)	69	None	NA
2-Hexanone (MBK)	39.3	None	NA
4-Chlorotoluene	3.9	None	NA
Acetone	86.3	None	NA
Bromobenzene	3.9	None	NA
Bromomethane (methyl brom	6.9	None	NA
Carbon disulfide	3.9	None	NA
Chloroethane	6.9	None	NA
Chloromethane	12.6	None	NA
cis-1,2-Dichloroethene	42.2	None	NA
Dibromochloromethane	3.9	None	NA
Dibromomethane	3.9	None	NA
Dichlorodifluoromethane	6.9	None	NA
Isopropylbenzene (Cumene)	3.9	None	NA
methyl-tert-butyl ether (MTBE	6.9	None	NA
n-Butylbenzene	3.9	None	NA
n-Propylbenzene	3.9	None	NA
p-Isopropyltoluene	3.9	None	NA
Sec-butylbenzene	3.9	None	NA
tert-Butylbenzene	3.9	None	NA
Trichloroethene	637.7	None	NA
Trichlorofluoromethane	3.9	None	NA
Vinyl acetate	3.9	None	NA

Toxicity Reference Values from Efroymson et al. 1997b

* Value for 1,2-Dichlorobenzene used for 1,3-Dichlorobenzene

N/A = Not Available

TABLE 26 STEP 3 ECOLOGICAL QUOTIENTS FOR TERRESTRIAL PLANTS FOR COPCs AT MARTIN STATE AIRPORT, MARYLAND

COPC	Surface Soil Mean	Toxicity Reference Value	Ecological Quotient (EQ_{mean})
Inorganics (mg/kg)			
Antimony	8	5	NA
Chromium	67.8	1	**67.8**
Copper	75.9	100	0.759
Hexavalent Chromium	4	None	NA
Lead	73.9	50	**1.48**
Mercury	0.186	0.3	0.62
Nickel	22.6	30	0.753
Selenium	8.5	1	**8.5**
Silver	0.91	2	0.455
Thallium	8.8	1	**8.8**
Zinc	164.9	50	3.298
Pesticides (ug/kg)			
Endosulfan I	0.068	None	NA
Endosulfan II	0.203	None	NA
Endosulfan sulfate	0.203	None	NA
Toxaphene	2	None	NA
Semivolatile organics (ug/kg)			
2,4,6-Trichlorophenol	231	None	NA
2,4-Dichlorophenol	231	None	NA
2,4-Dimethylpheool	231	None	NA
2,4-Dinitrotoluene	231	None	NA
2,6-Dinitrotoluene	231	None	NA
2-Chloronaphthalene	231	None	NA
2-Chlorophenol	231	None	NA
2-Chloroethylvinyl ether	3.9	None	NA
2-Methylnaphthalene	231	None	NA
2-Methylphenol (o-Cresol)	231	None	NA
2-Nitroaniline	1155	None	NA
3,3'-Dichlorobenzidine	231	None	NA
3-Nitroaniline	1155	None	NA
4,6-Dinitro-2-methylphenol	1155	None	NA
4-Bromophenyl phenyl ether	231	None	NA
4-Chloro-3-methylphenol	461	None	NA
4-Chlorphenyl phenyl ether	231	None	NA
4-Methylphenol (p-Cresol)	231	None	NA
4-Nitroaniline	1155	None	NA
Acenaphthylene	231	None	NA
Acrolein	98.3	None	NA
Acrylonitrile	98.3	None	NA
Anthracene	1503.3	None	NA
Benzo(a)anthracene	4859	None	NA
Benzo(a)pyrene	4326	None	NA
Benzo(b)fluoranthene	3812	None	NA
Benzo(g,h,I)perylene	2398	None	NA
Benzo(k)fluoranthene	3245	None	NA
bis(2-Chloroethoxy)methane	231	None	NA
bis(2-Chloroisopropyl)ether	231	None	NA
bis(2-Chloroethyl)ether	231	None	NA
Bis(2-ethylhexyl) phthalate	1651	None	NA
Benzyl butyl phthalate	231	None	NA
Carbazole	1376	None	NA
Chrysene	5004	None	NA
Dibenzo(a,h)anthracene	881	None	NA

COPC	Surface Soil Mean	Toxicity Reference Value	Ecological Quotient (EQ_{mean})
Dibenzofuran	231	None	NA
Di-n-octyl phthalate	231	None	NA
Fluoranthene	15880	None	NA
Fluorene	336.7	None	NA
Hexachlorobutadiene	89.1	None	NA
Hexachloroethane	231	None	NA
Indeno(1,2,3-cd)pyrene	2435	None	NA
Isophorone	231	None	NA
Naphthalene	89.1	None	NA
N-Nitroso-di-n-propylamine	231	None	NA
Phenanthrene	4152.2	None	NA
Pyrene	6.9	None	NA
Volatile Organics (ug/kg)			
1,1-Dichloroethene	3.9	None	NA
1,1-Dichloropropene	3.9	None	NA
1,2,3-Trichloropropane	3.9	None	NA
1,2,4-Trichlorobenzene	71.8	None	NA
1,2,4-Trimethylbenzene	3.9	None	NA
1,2-Dibromo-3-chloropropane	3.9	None	NA
1,2-Dichlorobenzene	71.8	None	NA
1,3,5-Trimethylbenzene	3.9	None	NA
1,3-Dichlorobenzene	71.8	None	NA
1,3-Dichloropropane	3.9	None	NA
1,4-Dichlorobenzene	68.14	None	NA
2,2-Dichloropropane	3.9	None	NA
2-Chlorotoluene	3.9	None	NA
2-Butanone (MEK)	69	None	NA
2-Hexanone (MBK)	39.3	None	NA
4-Chlorotoluene	3.9	None	NA
Acetone	86.3	None	NA
Bromobenzene	3.9	None	NA
Bromomethane (methyl bromid	6.9	None	NA
Carbon disulfide	3.9	None	NA
Chloroethane	6.9	None	NA
Chloromethane	12.6	None	NA
cis-1,2-Dichloroethene	42.2	None	NA
Dibromochloromethane	3.9	None	NA
Dibromomethane	3.9	None	NA
Dichlorodifluoromethane	6.9	None	NA
Isopropylbenzene (Cumene)	3.9	None	NA
methyl-tert-butyl ether (MTBE	6.9	None	NA
n-Butylbenzene	3.9	None	NA
n-Propylbenzene	3.9	None	NA
p-Isopropyltoluene	3.9	None	NA
Sec-butylbenzene	3.9	None	NA
tert-Butylbenzene	3.9	None	NA
Trichloroethene	637.7	None	NA
Trichlorofluoromethane	3.9	None	NA
Vinyl acetate	3.9	None	NA

Toxicity Reference Values from Efroymson et al. 1997a

* Value for 1,2-Dichlorobenzene used for 1,3-Dichlorobenzene

N/A = Not Available

TERRESTRIAL SPECIES
STEP 3 HAZARD QUOTIENT VALUES
MARTIN STATE AIRPORT

Ecological Contaminants of Concern	Vole		Shrew		American Robin		Red fox		Mourning Dove		White-Footed Mou		Red-Tailed Hawk	
	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l	NOAEL HQ_n	LOAEL HQ_l
Cadmium	0.06	0.01	0.85	0.08	0.14	0.01	0.00	0.00	0.08	0.01	0.15	0.01	0.00	0.00
Chromium	0.04	0.01	0.82	0.16	**2.30**	0.46	0.01	0.00	**2.23**	0.45	0.13	0.03	0.01	0.00
Copper	0.01	0.01	0.08	0.06	0.06	0.04	0.00	0.00	0.06	0.04	0.01	0.01	0.00	0.00
Lead	0.02	0.00	0.36	0.04	0.65	0.13	0.00	0.00	**2.14**	0.21	0.06	0.01	0.00	0.00
Mercury	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00
Selenium	0.71	0.43	**2.68**	**1.65**	0.78	0.23	0.03	0.02	0.82	0.24	0.55	0.34	0.01	0.00
Zinc	0.01	0.01	0.12	0.06	0.53	0.06	0.01	0.00	0.44	0.05	0.02	0.01	0.01	0.00
Toxaphene	0.00	0.00	0.04	0.01	0.10	0.02	0.00	0.00	0.06	0.01	0.01	0.00	0.00	0.00
4-Bromophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chlorphenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.01	0.00	0.17	0.03	0.02	0.00	0.01	0.00	0.02	0.00	0.03	0.01	0.00	0.00
Benzo(a)pyrene	0.00	0.00	0.16	0.03	0.02	0.00	0.01	0.00	0.02	0.00	0.02	0.00	0.00	0.00
Benzo(b)fluoranthene	0.00	0.00	0.13	0.03	0.02	0.00	0.01	0.00	0.02	0.00	0.02	0.00	0.00	0.00
Benzo(g,h,I)perylene	0.00	0.00	0.08	0.02	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00
Benzo(k)fluoranthene	0.00	0.00	0.11	0.02	0.01	0.00	0.01	0.00	0.01	0.00	0.02	0.00	0.00	0.00
Chrysene	0.01	0.00	0.20	0.04	0.02	0.00	0.01	0.00	0.02	0.00	0.03	0.01	0.00	0.00
Dibenzo(a,h)anthracene	0.00	0.00	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Fluoranthene	0.00	0.00	0.00	0.00	0.08	0.02	0.00	0.00	0.07	0.01	0.00	0.00	0.00	0.00
Hexachloroethane	0.00	0.00	0.00	0.00	NA	NA	0.00	0.00	NA	NA	0.00	0.00	NA	NA
Indeno(1,2,3-cd)pyrene	0.00	0.00	0.09	0.02	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00
Pentachlorophenol	0.00	0.00	0.05	0.01	0.02	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00
Pyrene	0.01	0.00	0.27	0.05	0.03	0.01	0.01	0.00	0.03	0.01	0.04	0.01	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TABLE 28 STEP 3 ECOLOGICAL QUOTIENTS FOR BENTHIC INVERTEBRATES FOR COPCs AT MARTIN STATE AIRPORT, MARYLAND

COPC	Sediment Mean	Toxicity Reference Value	Ecological Quotient (EQ_{mean})
Inorganics (mg/kg)			
Beryllium	1.3	NA	NA
Cadmium	102.75	1.2	**85.63**
Chromium	2047.5	81	**25.28**
Copper	50.9	34	**1.50**
Lead	53.6	46.7	**1.15**
Mercury	0.114	0.15	0.76
Nickel	25.8	20.9	**1.23**
Selenium	8.8	1	**8.80**
Silver	0.93	1	0.93
Thallium	8.7	NA	NA
Zinc	190.2	150	**1.27**
Pesticides (ug/kg)			
Endosulfan I	0.105	None	NA
Endosulfan II	0.315	None	NA
Endosulfan sulfate	0.315	None	NA
Methoxychlor	0.525	None	NA
Toxaphene	3.15	None	NA
Semivolatile organics (ug/kg)			
2,4,5-Trichlorophenol	368.3	None	NA
2,4,6-Trichlorophenol	311.6	None	NA
2,4-Dichlorophenol	311.7	None	NA
2,4-Dimethylphenol	311.7	29	**10.75**
2,4-Dinitrophenol	1335	None	NA
2,4-Dinitrotoluene	311.7	None	NA
2,6-Dinitrotoluene	311.7	None	NA
2-Chloronaphthalene	311.7	None	NA
2-Chlorophenol	311.7	None	NA
2-Methylnaphthalene	311.7	70	NA
2-Methylphenol (o-Cresol)	311.7	63	**4.95**
2-Nitroaniline	1335	None	NA
2-Nitrophenol	311.7	None	NA
3,3'-Dichlorobenzidine	311.7	None	NA
3-Nitroaniline	1335	None	NA
4,6-Dinitro-2-methyphenol	1324.2	None	NA
4-Bromophenyl phenyl ether	311.7	None	NA
4-Chloro-3-methylphenol	553.3	None	NA
4-Chlorphenyl phenyl ether	311.7	None	NA
4-Nitroaniline	1335	None	NA
4-Nitrophenol	1335	100	**13.35**
Acenaphthene	311.7	16	**19.48**
Acenaphthylene	362.5	44	**8.24**
Acrolein	731.3	None	NA
Acrylonitrile	731.3	None	NA
Anthracene	311.7	85.3	**3.65**
Benzo(a)anthracene	495	261	**1.90**

COPC	Sediment Mean	Toxicity Reference Value	Ecological Quotient (EQ_{mean})
Benzo(a)pyrene	528.3	430	**1.23**
Benzo(g,h,I)peryiene	461.7	670	0.7
Benzo(k)fluoranthene	495	240	**2.06**
bis(2-Chloroethoxy)methane	311.7	None	NA
bis(2-Chloroisopropyl)ether	311.7	None	NA
bis(2-Chloroethyl)ether	1078.3	None	NA
Bis(2-ethylhexyl) phthalate	1078.3	1300	NA
Benzyl butyl phthalate	311.7	63	NA
Carbazole	311.7	None	NA
Chrysene	528.3	384	**1.4**
Dibenz(a,h)anthracene	311.7	63.4	**4.92**
Diethyl phthalate	311.7	200	**1.56**
Dimethyl phthalate	311.7	71	**4.39**
Fluoranthene	728.3	600	**1.21**
Fluorene	311.7	19	**16.41**
Hexachlorobenzene	311.7	22	NA
Hexachlorobutadiene	201.6	11	NA
Hexachlorocylcopentadiene	311.7	None	NA
Hexachloroethane	311.7	None	NA
Indeno(1,2,3-cd)pyrene	478.3	600	0.8
Isophorone	311.7	None	NA
Naphthalene	552.9	160	**3.46**
Nitrobenzene	311.7	None	NA
N-Nitroso-di-n-propylamine	311.7	None	NA
N-Nitrosodiphenylamine	311.7	28	**11.13**
Pentachlorophenol	1335	360	**3.71**
Phenanthrene	545	240	**2.27**
Phenol	311.7	420	0.74
Pyrene	728.3	665	**1.1**
Volatile Organics (ug/kg)			
1,1-Dichloroethene	25.3	None	NA
1,1-Dichloropropene	25.3	None	NA
1,2,3-Trichlorbenzene	25.3	40	0.63
1,2,3-Trichloropropane	25.3	None	NA
1,2,4-Trichlorobenzene	160.2	40	**4.01**
1,2,4-Trimethylbenzene	2352.6	None	NA
1,2-Dibromo-3-chloropropane	25.3	None	NA
1,2-Dichlorobenzene	160.2	35	**4.6**
1,3,5-Trimethylbenzene	875.3	None	NA
1,3-Dichlorobenzene	160.2	None	NA
1,3-Dichloropropane	25.3	None	NA
1,4-Dichlorobenzene	160.2	110	**1.46**
2,2-Dichloropropane	25.3	None	NA
2-Chlorotoluene	25.3	None	NA
2-Butanone (MEK)	498.1	None	NA
2-Hexanone (MBK)	253.9	None	NA
4-Chlorotoluene	25.3	None	NA
Acetone	550	None	NA
Benzene	31.4	None	NA

COPC	Sediment Mean	Toxicity Reference Value	Ecological Quotient (EQ_{mean})
Bromobenzene	25.3	None	NA
Bromomethane (methyl bromi	49.7	None	NA
Carbon disulfide	36.9	None	NA
Chloroethane	49.7	None	NA
Chloromethane	49.7	None	NA
cis-1,2-Dichloroethene	5717	None	NA
Dibromochloromethane	25.3	None	NA
Dibromomethane	25.3	None	NA
Dichlorodifluoromethane	49.7	None	NA
Ethylbenzene	2507.4	10	250.74
Isopropylbenzene (Cumene)	185.7	None	NA
Methylene Chloride	37.3	None	NA
methyl-tert-butyl ether (MTBE	49.7	None	NA
n-Butylbenzene	272	None	NA
n-Propylbenzene	340.7	None	NA
p-Isopropyltoluene	272	None	NA
Sec-butylbenzene	182.4	None	NA
Styrene (monomer)	25.3	None	NA
tert-Butylbenzene	25.3	None	NA
Toluene	58348.5	None	NA
Trichloroethene	11558.2	41	281.91
Trichlorofluoromethane	25.3	None	NA
Vinyl acetate	25.3	None	NA
Vinyl chloride	160.7	None	NA
Xylenes, total	11586.8	40	289.67

Toxicity Reference Values from Efroymson et al. 1997a

* Value for 1,2-Dichlorobenzene used for 1,3-Dichlorobenzene

N/A = Not Available

TABLE 29 STEP 3 ECOLOGICAL QUOTIENTS FOR AQUATIC COMMUNITIES FOR COPCs AT MARTIN STATE AIRPORT, MARYLAND

COPC	Surface Water Mean	Toxicity Reference Value	Ecological Quotient (EQ_{mean})
Inorganics (ug/L)			
Total Cadmium	2.5	0.1	**25**
Total Copper	8.25	2.85	**2.89**
Total Lead	2.5	0.54	**4.63**
Total Silver	2.5	0.0001	**25000.00**
Dissolved Cadmium	2.5	0.1	**25**
Dissolved Copper	9.75	2.85	**3.42**
Dissolved Lead	2.5	0.54	**4.63**
Dissolved Silver	2.5	0.0001	**25000.00**
Dissolved Zinc	42.5	37	**1.15**
Semivolatile organics (ug/L)			
2,6-Dinitrotoluene	5	None	**NA**
2-Methylnaphthalene	5	None	**NA**
2-Nitroaniline	5	None	**NA**
3,3'-Dichlorobenzidine	5	None	**NA**
3,4-Methylphenol	5	None	**NA**
3-Nitroaniline	12.5	None	**NA**
4,6-Dinitro-2-methyphenol	12.5	2.3	**5.43**
4-Bromophenyl phenyl ether	5	1.5	**3.33**
4-Chloro-3-methylphenol	5	0.3	**16.7**
4-Chlorphenyl phenyl ether	5	None	**NA**
4-Nitroaniline	5	None	**NA**
Acetophenone	5	None	**NA**
Anthracene	5	0.1	**50.00**
Benzo(a)pyrene	5	0.014	**357.14**
Benzo(b)fluoranthene	5	None	**NA**
Benzo(g,h,I)perylene	5	None	**NA**
Benzo(k)fluoranthene	5	None	**NA**
bis(2-Chloroisopropyl)ether	5	None	**NA**
Benzyl butyl phthalate	5	3	**1.67**
Carbazole	5	None	**NA**
Chrysene	5	None	**NA**
Dibenz(a,h)anthracene	5	None	**NA**
Diethyl phthalate	5	3	**1.67**
Dimethyl phthalate	5	3	**1.67**
Hexachlorobenzene	5	3.68	**1.36**
Indeno(1,2,3-cd)pyrene	5	None	**NA**
N-Nitroso-di-n-propylamine	5	None	**NA**
Pyrene	5	None	**NA**
Volatile Organics (ug/L)			
1,2,3-Trichloropropane	0.5	None	**NA**
1,2,4-Trimethylbenzene	0.5	None	**NA**
1,2-Dibromo-3-chloropropane	0.5	None	**NA**
1,3,5-Trimethylbenzene	0.5	None	**NA**
1,3-Dichloropropane	0.5	None	**NA**
2-Chlorotoluene	0.5	None	**NA**
4-Chlorotoluene	0.5	None	**NA**
Bromobenzene	0.5	None	**NA**
Chloroethane	0.5	None	**NA**
Isopropylbenzene (Cumene)	0.5	None	**NA**

COPC	Surface Water Mean	Toxicity Reference Value	Ecological Quotient (EQ_{mean})
methyl-tert-butyl ether (MTBE)	3.75	None	NA
n-Butylbenzene	0.5	None	NA
n-Propylbenzene	0.5	None	NA
p-Isopropyltoluene	0.5	None	NA
o xylene	1.5	None	NA
Sec-butylbenzene	0.5	None	NA
Styrene (monomer)	0.5	None	NA
tert-Butylbenzene	0.5	None	NA
Vinyl acetate	0.5	None	NA

Toxicity Reference Values from Efroymson et al. 1997a
N/A = Not Available

AQUATIC SPECIES
MEAN CONCENTRATION HAZARD QUOTIENT VALUES
MARTIN STATE AIRPORT

	Raccoon		Mallard		Belted Kingfisher		Great Blue Heron	
Ecological Contaminants	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
of Concern	HQ_n	HQ_l	HQ_n	HQ_l	HQ_n	HQ_l	HQ_n	HQ_l
Total Cadmium	0.11	0.02	0.02	0.00	0.12	0.01	0.78	0.06
Dissolved Cadmium	0.00	0.00	0.00	0.00	0.03	0.00	0.28	0.02
Total Chromium	0.88	0.18	0.13	0.03	0.54	0.11	**3.62**	0.72
Total Copper	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.02
Dissolved Copper	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.02
Total Lead	0.01	0.00	0.00	0.00	0.01	0.00	0.06	0.01
Total Nickel	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.02**	**0.01**
Total Selenium	0.09	0.05	0.00	0.00	0.03	0.01	0.25	0.05
Total Zinc	0.01	0.00	0.00	0.00	0.04	0.00	0.28	0.03
4-Chlorophenyl phenyl ether	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	0.00	0.00	0.00	0.00	0.01	0.00	0.07	0.01
Benzo(b)fluoranthene	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.00**	**0.07**	**0.01**
Benzo(g,h,I)perylene	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.00**	**0.06**	**0.01**
Benzo(k)fluoranthene	0.00	0.00	0.00	0.00	0.01	0.00	0.07	0.01
Chrysene	0.00	0.00	0.00	0.00	0.01	0.00	0.07	0.01
Dibenz(a,h)anthracene	0.00	0.00	0.00	0.00	0.01	0.00	0.06	0.01
Fluorene	0.00	0.00	0.00	0.00	0.03	0.01	0.23	0.05
Hexachlorobenzene	0.00	0.00	0.00	0.00	0.26	0.05	2.15	0.41
Hexachlorobutadiene	0.00	0.00	0.00	0.00	0.02	0.00	0.20	0.04
Hexachlorocyclopentadiene	0.00	0.00	NA	NA	NA	NA	NA	NA
Hexachloroethane	0.00	0.00	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.00	0.00	0.00	0.00	0.01	0.00	0.07	0.01
Pentachlorophenol	0.00	0.00	**0.00**	**0.00**	**0.01**	**0.00**	**0.07**	**0.04**
Phenanthrene	0.00	0.00	**0.00**	**0.00**	**0.08**	**0.02**	**0.64**	**0.13**
Pyrene	0.00	0.00	0.00	0.00	0.01	0.00	0.07	0.01
1,1,1,2-Tetrachloroethane	0.00	0.00	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachlorethane	0.00	0.00	NA	NA	NA	NA	NA	NA
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
0	0.00	0.00	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

TABLE MSA-31 SUMMARY OF ECOLOGICAL COPC REMAINING AFTER STEP 3 RISK ASSESSMENT

Chemical	Surface Soil								Surface Water					Sediment				
	Invertebrates & Plants	Vole	Shrew	White-Footed Mouse	Red Fox	American Robin	Mourning Dove	Red-Tailed Hawk	Water Column Communities	Raccoon	Mallard	Great Blue Heron	Belted Kingfisher	Benthic Inverts.	Raccoon	Mallard	Great Blue Heron	Belted Kingfisher
Inorganics																		
Total Antimony	X																	
Total Beryllium	X													x				
Total Cadmium	X		X						X					X				
Dissolved Cadmium									X									
Total Chromium	X					X	X							X			X	
Total Copper	X								X					X				
Dissolved Copper									X									
Hexavalent Chromium	X																	
Total Lead	X						X		X					X				
Dissolved Lead									X									
Total Mercury	X																X	X
Total Nickel	X													X				
Total Selenium	X		X											X				
Total Silver	X								X									
Dissolved Silver									X									
Total Thallium	X													x				
Total Zinc	X													X				
Dissolved Zinc									X									
Pesticides																		
Endosulfan I	x													x				
Endosulfan II	x													x				
Endosulfan sulfate	x													x				
Methoxychlor														x				
Toxaphene	x													x				
Semivolatile Organics																		
2,4,5-Trichlorophenol	X													x				
2,4,6-Trichlorophenol	X													x				
2,4-Dichlorophenol	X													x				
2,4-Dimethylphenol	X													X				
2,4-Dinitrophenol	X													x				
2,4-Dinitrotoluene	x													x				
2,6-Dinitrotoluene	x								x					x				
2-Chloronaphthalene	x													x				
2-Chlorophenol	X													x				
2-Chloroethyl vinyl ether	x																	
2-Methylnapthalene	x								x					x				
2-Methyl phenol (o-Cresol)	X													X				

TABLE MSA-31 SUMMARY OF ECOLOGICAL COPC REMAINING AFTER STEP 3 RISK ASSESSMENT

Chemical	Surface Soil								Surface Water					Sediment				
	Invertebrates & Plants	Vole	Shrew	White-Footed Mouse	Red Fox	American Robin	Mourning Dove	Red-Tailed Hawk	Water Column Communities	Raccoon	Mallard	Great Blue Heron	Belted Kingfisher	Benthic Inverts.	Raccoon	Mallard	Great Blue Heron	Belted Kingfisher
2-Nitroaniline	x								x					x				
2-Nitrophenol														x				
3,3'-Dichlorobenzidine	x								x					x				
3,4-Methylphenol									x									
3-Nitroaniline	x								x					x				
4,6-Dinitro-2-methylphenol	x								X					x				
4-Bromophenyl-phenylether									X					x				
4-Chloro-3-methylphenol	x								X					x				
4-Chlorophenyl-phenylether									x					x				
4-Methylphenol (p-Cresol)	X																	
4-Nitroaniline	x								x					x				
4-Nitrophenol	X													X				
Acenaphthene	X													X				
Acenaphthylene	X													X				
Acetophenone									x									
Acrolein	x													x				
Acrylonitrile	x													x				
Anthracene	X								X					X				
Benzo(a)anthracene	X													X			X	
Benzo(a)pyrene	X								X					X				
Benzo(b)fluoranthene	X								x			x						
Benzo(g,h,i)perylene	X								x			x					X	
Benzo(k)fluoranthene	X								x			x		X			X	
bis(2-Chloroethoxy)methane	x													x				
bis(2-Chloroisopropyl)ether	x								x					x				
bis(2-Chloroethyl)ether	x													x				
bis(2-ethylhexyl)phthalate	x													x				
Benzyl butyl phthalate	x								X					x				
Carbazole	x								x					x				
Chrysene	X								x			x		X			X	
Dibenzo(a,h)anthracene	X								x			x		X			x	
Dibenzofuran	x																	
Diethyl phthalate									X					X				
Dimethyl phthalate									X					X				
Di-n-octyl phthalate	x																	
Fluoranthene	X													X				
Fluorene	X													X			x	
Hexachlorobenzene									X			x	x	x			x	x

TABLE MSA-31 SUMMARY OF ECOLOGICAL COPC REMAINING AFTER STEP 3 RISK ASSESSMENT

Chemical	Surface Soil								Surface Water					Sediment				
	Invertebrates & Plants	Vole	Shrew	White-Footed Mouse	Red Fox	American Robin	Mourning Dove	Red-Tailed Hawk	Water Column Communities	Raccoon	Mallard	Great Blue Heron	Belted Kingfisher	Benthic Inverts.	Raccoon	Mallard	Great Blue Heron	Belted Kingfisher
Hexachlorobutadiene	X													X			X	
Hexachlorocyclopentadiene														X				
Hexachloroethane	X													X				
Indeno(1,2,3-c,d)pyrene	X								X			X					X	
Isophorone	X													X				
Naphthalene														X				
Nitrobenzene														X				
N-Nitroso-di-n-propylamine	X								X					X				
N-Nitrosodiphenylamine														X				
Pentachlorphenol	X													X				
Phenanthrene	X													X			X	
Phenol	X																	
Pyrene									X					X				
Volatile Organics																		
1,1,1,2-Tetrachloroethane																		
1,1,2,2-Tetrachloroethane																		
1,1-Dichloroethene	X													X				
1,1-Dichloropropene	X													X				
1,2,3-Trichlorobenzene																		
1,2,3-Trichloropropane	X								X					X				
1,2,4-Trichlorobenzene														X				
1,2,4-Trimethylbenzene	X								X					X				
1,2-Dibromo-3-chloropropane	X								X					X				
1,2-Dichlorobenzene														X				
1,3,5-Trimethylbenzene	X								X					X				
1,3-Dichlorobenzene	X													X				
1,3-Dichloropropane	X								X					X				
1,4,-Dichlorobenzene														X				
2,2-Dichloropropane	X													X				
2-Chlorotoluene	X								X					X				
2-Butanone (MEK)	X													X				
2-Hexanone (MBK)	X													X				
4-Chlorotoluene	X								X					X				
Acetone	X													X				
Benzene														X				
Bromobenzene	X								X					X				
Bromomethane (methyl bromide)	X													X				
Carbon Disulfide	X													X				

TABLE MSA-31 SUMMARY OF ECOLOGICAL COPC REMAINING AFTER STEP 3 RISK ASSESSMENT

Chemical	Surface Soil								Surface Water					Sediment				
	Invertebrates & Plants	Vole	Shrew	White-Footed Mouse	Red Fox	American Robin	Mourning Dove	Red-Tailed Hawk	Water Column Communities	Raccoon	Mallard	Great Blue Heron	Belted Kingfisher	Benthic Inverts.	Raccoon	Mallard	Great Blue Heron	Belted Kingfisher
Chloroethane	x								x					x				
Chloromethane	x													x				
cis-1,2-Dichloroethene														x				
Dibromochloromethane	x													x				
Dibromomethane	x													x				
Dichlorodifluoromethane	x													x				
Ethylbenzene														X				
Isopropylbenzene (Cumene)	x								x					x				
Methylene Chloride														x				
methyl-tert-butyl-ether (MTBE)	x								x					x				
n-Butylbenzene	x								x					x				
n-Propylbenzene	x								x					x				
p-Isopropylbenzene	x								x					x				
o xylene									x									
Sec-Butylbenzene	x								x					x				
Styrene (monomer)									x					x				
tert-Butylbenzene	x								x					x				
Toluene														x				
Trichloroethene	X													X				
Trichlorofluoromethane	x													x				
Vinyl acetate	x								x					x				
Vinyl chloride														x				
Xylenes, total														x				

X - COPC remaining after Step 2

x - COPC remaining after Step 2 (only COPC because.1/2 RL greater than SRV or No SRV available)

Not Measured or not a COPC in this media.

No Toxicological Data Available

TABLE 32 ECOLOGICAL RISK ASSESSMENT SUMMARY

Assessment Endpoint	Measurement Endpoint	Result
Ecological health of terrestrial plant communities	Evaluation of soil chemistry with respect to vegetation screening values	• Mean HQs for 13 metals, 4 pesticides, 50 semi-volatile organic compounds, and 32 volatile organic compounds were > 1 or lacked a TRV, indicating potential for risk to terrestrial plants.
Ecological health of terrestrial invertebrate communities	Evaluation of soil chemistry with respect to soil invertebrate screening values	• Mean HQs for 13 metals, 4 pesticides, 50 semi-volatile organic compounds, and 32 volatile organic compounds were > 1 or lacked a TRV, indicating potential for risk to terrestrial invertebrate communities.
Long-term health and reproductive capacity of omnivorous avian species (Mourning dove)	Evaluation of dose in prey based on surface soils data and dietary exposure models	• NOAEL HQs based on the mean concentrations were below 1.0 for all COPCs except chromium and lead. • LOAEL HQs for chromium and lead were below 1.0, therefore risks to populations of the Mourning Dove from these COPCs are acceptable as no adverse effects are expected.
Long term health and reproductive capacity of invertivorous avian species (American robin)	Evaluation of dose in prey based on surface soils data and dietary exposure models	• NOAEL HQs based on the mean concentrations were below 1.0 for all COPCs except chromium. • LOAEL HQs based on the mean concentration were below 1.0 for chromium and an acceptable risk to populations of the American robin from chromium exists.
Long-term health and reproductive capacity of carnivorous avian species (Red-tailed hawk)	Evaluation of dose in prey based on surface soils data and dietary exposure models	• NOAEL HQs based on the mean concentrations were below 1.0 for all COPCs.
Long-term health and reproductive capacity of small herbivorous mammalian species (Meadow vole)	Evaluation of dose in prey based on surface soils data and dietary exposure models	• NOAEL HQs based on the mean concentrations were below 1.0 for all COPCs.
Long-term health and reproductive capacity of small carnivorous mammalian species (Short tailed shrew)	Evaluation of dose in prey based on surface soils data and dietary exposure models	• With the exception of selenium; NOAEL HQs based on mean concentrations were below 1.0 indicating acceptable risk. • LOAEL HQs based on the mean concentration were below 1.0 for selenium and an acceptable risk to populations of the short-tailed shrew from selenium exists.
Long-term health and reproductive capacity of herbivorous mammalian species (White-footed mouse)	Evaluation of dose in prey based on surface soils data and dietary exposure models	• The NOAEL HQ for all COPCs were below 1.0 indicating acceptable risk.
Long-term health and reproductive capacity of large omnivorous mammalian species (Red fox)	Evaluation of dose in prey based on surface and sub-surface soils data and dietary exposure models	• NOAEL HQs based on the mean concentrations were below 1.0 for all COPCs.

TABLE MSA-32 (continued)

Assessment Endpoint	Measurement Endpoint	Result
Ecological health of aquatic water column communities	Evaluation of surface water chemistry with respect to water quality criteria	• Mean HQs for 4 metals(both total and dissolved) and 1 metal (just dissolved, 28 semi-volatile organic compounds, and 19 volatile organic compounds were > 1, or lacked a TRV, indicating risk to aquatic water column communities.
Ecological health of benthic invertebrate communities	Evaluation of sediment chemistry with respect to sediment screening values	• Mean HQs for 9 metals, 4 pesticides, 53 semi-volatile organic compounds, and 43 volatile organic compounds were > 1 or lacked a TRV, indicating risk to benthic invertebrate communities.
Long-term health and reproductive capacity of omnivorous aquatic avian species (Mallard duck)	Evaluation of dose in prey based on surface water and sediment data and dietary exposure models	• The NOAEL HQ for all COPCs was below 1.0 indicating acceptable risk.
Long-term health and reproductive capacity of picivorous aquatic avian species (Belted kingfisher)	Evaluation of dose in prey based on surface water and sediment data and dietary exposure models	• The NOAEL HQ for all COPCs, except mercury, were below 1.0 indicating acceptable risk. • The LOAEL HQ for mercury was greater than 1.0 indicating possible risk to the belted kingfisher.
Long-term health and reproductive capacity of picivorous aquatic avian species (Great blue heron)	Evaluation of dose in prey based on surface water and sediment data and dietary exposure models	• The NOAEL HQ for all COPCs except, chromium, mercury, and hexachlorobenzene, were less than 1.0 indicating acceptable risk. • LOAEL HQs for chromium and hexachlorobenzene were less than 1.0 indicating acceptable risk as no adverse effects are expected. • LOAEL HQ for mercury was greater than 1.0 indicating possible risk to the great blue heron.
Long-term health and reproductive capacity of omnivorous aquatic mammalian species (Raccoon)	Evaluation of dose in prey based on surface water and sediment data and dietary exposure models	• The NOAEL HQ for all COPCs was below 1.0 indicating acceptable risk.