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Large Home Range Receptor Ecological Risk Assessment Report

Santa Susana Field Laboratory, Ventura County, California

Draft

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Prepared for The Boeing Company

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Acronyms and Abbreviations

2007 Consent Order	Consent Order for Corrective Action Order
µg/L	microgram(s) per liter
AOC	Administrative Order on Consent
AUF	area use factor
bgs	below ground surface
Boeing	The Boeing Company
BTV	background threshold value
CMS	corrective measures study
COEC	chemical of ecological concern
CPEC	chemical of potential ecological concern
DOE	U.S. Department of Energy
DSFR	Data Summary and Findings Report
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
EcoCSM	ecological conceptual site model
EcoRBSL	ecological risk-based screening level
EPC	exposure point concentration
ERA	ecological risk assessment
GIS	geographic information system
HI	hazard index
HQ	hazard quotient
IDW	Inverse Distance Weight
ISM	incremental sampling methodology
LHR	large home range
mg/kg	milligram(s) per kilogram
MW	molecular weight
NASA	National Aeronautics and Space Administration
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
SSFL	Santa Susana Field Laboratory
T&E	threatened or endangered
TCDD	tetrachlorodibenzo-p-dioxin
TEQ	toxicity equivalent
UCL	upper confidence limit
WOE	weight of evidence

1. Introduction

1.1 Purpose and Scope

This report was prepared for The Boeing Company (Boeing) and presents the findings of the large home range receptor ecological risk assessment (LHR ERA) for the Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) Boeing Subareas at the Santa Susana Field Laboratory (SSFL) in Ventura County, California. The objective of this LHR ERA is to determine whether exposure to current concentrations of bioaccumulative chemicals in environmental media at the site could pose unacceptable risks[1] to LHR ecological receptors and requires evaluation of corrective action as part of a corrective measures study (CMS), or if potential risks to LHR ecological receptors are acceptable. If current concentrations of bioaccumulative chemicals in environmental media at the site pose unacceptable risks, this report identifies the primary contributors to the unacceptable risks that are recommended for further evaluation during the CMS. The primary contributors to unacceptable risks identified based on the results of the LHR ERA serve to refine the selection of the media and areas of each Boeing RFI Subarea and media and areas of the former Rocketdyne-Atomics International Rifle and Pistol Club trap and skeet shooting range investigation area (Former Shooting Range) that are recommended for further evaluation during the CMS.

The LHR ERA was performed following the methods and assumptions described in the *Standardized Risk Assessment Methodology (SRAM) Work Plan, Revision 3, Santa Susana Field Laboratory, Ventura County, California* (SRAM Rev. 3) (Stantec, 2018a). Chemical sampling results for environmental media at the Boeing RFI Subareas and Former Shooting Range were used to estimate potential risks to LHR ecological receptors and to identify the primary chemicals contributing to unacceptable risks, if any.

1.2 Background

The Consent Order for Corrective Action (2007 Consent Order) (DTSC, 2007) identifies 11 Group Reporting Areas for the SSFL, referred to as RFI Groups (Groups 1A, 1B, and 2 through 10). Boeing is completing the RCRA Corrective Action program in accordance with the 2007 Consent Order. However, Boeing restructured the RFI Group Reporting Areas to account for requirements of the 2010 Administrative Orders on Consent (AOCs) for Remedial Action (DTSC, 2010a, 2010b). The portions of land that are not subject to the AOCs (that is, Administrative Areas I and III and the Southern Undeveloped Area) were reorganized in 2013 into nine Boeing subareas for RFI reporting to complete the RFI in accordance with the 2007 Consent Order (DTSC, 2007). The subareas consist of zero to four RFI sites, and the surrounding undeveloped land ("unaffiliated" areas). In addition, the Former Shooting Range is included in the LHR ERA (Figure 1-1)

The Boeing areas included in this LHR ERA, hereafter referred to as the Boeing Evaluation Areas, are summarized below. Site history, existing conditions, and characterization and transport-related evaluations are provided in the Data Summary and Findings Report (DSFR) for the RFI sites, including the accompanying Subarea DSFRs, and for the Former Shooting Range. The findings of risk assessments performed for small home range ecological receptors for each Boeing RFI site and for the Former Shooting Range are provided in various risk assessment reports. References to the relevant DSFRs and risk assessment reports for the Boeing Evaluations Areas are provided below.

- Subarea 1A Central – Includes the Advanced Propulsion Test Facility, Building 359, and Happy Valley North RFI sites, as well as areas unaffiliated with RFI sites in Subarea 1A Central. Site history, existing conditions, and characterization and transport-related evaluations are provided in the DSFR for each RFI site/area (MWH, 2020a; MWH, 2020b, MWH, 2020c, MWH, 2020d) and the overarching Subarea 1A Central DSFR (MWH, 2020e). The findings of risk assessments performed for small home range ecological receptors for the Subarea 1A Central RFI sites are provided in *Draft RCRA*

[1] "Risk" is a general term that refers to the estimated risks and hazards from potential exposures of human and ecological receptors to environmental media at the site.

Facility Investigation Human Health and Ecological Risk Assessment Report, Boeing RFI Subarea 1A Central, Santa Susana Field Laboratory, Ventura County, California (Stantec, 2020a).

- Subarea 1A North – Includes the Area I Landfill, B-1 Area, and Instrument and Equipment Laboratories RFI sites, as well as areas unaffiliated with RFI sites in Subarea 1A North. Some portions of Subarea 1A North are located outside the SSFL boundary and are referred to as 1A North Offsite Areas on Figure 1-1 and elsewhere in this report. Site history, existing conditions, and characterization and transport-related evaluations are provided in the DSFR for each RFI site/area (MWH, 2017a; MWH, 2017b, MWH, 2017c, MWH, 2017d) and the overarching Subarea 1A North DSFR (MWH, 2017e). The findings of risk assessments performed for small home range ecological receptors for the Subarea 1A North RFI sites are provided in *Draft RCRA Facility Investigation Human Health and Ecological Risk Assessment Report, Boeing RFI Subarea 1A North, Santa Susana Field Laboratory, Ventura County, California* (Stantec, 2020b).
- Subarea 1A South – Includes the Canyon, Happy Valley South, and Laser Engineering Test Facility/Component Test Laboratory I RFI sites, as well as areas unaffiliated with RFI sites in Subarea 1A South. Site history, existing conditions, and characterization and transport-related evaluations are provided in the DSFR for each RFI site/area (MWH, 2020f; MWH, 2020g, MWH, 2020h, MWH, 2020i) and the overarching Subarea 1A South DSFR (MWH, 2020j). The findings of risk assessments performed for small home range ecological receptors for the Subarea 1A South RFI sites are provided in *Draft RCRA Facility Investigation Human Health and Ecological Risk Assessment Report, Boeing RFI Subarea 1A South, Santa Susana Field Laboratory, Ventura County, California* (Stantec, 2020c).
- Subarea 1B North – Includes the Bowl Area and R-1 Pond RFI sites, as well as areas unaffiliated with RFI sites in Subarea 1B North. Site history, existing conditions, and characterization and transport-related evaluations are provided in the DSFR for each RFI site/area (CH2M, 2017a; CH2M, 2017b; CH2M, 2017c) and the overarching Subarea 1B North DSFR (CH2M, 2017d). The findings of risk assessments performed for small home range ecological receptors for the Subarea 1B North RFI sites are provided in *RCRA Facility Investigation Human Health and Ecological Risk Assessment Report, Boeing RFI Subarea 1B North, Santa Susana Field Laboratory, Ventura County, California* (Jacobs, 2020a).
- Subarea 1B Southeast – Includes the Component Test Laboratory III and Perimeter Pond RFI sites, as well as areas unaffiliated with RFI sites in Subarea 1B Southeast. Site history, existing conditions, and characterization and transport-related evaluations are provided in the DSFR for each RFI site/area (CH2M, 2020a; CH2M, 2020b; CH2M, 2020c) and the overarching Subarea 1B Southeast DSFR (CH2M, 2020d). The findings of risk assessments performed for small home range ecological receptors for the Subarea 1B Southeast RFI sites are provided in *RCRA Facility Investigation Human Health and Ecological Risk Assessment Report, Boeing RFI Subarea 1B Southeast, Santa Susana Field Laboratory, Ventura County, California* (Jacobs, 2020b).
- Subarea 1B Southwest – Includes the Area I Burn Pit and Component Test Laboratory V RFI sites, as well as areas unaffiliated with RFI sites in Subarea 1B Southwest. Site history, existing conditions, and characterization and transport-related evaluations are provided in the DSFR for each RFI site/area (CH2M, 2017e; CH2M, 2017f; CH2M, 2017g) and the overarching Subarea 1B Southwest DSFR (CH2M, 2017h). The findings of risk assessments performed for small home range ecological receptors for the Subarea 1B Southwest RFI sites are provided in *RCRA Facility Investigation Human Health and Ecological Risk Assessment Report, Boeing RFI Subarea 1B Southwest, Santa Susana Field Laboratory, Ventura County, California* (Jacobs, 2020c).
- Subarea 5/9 North - Includes the Engineering Chemical Laboratory and Silvernale RFI sites, as well as areas unaffiliated with RFI sites in Subarea 5/9 North. Site history, existing conditions, and characterization and transport-related evaluations are provided in the DSFR for each RFI site/area (CH2M, 2020e; CH2M, 2020f; CH2M, 2020g) and the overarching Subarea 5/9 North DSFR (CH2M, 2020h). The findings of risk assessments performed for small home range ecological receptors for the Subarea 5/9 North RFI sites are provided in *RCRA Facility Investigation Human Health and Ecological Risk Assessment Report, Boeing RFI Subarea 5/9 North, Santa Susana Field Laboratory, Ventura County, California* (Jacobs, 2020d).

- Subarea 5/9 South – Includes the Compound A Facility, Environmental Effects Laboratory, Systems Test Laboratory IV, and the Area III Sewage Treatment Plant RFI site, as well as areas unaffiliated with RFI sites in Subarea 5/9 South. Site history, existing conditions, and characterization and transport-related evaluations are provided in the DSFR for each RFI site/area (CH2M, 2019a; CH2M, 2019b; CH2M, 2019c; CH2M, 2019d; CH2M, 2019e) and the overarching Subarea 5/9 South DSFR (CH2M, 2019f). The findings of risk assessments performed for small home range ecological receptors for the Subarea 5/9 South RFI sites are provided in *RCRA Facility Investigation Human Health and Ecological Risk Assessment Report, Boeing RFI Subarea 5/9 South, Santa Susana Field Laboratory, Ventura County, California* (Jacobs, 2020e).
- Subarea 10 – Subarea 10 comprises approximately 800 acres of the approximately 1,200-acre southern undeveloped portion of the SSFL and is divided into the Western, Central, and Eastern watersheds. History, existing conditions, and characterization and transport-related evaluations are provided in the DSFR for Subarea 10 (CH2M, 2019g). The findings of risk assessments performed for small home range ecological receptors for Subarea 10 are provided in *RCRA Facility Investigation Human Health and Ecological Risk Assessment Report, Boeing RFI Subarea 10, Santa Susana Field Laboratory, Ventura County, California* (Jacobs, 2020f).
- Shooting Range Area – The Shooting Range Area is located north of Subarea 1A North. The property is owned by the Mountains Recreation and Conservation Authority and is being investigated under the 2007 Consent Order (DTSC, 2007). The Shooting Range Area includes the Former Shooting Range investigation area as well as an adjacent area that may be impacted by operations at the Former Shooting Range. Site history, existing conditions, and characterization and transport-related evaluations is provided in the DSFR for the Former Shooting Range (Stantec, 2020d). The findings of risk assessments performed for small home range ecological receptors for the Shooting Range Area are provided in *Draft RCRA Facility Investigation Human Health and Ecological Risk Assessment Report, Former Rocketdyne-Atomics International Rifle and Pistol Club Shooting Range Investigation Area, Santa Susana Field Laboratory, Ventura County, California* (Stantec, 2020e).

Upon the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) approval of the DSFRs for Boeing RFI sites, including the accompanying Subarea DSFRs, and the Former Shooting Range DSFR, these documents will collectively serve as the Final RFI Report for these areas. Together, the Boeing RFI Subarea, RFI Site, and Former Shooting Range DSFRs, the risk assessment reports pertaining to each Boeing RFI site and the Former Shooting Range, and this LHR ERA will meet the requirements presented in Section 3.4.2 of the 2007 Consent Order once approved by DTSC.

1.3 Assumptions

This LHR ERA is based on the following assumptions and constraints, which are typical for ERAs currently being performed:

- Evaluations of current exposures are based on existing conditions.
- Future land use is assumed to remain unchanged from existing conditions or will revert to native habitat.
- The abiotic media of primary ecological concern are soil, sediment, and surface water.
- Current chemical concentrations are present at a steady state and will not change over time.
- Chemicals not analyzed for are not considered present or evaluated, although they may be indicated as uncertainties in the LHR ERA.

Potential ecological risks are evaluated and presented in this LHR ERA for the mule deer, bobcat, red-tailed hawk, and great blue heron, which are considered LHR receptors. Small home range receptors (that is, terrestrial plants, soil invertebrates, hermit thrush, deer mouse, aquatic organisms, and benthic organisms) were evaluated in the DSFRs for each RFI Subarea.

1.4 Organization

This LHR ERA is organized as follows:

- **Section 1 – Introduction.** This section provides an introduction to the report, including the purpose and scope, site background, assumptions, and report organization.
- **Section 2 – Problem Formulation.** The problem formulation contains information on the site and/or exposure areas that will be used to focus the analysis phase of the ERA. It includes a description of the ecological setting, evaluates potential exposure pathways and routes, and identifies chemicals of potential ecological concern (CPECs) for the media of potential concern at the site.
- **Section 3 – Analysis.** The analysis phase links the problem formulation (Section 2) with the risk characterization (Section 4) and consists of the technical evaluation of ecological and chemical data to determine potential for ecological exposure and effects. The analysis phase includes the exposure characterization and ecological effects characterization.
- **Section 4 – Risk Characterization.** The ecological risk characterization evaluates the evidence linking exposures to CPECs with their potential ecological effects on the representative species being evaluated. The risk characterization includes risk estimation and weight of evidence evaluation.
- **Section 5 – Uncertainty Analysis.** The uncertainty analysis summarizes assumptions made for each element of the assessment process and qualitatively evaluates potential impacts the related uncertainties may have on interpreting the results of the LHR ERA.
- **Section 6 – Conclusions and Recommendations.** This section presents the conclusions of the LHR ERA including the chemicals of ecological concern (COECs) that are recommended for further evaluation during the CMS, if applicable.
- **Section 7 – References.** This section presents a list of references used to prepare this report.

Appendixes

- **Appendix A:** Large Home Home Range Receptor Risk Assessment Database
- **Appendix B:** Location-specific Risk Calculations
- **Appendix C:** Risk Interpolations for the Baseline Exposure Scenario
- **Appendix D:** Risk Interpolations for the Subarea-level Exposure Scenario
- **Appendix E**: Risk Interpolations for the Facility-wide Exposure Scenario

2. Problem Formulation

The problem formulation contains the background information on the site and exposure areas and is used to focus the analysis phase of the LHR ERA. It includes a description of the ecological setting, evaluates potential exposure pathways and routes, and identifies CPECs for the media of potential.

2.1 Ecological Setting

Biological conditions (including vegetation types and sensitive species) at the SSFL were initially described in the *Biological Conditions Report*, which was provided as Appendix I of the *Final Standardized Risk Assessment Methodology (SRAM) Work Plan, Santa Susana Field Laboratory, Ventura County, California, Revision 2* (MWH, 2005). More recent biological observations and summations of surveys are presented in the *Acoustical Bat Survey, Santa Susana Field Laboratory, Ventura County, California* (Forde Biological Consultants, 2014); *Biological Resources Study for the Boeing Company, Santa Susana Field Laboratory, Ventura County, California* (Padre Associates, Inc., 2016); the *Draft Program Environmental Impact Report for the Santa Susana Field Laboratory, Ventura County, CA* (DTSC, 2017); and the *Santa Susana Field Laboratory, Remediation: Biological Assessment* (DOE, 2018). The data within these reports are presented graphically in the *Geographic Information System Gold Copy Data Management Tool* (CH2M, 2016) and subsequent updates to this tool submitted to DTSC in 2017, 2018, 2019, and 2020.

Commonly observed bird and mammal species at the SSFL are presented in the following subsections and include both small home range and LHR species. Federal- or State-listed threatened or endangered (T&E)[2] other state or local species of special concern that have been observed at the SSFL are presented in Table 2-1.

2.1.1 Birds

Numerous bird species have been observed throughout the SSFL (Padre Associates, Inc., 2016). Commonly observed species include raptors (northern harrier, sharp-shined hawk, Cooper's hawk, red-tailed hawk, and American kestrel), hummingbirds, woodpeckers and flickers, passerines (sparrows, wrens, nuthatch, thrush, robin, bluebirds, goldfinch, meadowlarks, and juncos), owls, crows, swallows, orioles, kingbirds, pigeons, doves, and semi-aquatic birds (egrets, great blue heron, pelican grebe, ring-necked duck, mallard, coot, gulls, and yellowlegs).

Most bird species observed at the SSFL are protected during nesting under the Migratory Bird Treaty Act. In addition, golden eagle (*Aquila chrysaetos*), protected under the Bald Eagle and Golden Eagle Protection Act, are known to nest near the Northern Undeveloped Land.

2.1.2 Mammals

Mammals commonly observed at the SSFL include Audubon's cotton tail (*Sylvilagus audubonii*), brush rabbit (*Sylvilagus bachmani*), mule deer (subspecies black-tailed deer); *Odocoileus hemionus*), coyote (*Canis latrans*), woodrat (*Neotoma* sp.), gray fox (*Urocyon cinereoargenteus*), California ground squirrel (*Spermophilus beechei*), wester gray squirrel (*Sciurus griseus*), California vole (*Microtus californicus*), dee mouse (*Peromyscus maniculatus*). In addition, multiple cougar (*Puma concolor*) sightings have been made in the Southern Undeveloped Area as well as signs in Area I and Area II (Padre Associates, Inc., 2016).

Bat surveys conducted by Forde Biological Consultants (2014) included caves located in Area I, Area III, and the Southern Undeveloped Area. Bat species observed or recorded included Yuma myotis (*Myotis yumanensis*), California myotis (*Myotis californicus)*, western small-footed myotis (*Myotis ciliolabrum*), silver-haired bat (*Lasionycteris noctivagans*), canyon bat (*Parastrellus hesperus*), big brown bat

[2] Includes species listed, proposed, or under review by the federal government or the State of California as Threatened or Endangered.

(*Eptesicus fuscus*), western red bat (*Lasiurus blossevillii*), hoary bat (*Lasiurus cinereus*), Townsends big-eared bat (*Corynorhinus townsendii*), pallid bat (*Antrozous pallidus*), Mexican free-tailed bat (*Tadarida brasiliensis*), and greater bonneted bat (*Eumops perotis*). The western red bat, pallid bat, Townsends big-eared bat, and greater bonneted bat are listed as California Department of Fish and Wildlife Species of Special Concern. The Townsends big-eared bat is also currently a Candidate species for listing as Endangered under the California Endangered Species Act.

2.2 Conceptual Site Model for LHR Receptors

The ecological conceptual site model (EcoCSM) identifies exposures that may result under reasonably anticipated uses of the site under both current and future conditions. Input parameters used to develop the EcoCSM are described in the following subsections and the EcoCSM for LHR receptors that may use the SSFL is shown on Figure 2-1.

2.2.1 Exposure Pathway Analysis

Exposure pathways refer to the media and routes through which chemical stressors could reach ecological receptors. Potential exposure pathways must meet specific criteria for an exposure to occur. Aside from necessary habitat for ecological receptors, a complete exposure pathway must include the following elements:

- Contaminant source (for example, RFI sites, spills, or debris areas)
- Mechanism for contaminant release and transport (for example, surface runoff)
- Exposure point (for example, soil)
- Feasible route of exposure (for example, ingestion)
- Receptor (for example, bird or mammal)

Identification of potentially complete exposure pathways to be evaluated in the LHR ERA are summarized in Table 2-2.

2.2.2 Data Evaluation

CPECs for this LHR ERA were identified from existing soil, sediment, and surface water data that were evaluated according to the SRAM Rev. 3 (Stantec, 2018a). Locations of soil and sediment samples collected and analyzed throughout the SSFL are shown on Figure 2-2. Surface water samples collected from waterbodies that would provide a drinking source for LHR receptors included Silvernale Reservoir, Perimeter Pond, and R-1 Pond. Data collection, validation, and reduction for samples collected from Boeing areas were summarized in the DSFRs for each RFI Subarea. Data from soil samples collected from the U.S. Department of Energy (DOE) and National Aeronautics and Space Administration (NASA) reporting areas were also used to the extent that they were reported in the Gold Copy. Analytical data were evaluated in accordance with the processes outlined in Section 2 and Section 6 of the SRAM Rev. 3 (Stantec, 2018a) to identify the data of acceptable quality for this LHR ERA. Data considered usable for quantitative risk assessment purposes were identified for each sample location following the same procedures as used for the small home range receptor ERAs (Stantec, 2018a). The following data groupings were used for the LHR exposures and data are presented in Appendix A:

- Soil and sediment samples collected throughout both the Boeing Evaluation Areas and non-Boeing subareas of the SSFL (as shown on Figure 2-2) were combined for evaluation of potential risks to terrestrial LHR receptors (red-tailed hawk, mule deer, and bobcat). In addition, grasslands surrounding pond features were evaluated for potential risks to the great blue heron. Sediment samples were included as soil because areas are only wet seasonally and most are typically dry. Combination of soil and sediment represents the most conservative estimation of potential exposures to terrestrial receptors. Soil and sediment samples retained for evaluation were those collected from 0 to 2 feet below ground surface (bgs), based on end depth as designated in the SRAM Rev. 3 (Stantec, 2018a). Soil and sediment samples collected from depths greater than 2 feet bgs were excluded because they are beyond the typical exposure range for LHR receptors. The combined soil and sediment samples are hereafter referred to as “soil” in the text and tables.

- Soil and sediment samples that were collected within footprints of Silvernale Reservoir, Perimeter Pond, and R-1 Pond represent the most conservative scenario for the periods of time that these areas contain surface runoff and are “wet” under current or potential future conditions and were evaluated for potential risks to semi-aquatic LHR receptors (great blue heron). Soil and sediment samples retained for evaluation were collected from the area that represented the maximum “wet” footprint of each pond and were collected from 0 to 2 feet bgs, based on end depth as designated in the SRAM Rev. 3 (Stantec, 2018a). The combined soil and sediment sample locations are referred to hereafter as “lakebed sediments” in text and tables.
- Surface water samples collected from Silvernale Reservoir, Perimeter Pond, and R-1 Pond were retained for evaluation per the SRAM Rev. 3 (Stantec, 2018a) as these sources may provide a more consistent source of drinking water fo2r LHR receptors. For metals, the total recoverable fraction results were used as these represent the fraction that is potentially ingested by LHR receptors. (Note: surface water from intermittent sources such as storm water runoff were not evaluated for the LHR receptors as these events do not represent a consistent water source for LHR wildlife. They were evaluated in the small home range ERAs for potential risks to aquatic organisms, terrestrial plants, deer mice, and hermit thrush. The ecological risk-based screening levels [EcoRBSLs] for small home range receptors are more conservative than those for the LHR receptors, and as such, the small home range evaluation of potential risks from intermittent surface water runoff was the most conservative; surface water data from intermittent runoff events were not retained for the LHR ERA).

Consistent with discussions held with DTSC in June 2017 regarding data collected in the Shooting Range Area, the LHR ERA quantitatively evaluates the same data that were used in the small home range risk assessment for the Shooting Range Area. Some data collected from the Shooting Range Area were not included in quantitative evaluations and are only evaluated qualitatively, primarily due to use of older sampling methods (for example, data were not sieved), double counting for areas that were sampled under multiple methods, and focus on data with the highest potential for risk to human receptors. Although one criteria for data selection was based on human exposure, it was preferred that the datasets used in the human health risk assessment, small home range ERA, and LHR ERA be consistent. Data collected from the Shooting Range Area that were evaluated qualitatively (not quantitatively) include analytical results for Shooting Range Area-related constituents (that is, arsenic, lead, and polycyclic aromatic hydrocarbons [PAHs]) from the following investigations:

- Incremental sampling methodology (ISM) Investigation: Included both fine-fraction and coarse fraction samples. The coarse fraction results were evaluated qualitatively.
- Loop Trail Investigation: Discrete soil samples were collected along the portions of primary and secondary hiking trails that pass through the Former Shooting Range. These samples were sieved and the fine fraction samples were analyzed for lead. Data for these fine fraction samples were evaluated qualitatively.
- Migration Area and Northern Drainage Sampling Investigation: Discrete soil and sediment samples were collected at, and downstream of, potential migration areas to assess the potential transport of lead-impacted media from the shooting range to, and within, the Northern Drainage. The migration area samples located within Shooting Range Area and Subarea 1A North Offsite Areas were included in the qualitative dataset.
- Pre-RFI and RFI Data: Discrete soil samples were collected from the Shooting Range Area during Pre-RFI (1992) and RFI (2001, 2006 through 2010, 2013, and 2014) that were not sieved prior to analysis were evaluated qualitatively.

These additional qualitative data are used to provide context to exposure concentrations used in the LHR ERA, and to support the evaluation of potential COECs. The qualitative data are included in Appendix A and results of the qualitative data evaluation, including a weight-of-evidence (WOE) evaluation, are presented in the Risk Description (Section 4.3).

2.2.3 Identification of CPECs

CPECs were identified in accordance with the process described in SRAM Rev. 3 (Stantec, 2018a). The following sequential criteria were applied in the order listed below to select LHR ERA CPECs:

Soil and Lakebed Sediments

The selection criteria used to identity CPECs in soil and lakebed sediment are summarized below. Soil and lakebed sediment CPECs are shown in Table 2-3.

- The chemical was detected at the SSFL using validated laboratory analyses.
- The chemical was known to be bioaccumulative or have the potential to be bioaccumulative using the following criteria:
  - Chemicals with bioaccumulation factors greater than 1 (EPA, 2007)
  - Chemicals with a log octanol water coefficient (logKow) greater than 4.2 (EPA, 2000)
  - Naval Facilities Engineering Command list of bioaccumulative chemicals (NAVFAC, 2001)
  - Texas Natural Resources Conservation Commission list of bioaccumulative chemicals (TNRCC, 2006)
  - Chemical is similar to another bioaccumulative chemical or suspected to be bioaccumulative
- The chemical was present in excess of background values (where background information is available). The background evaluation consisted of the following:
  - If the maximum detection was above the background threshold value (BTV), or a BTV was not available, and the chemical met the preceding requirements, it was considered a CPEC.
  - If the maximum detection was below the BTV, then that chemical was not considered a CPEC.

Surface Water

The selection criteria used to identity CPECs in surface water are summarized below.

- Surface water body may serve as a drinking water source for LHR receptors.
- The chemical was detected using validated laboratory analyses.

All detected analytes in R-1 Pond, Perimeter Pond, and Silvernale Reservoir were retained as CPECs. Summary statistics for surface water are presented in Table 2-4.

3. Analysis

The analysis phase links the problem formulation (Section 2) with the risk characterization (Section 4) and consists of the technical evaluation of ecological and chemical data to determine potential for ecological exposure and effects. The analysis phase includes exposure characterization and ecological effects characterization. These two components are used to evaluate the relationships among receptors, potential exposures, and potential effects. The results provide the information necessary to estimate potential ecological hazards to representative species under current site conditions.

3.1 Exposure Characterization

The exposure characterization is used to evaluate the relationship between ecological receptors at or near the site and potential stressors (that is, CPECs). Media and receptors of potential ecological concern were identified as part of the EcoCSM, as discussed in Section 2.

3.1.1 Exposure Pathways

Exposure scenarios and receptor exposure factors for the SSFL were evaluated and presented in Section 6 of the SRAM Rev. 3 (Stantec, 2018a). The receptor groups and potential exposure scenarios evaluated for the LHR ERA are summarized below:

- **Birds:** Potential exposure routes for birds include the following:
  - **Soil:** Red-tailed hawk - exposure through incidental ingestion of soil (0 to 2 feet bgs) and food chain uptake (ingestion of food sources that may have bioaccumulated CPECs).
  - **Lakebed Sediment:** Great blue heron – exposure through incidental ingestion of lakebed sediment (0 to 2 feet bgs) and food chain uptake (ingestion of food sources that may have bioaccumulated CPECs).
  - **Surface Water:** Great blue heron – exposure through ingestion of surface water. Note: surface water ingestion was not evaluated for the red-tailed hawk as they obtain their moisture intake through prey (Stantec, 2018a).
- **Mammals:** Potential exposure routes for mammals include the following:
  - **Soil:** Mule deer and bobcat - exposure via incidental ingestion of soil (0 to 2 feet bgs) and food chain uptake (ingestion of food sources that may have bioaccumulated CPECs).
  - **Surface Water:** Mule deer and bobcat – exposure through ingestion of surface water.

3.1.2 Exposure Areas

The LHR ERA differs from the small home range receptor ERAs in that the evaluation of soil and lakebed sediment exposures was completed under three scenarios: Baseline, Subarea-level, and Facility-wide. Surface water exposures were evaluated in the same manner as the small home range receptors whereby each surface water source was evaluated independently.

Baseline Exposure Scenario – The Baseline exposure scenario represents the most conservative estimation and is not used for decision making purposes. In this exposure scenario, all sampling locations are treated as if the receptor spends all of its time there (that is, it is a location-by-location estimate) and all area use factors (AUFs) are equal to 1. The Baseline exposure scenario was prepared to provide a baseline contour of potential risks to each receptor to be used as a comparison for the other, more realistic exposure scenarios.

Subarea Exposure Scenario - The Subarea-level exposure scenario estimates potential risks of CPECs to receptors whose foraging range is larger than individual RFI sites and reporting areas, but smaller than the full SSFL facility. It is assumed that these receptors may move among/between RFI sites to access suitable habitat areas within an individual Boeing RFI Subarea. The areas evaluated under the Subarea-

level exposure scenario are those defined as Boeing Evaluation Areas on Figure 1-1. The AUF (as developed below) is based on each receptor's foraging range and the acreage of each subarea and/or offsite area.

Facility-wide Exposure Scenario – The Facility-wide exposure scenario assesses potential risks from CPECs on LHR receptors whose foraging range may be larger than subareas or may move across multiple subareas to access contiguous suitable habitat types. Potential risks at each sample location are modified based on habitat suitability for each receptor within the SSFL. The facility-wide exposure area includes all areas within the SSFL administrative boundary (Boeing Evaluation Areas and the non-Boeing subareas) as well as the portions of the Boeing Evaluations Areas that are located outside the SSFL administrative boundary (Figure 1-1).

The Subarea- and Facility-wide exposure scenarios provide two different approaches to evaluating the potential risks to LHR receptors. They are used together to identify COECs for the Boeing controlled areas of the SSFL. Evaluation of the LHR receptors for the DOE- and NASA-controlled areas (Administrative Areas II and IV, a small portion of Administrative Area I, and the Northern Undeveloped Area) is not reported in this LHR ERA report due to the regulatory agreements DOE and NASA have with DTSC for cleanup of these areas.

The red-tailed hawk, mule deer, bobcat, and great blue heron were evaluated under each of the three exposure scenarios for soil or lakebed sediments, as per each receptor's exposure model. The habitat types present at the SSFL and the suitability of each habitat type to the LHR receptors are summarized in Table 3-1. The habitats considered suitable for each LHR receptor are shown on Figure 3-1 (red-tailed hawk), Figure 3-2 (mule deer), Figure 3-3 (bobcat), and Figure 3-4 (great blue heron).

3.1.3 Area Use Factors

AUFs were used to modify the location-specific risk estimates based on the availability of suitable habitat, habitats preferred by each LHR receptor, and the typical foraging range of each LHR receptor, as documented in literature sources.

The baseline exposure scenario assumed the most conservative exposure and the AUF was set to 1 at each sampling location.

The Subarea-level receptor AUFs are a foraging range-based AUF and were calculated as the area of receptor-suitable habitat within the subarea divided by the receptor's foraging range as shown below and in Table 3-2. This foraging range-based AUF provides a more realistic estimate of potential use as most of the individual subareas are smaller than the foraging ranges of the LHR receptors and the subarea-level AUF incorporates only those habitats that are suitable for each receptor as opposed to the entire size of the subarea.

$$Subarea\ AUF = \frac{Receptor\ suitable\ habitat\ within\ subarea\ (acres)}{Receptor\ foraging\ range\ (acres)}$$

The Facility-wide receptor AUFs are a suitability-based AUF and were calculated as the amount of receptor-suitable habitat compared to the total area of the SSFL facility (all areas within the SSFL administrative boundary as well as the portions of the Boeing Evaluation Areas that are located outside the SSFL administrative boundary) calculated using the equation below and summarized in Table 3-3. The SSFL facility acreage is larger than the foraging ranges of all LHR receptors being evaluated and there is no physical impediment to restrict usage of the areas within or outside of the SSFL facility. Specifically, LHR receptors may use any portion of the SSFL facility or cross outside the SSFL facility boundaries while they forage. The use of receptor-suitable habitat versus total habitat assumes that 100% of suitable habitat within the SSFL is potentially used, but also allows for potential foraging outside the SSFL.

$$Facility\ AUF = \frac{Receptor\ suitable\ habitat\ at\ SSFL\ Facility\ (acres)}{Total\ SSFL\ Facility\ habitat\ (acres)}$$

3.1.4 Exposure Point Concentrations

Exposure point concentrations (EPCs) were calculated from concentrations measured in soil, lakebed sediment, and surface water collected during field investigations at the SSFL. The data retained for evaluation in the LHR ERA are presented in Appendix A.

For soil and lakebed sediments, the maximum detected concentration for all samples collected in the 0- to 2-foot-bgs interval for each sampling location was the location-specific EPC.[3] Due to the large number of data points, maximum detected concentrations for soil and lakebed sediment sample locations are presented as part of the risk estimate dataset (Appendix B).

For surface water, EPCs were computed using the methods described in the SRAM Rev. 3 (Stantec, 2018a) and are represented by either the upper confidence limit (UCL) on the mean concentration, as recommended by ProUCL, or the maximum detected concentration, whichever is lowest for each CPEC/water body. Due to the limited number of samples in R-1 Pond and Perimeter Pond, the EPCs were the maximum detected concentrations. Sufficient samples were collected at Silvernale Reservoir to calculate UCLs and the EPC selected was the UCL or maximum detected concentration, whichever was lowest. The EPCs for surface water are presented in Table 3-4.

3.2 Ecological Effects Characterization

The ecological effects characterization consists of an evaluation of available toxicity information that can be used to relate the exposure estimates to a level of adverse effects. This evaluation was completed for chemicals detected at the SSFL and is presented in Section 6 of the SRAM Rev. 3 (Stantec, 2018a).

EcoRBSLs are medium/chemical/receptor-specific values that were developed from the exposure and toxicity assumptions as documented in Appendixes A, C, D, and E of the SRAM Rev. 3 (Stantec, 2018a) and are summarized in Attachment 2 of the *Human Health and Ecological Risk-Based Screening Levels, Santa Susana Field Laboratory, Ventura County, California* (Stantec, 2018b).

EcoRBSLs for birds and mammals are back-calculated from receptor-specific exposure assumptions and chemical-specific toxicity reference values. Low EcoRBSLs are conservative and are mostly based on no observed adverse effect levels. High EcoRBSLs are based on mid-level effects or lowest observed adverse effect levels. The EcoRBSLs for CPECs in soils and lakebed sediments are presented for each LHR receptor in Table 3-5. The EcoRBSLs for LHR receptors for surface water are presented in Table 3-6.

[3] The EPCs used in the LHR ERA were not area-weighted values for data aggregated across the exposure areas as were used for the small home range ERAs. This difference integrates a large degree of conservancy into the resulting LHR risk estimates. This approach was necessary for preparing the geographic information system (GIS-)-based risk contours that were used in conducting this LHR ERA. Procedures for preparing the GIS-based risk contours are described in Section 4.1.1.

4. Risk Characterization

The ecological risk characterization evaluates the evidence linking exposures to CPECs with their potential ecological effects on the representative species being evaluated to identify COECs for CMS evaluation recommendations.

4.1 Risk Estimation Methods

Potential risks for soil, lakebed sediment, and surface water exposure pathways were estimated following the procedures outlined the SRAM Rev. 3 (Stantec, 2018a) and are summarized in the following subsections.

4.1.1 Soil and Lakebed Sediment

Potential ecological risks for soil and lakebed sediment exposures were calculated using the sum-of-fractions approach in combination with geographic information system (GIS) modeling to estimate potential risks for each LHR receptor at each sample location across the SSFL. The following risk estimates were completed for each CPEC/receptor pair for each of the three defined exposure scenarios: Baseline, Subarea, and Facility-wide.

- Site (or location-specific) risk estimates
- Incremental risk estimates
- Hazard indices (HIs)

Risk estimations were completed using both the Low and High EcoRBSLs for each LHR receptor. The risk estimates are presented in Appendix B for all exposure scenarios.

Site Risk. Site (or location-specific) hazard quotients (HQs) were calculated by dividing the location-specific EPC by the respective medium/chemical/receptor-specific EcoRBSLs to derive a location-specific HQ using the following equation:

$$location\ HQ = \frac{location\ EPC}{EcoRBSL}\ x\ AUF$$

Where:

Location HQ	=	hazard quotient for the individual sample location
Location EPC	=	exposure point concentration (milligrams per kilogram [mg/kg]) for the sample location
EcoRBSL	=	ecological risk-based screening level (mg/kg)
AUF	=	Baseline, Subarea, or Facility-wide AUF, as applicable (unitless)

The resulting location-specific HQs were then interpolated across the SSFL to produce an estimated risk contour. Interpolation is a procedure used to predict values for locations lacking measured data (Childs, 2004). There are several interpolation methods and selection of the best method is a function of the distribution of sample points and the phenomenon being studied. The Inverse Distance Weight (IDW) method was used to interpolate HQs across the SSFL. IDW is a geostatistical interpolation method that generally allows for more advanced prediction. The IDW interpolation method determines values for areas without measured data using a linear-weighted combination of the nearest measured sample points. The weight assigned is a function of the distance between an input point (sample location) and the output location. The greater the distance, the less influence the input point has on the output location. The resulting contour provides a visual estimation of potential risks for areas without data. Data collected from all portions of the SSFL were used to develop the risk contours for each exposure scenario/LHR receptor, regardless of habitat suitability. However, areas that are not considered suitable habitat for each receptor are indicated on the resulting risk contour figures.

Incremental Risk. Incremental risk is the additional risk that a receptor may incur from site-related exposure to chemicals in excess of the potential risks from exposure to background concentrations. Incremental risks for LHR ERA were calculated differently than for the small home range receptor ERAs due to the need to interpolate location-specific results across the SSFL in the risk contour process. Incremental risks were estimated for receptor/CPEC pairs with BTVs as follows:

$$Incremental\ HQ\ = \frac{location\ EPC - BTV}{EcoRBSL}\ x\ AUF$$

Where:

Incremental HQ	=	Incremental hazard quotient
Location EPC	=	maximum detected concentration for the sample location (mg/kg)
BTV	=	background threshold value (mg/kg)
EcoRBSL	=	ecological risk-based screening level (mg/kg)
AUF	=	Baseline, Subarea, or Facility-wide AUF, as applicable (unitless)

Incremental risks were not calculated for analytes without BTVs including aroclors, polychlorinated biphenyl (PCB) toxicity equivalents (TEQs) (PCB_TEQ_bird and PCB_TEQ_mammal), and pentachlorophenol.

Hazard Index. HIs for those chemicals within chemical classes exhibiting similar toxic mechanisms including aroclors, high molecular weight (MW) PAHs, low MW PAHs, and organochlorine pesticides were calculated by summing the location-specific HQs into a location-specific HI for the given chemical group. Location HIs for each chemical group were calculated for the Baseline, Subarea-level, and Facility-wide exposure scenarios and then interpolated across the SSFL.

4.1.2 Surface Water

Potential ecological risks for ingestion of surface water by LHR receptors were calculated using the sum of fractions approach, as described in the SRAM Rev. 3 (Stantec, 2018a). This is the same method as was used for the small home range receptors. HQs were calculated using both Low and High EcoRBSLs as follows:

$$HQ = \frac{Surface\ water\ EPC}{EcoRBSL}$$

Where:

HQ	=	hazard quotient for the individual sample location
EPC	=	exposure point concentration (micrograms per liter [µg/L]) for the surface water source
EcoRBSL	=	ecological risk-based screening level (µg/L)

Potential risks for ingestion of surface water were not interpolated as they were already constrained by the water bodies. Results of the surface water risk estimates were evaluated in the same way as they were for the small home range receptors.

4.2 Risk Estimation Results

4.1.1 Soil and Lakebed Sediment

Site risk, Incremental risk, and hazard indices (Site and Incremental) were estimated for each CPEC/receptor pair under each of the three defined exposure scenarios: Baseline, Subarea-level, and Facility-wide. CPECs with HQs exceeding 1 for at least 1 sample location in the Boeing Evaluation Areas are summarized in Table 4-1 and chemical groups with HIs exceeding 1 for the Boeing Evaluation Areas are summarized in Table 4-2. (Note: the summary presented is for all portions of the Boeing Evaluation Areas and is not limited to habitats suitable for the listed receptor). All risk estimates are presented in Appendix B.

The total number of sample locations with analytical results for each CPEC is presented in Table 4-3 along with the number of sample locations with EPCs exceeding the Low or High EcoRBSLs for Site and Incremental risks for each exposure scenario (Baseline, Subarea-level, and Facility-wide). Numbers of sample locations across the Boeing Evaluation Areas with exceedances are grouped in the following HQ ranges: 1 to 5, 5 to 10, 10 to 100, 100 to 1000, and greater than 1000. The number of exceedances is for all Boeing Evaluation Areas and locations may or may not occur in habitats suitable for the listed receptor. A similar summary of chemical group HIs exceeding 1 is presented in Table 4-4. It should be noted that the numbers of exceedances for individual sample locations exceeding EcoRBSLs do not represent an area-weighted risk. All risk estimates are included in Appendix B.

The risk contour figures present the interpolated results across the SSFL and are the basis for recommendations for risk management consideration. Risk contours (interpolations) were prepared for each exposure scenario/CPEC/receptor combination with a Site HQ exceeding 1 at both the Low and High EcoRBSL. Each risk contour figure includes the four risk interpolations completed: Site Low EcoRBSL risk interpolation, Site High EcoRBSL risk interpolation, Incremental Low EcoRBSL risk interpolation, and Incremental High EcoRBSL risk interpolation. Risk contour figures will appear blank in instances where the number of exceedances were very low, had very low HQs, or were spatially distant from each other because interpolation between those HQs to the surrounding sample locations with HQs less than 1 will reduce the overall risk for that area to be less than 1 (that is, the interpolation process is completing the ”area weighting” that would typically be done through calculating a 95 UCL EPC). Interpolations for Incremental risk will also be blank for CPECs without BTVs and therefore do not have incremental risk estimates (aroclors, PCB_TEQs, and pentachlorophenol). Risk contour figures are presented in Appendix C (Baseline exposure scenario), Appendix D (Subarea-level exposure scenario), and Appendix E (Facility-wide exposure scenario).

Baseline Risk

Baseline risk estimates were calculated using the location-specific EPC (maximum detected value of samples collected from 0 to 2 feet bgs at that location), an AUF of 1, and the Low and High EcoRBSLs. The Baseline exposure scenario was completed to present the most conservative estimate of potential risks and is used primarily for comparison purposes to the Subarea-level and Facility-wide exposure scenarios. The Baseline risk estimate is overly conservative as the use of an AUF of 1 assumes that the receptor spends its entire life at a single sample location.

CPECs with at least 1 location-specific HQ exceeding 1 at the Low EcoRBSL for the Baseline exposure scenario are summarized for each receptor in Table 4-3 with a count of how many sample locations across the Boeing Evaluation Areas had Site and Incremental HQs exceeding 1 for the Low and High EcoRBSLs for that receptor although samples may or may not occur in suitable habitats for the listed receptor. The count of how many sample locations had Site and Incremental chemical group HIs exceeding 1 at the Low and High EcoRBSLs under the Baseline exposure scenario are presented in Table 4-4. The risk estimates for each receptor including HQs and HIs under the Baseline exposure scenario are presented in Appendix B.

Baseline risk contours were prepared for each CPEC/receptor pair that had Site HQs exceeding 1 for both the Low and High EcoRBSL. Each risk contour figure includes four risk interpolations for that CPEC/receptor pair: Site Low EcoRBSL risk interpolation, Site High EcoRBSL risk interpolation, Incremental Low EcoRBSL risk interpolation, and Incremental High EcoRBSL risk interpolation. Risk contour figures for the Baseline exposure scenario are presented in Appendix C and are listed below.

- Red-tailed Hawk
  - Cadmium (Figure C-1)
  - Chromium (Figure C-2)
  - Copper (Figure C-3)
  - Lead (Figure C-4)
  - Mercury (Figure C-5)
  - Nickel (Figure C-6)
  - Zinc (Figure C-7)

  - 2,3,7,8-TCDD_TEQ_Bird (Figure C-8)
  - PCB_TEQ_Bird (Figure C-9)
  - Pentachlorophenol (Figure C-10)
- Mule Deer
  - Cadmium (Figure C-11)
  - Nickel (Figure C-12)
  - Zinc (Figure C-13)
  - 2,3,7,8-TCDD_TEQ_Mammal (Figure C-14)
  - Pentachlorophenol (Figure C-15)
- Bobcat
  - Cadmium (Figure C-16)
  - Nickel (Figure C-17)
  - Zinc (Figure C-18)
  - Aroclor-1248 (Figure C-19)
  - 2,3,7,8-TCDD_TEQ_Mammal (Figure C-20)
  - PCB_TEQ_Mammal (Figure C-21)
  - Pentachlorophenol (Figure C-22)
- Great Blue Heron
  - Selenium (Figure C-23)
  - Zinc (Figure C-24)
  - Aroclor-1254 (Figure C-25)
  - Di-n-butyl phthalate (Figure C-26)

Chemical groups with HIs exceeding 1 are summarized in Table 4-2. Chemical groups with Site HIs exceeding 1 at the Low and High EcoRBSL for each receptor are summarized below along with their respective contour figure where completed. Baseline risk contours for HI exceedances are presented in Appendix C.

- Red-tailed Hawk - none
- Mule Deer - none
- Bobcat – aroclors (Figure C-27)
- Great Blue Heron – aroclors (Figure C-28)

Subarea-level Risk

Subarea-level risk estimates were calculated using the location-specific EPC (maximum detected value), the Subarea AUFs for each receptor, and the Low and High EcoRBSLs. The location-specific Site and Incremental HQs for each sample location are presented in Appendix B.

CPECs with at least 1 location-specific HQ exceeding 1 at the Low EcoRBSL for the Subarea-level exposure scenario are summarized for each receptor in Table 4-3 with a count of how many sample locations across the Boeing Evaluation Areas had Site and Incremental HQs exceeding 1 for the Low and High EcoRBSLs for that receptor (sample locations may or may not occur in habitats suitable for the listed receptor). The count of how many sample locations had Site and Incremental HIs exceeding 1 for the Low and High EcoRBSLs under the Subarea-level exposure scenario are presented in Table 4-4. The risk estimates for each receptor including HQs and HIs under the Subarea-level exposure scenario are presented in Appendix B.

Subarea-level risk contours were prepared for each CPEC/receptor pair that had Site HQs exceeding 1 for both the Low and High EcoRBSL. Each risk contour figure includes four risk interpolations for that CPEC/receptor pair: Site Low EcoRBSL risk interpolation, Site High EcoRBSL risk interpolation, Incremental Low EcoRBSL risk interpolation, and Incremental High EcoRBSL risk interpolation. Risk contour figures for the Subarea-level exposure scenario are presented in Appendix D and are listed below.

- Red-tailed Hawk
  - Cadmium (Figure D-1)
  - Chromium (Figure D-2)
  - Lead (Figure D-3)
  - Zinc (Figure D-4)
  - 2,3,7,8-TCDD_TEQ_Bird (Figure D-5)
  - PCB_TEQ_Bird (Figure D-6)
  - Pentachlorophenol (Figure D-7)
- Mule Deer
  - Cadmium (Figure D-8)
  - Nickel (Figure D-9)
  - Zinc (Figure D-10)
  - 2,3,7,8-TCDD_TEQ_Mammal (Figure D-11)
  - Pentachlorophenol (Figure D-12)
- Bobcat
  - Cadmium (Figure D-13)
  - 2,3,7,8-TCDD_TEQ_Mammal (Figure D-14)
- Great Blue Heron
  - none

Chemical groups with Subarea-level HIs exceeding 1 are summarized in Table 4-2. There were some exceedances at the Low EcoRBSL, but no chemical groups had Site HIs exceeding 1 at the Low and High EcoRBSL (as summarized below).

- Red-tailed Hawk - none
- Mule Deer - none
- Bobcat – none
- Great Blue Heron - none

Facility-wide Risk

Facility-wide risk estimates were calculated using the location-specific EPC (maximum detected value), the Facility-wide AUFs for each receptor, and the Low and High EcoRBSLs. The location-specific Site and Incremental HQs are presented in Appendix B.

CPECs with at least 1 location-specific HQ exceeding 1 at the Low EcoRBSL for the Facility-wide exposure scenario are summarized for each receptor in Table 4-3 with a count of how many sample locations across the Boeing Evaluation Areas had Site and Incremental HQs exceeding 1 for the Low and High EcoRBSLs for that receptor (sample locations may or may not occur in habitats suitable for the listed receptor). The count of how many sample locations had Site and Incremental HIs exceeding 1 for the Low and High EcoRBSLs under the Facility-wide exposure scenario are presented in Table 4-4. The risk estimates for each receptor including HQs and HIs under the Facility-wide exposure scenario are presented in Appendix B.

Facility-wide risk contours were prepared for each CPEC/receptor pair that had Site HQs exceeding 1 for both the Low and High EcoRBSL. Each risk contour figure includes four risk interpolations for that CPEC/receptor pair: Site Low EcoRBSL risk interpolation, Site High EcoRBSL risk interpolation,

Incremental Low EcoRBSL risk interpolation, and Incremental High EcoRBSL risk interpolation. Risk contour figures for the Facility-wide exposure scenario are presented in Appendix E and are listed below.

- Red-tailed Hawk
  - Cadmium (Figure E-1)
  - Copper (Figure E-2)
  - Lead (Figure E-3)
  - Zinc (Figure E-4)
  - 2,3,7,8-TCDD_TEQ_Bird (Figure E-5)
  - PCB_TEQ_Bird (Figure E-6)
  - Pentachlorophenol (Figure E-7)
- Mule Deer
  - Cadmium (Figure E-8)
  - Nickel (Figure E-9)
  - Zinc (Figure E-10)
  - 2,3,7,8-TCDD_TEQ_Mammal (Figure E-11)
  - Pentachlorophenol (Figure E-12)
- Bobcat
  - Cadmium (Figure E-13)
  - Zinc (Figure E-14)
  - Aroclor-1248 (Figure E-15)
  - 2,3,7,8-TCDD_TEQ_Mammal (Figure E-16)
  - PCB_TEQ_Mammal (Figure E-17)
  - Pentachlorophenol (Figure E-18)
- Great Blue Heron
  - Di-n-butyl phthalate (Figure E-19)

Chemical groups with HIs exceeding 1 are summarized in Table 4-2. Chemical groups with Site HIs exceeding 1 at the Low and High EcoRBSL for each receptor are summarized below along with their respective contour figure where completed. Facility-wide risk contours for HI exceedances are presented in Appendix E.

- Red-tailed Hawk - none
- Mule Deer - none
- Bobcat – aroclors (Figure E-20)
- Great Blue Heron - none

4.2.2 Surface Water

Risk estimations for ingestion of surface water by mule deer, bobcat, and great blue heron were completed for R-1 Pond, Perimeter Pond, and Silvernale Reservoir. HQs are presented in Table 4-5 for birds and Table 4-6 for mammals. There were no exceedances of the Low or High EcoRBSLs (where they were available). Potential risks from surface water were not evaluated further.

4.3 Risk Description and Weight of Evidence Evaluation

The WOE evaluation for the LHR ERA is an iterative process following the general procedures presented in the SRAM Rev. 3 (Stantec, 2018a). The LHR ERA includes the evaluation of multiple exposure scenarios (Baseline, Subarea-level, and Facility-wide) for each receptor and uses the GIS-based risk interpolation to visually present potential risks across the Boeing Evaluation Areas. Like the small home range risks assessments, the WOE considers multiple lines of evidence to identify COECs recommended for risk management consideration.

Quantitative and qualitative lines of evidence are used in the interpretation of the potential for adverse effects from CPECs to ecological receptors. Three exposure scenarios were evaluated for each CPEC/receptor (Baseline, Subarea-level, Facility-wide). As the overall objective of the LHR is to ascertain within the limits of the assessment, whether a CPEC poses a risk to LHR receptors, the results of the 3 exposure scenarios were evaluated collectively to provide a recommendation for each CPEC. The lines of evidence evaluated for each CPEC under each exposure scenario are listed below. The combined body of evidence for each CPEC is then discussed in following subsections.

- Location-specific Site HQs and Incremental HQs for each exposure scenario/CPEC/receptor. Location-specific Site and Incremental HQs were calculated for each receptor at the Low EcoRBSL and the High EcoRBSL for each exposure scenario. A summary of the number of specific locations with HQs falling within given ranges (1 to 5, 5 to 10, 10 to 100, 100 to 1000, and greater than 1000) are summarized in Table 4-3. Counts include all sample locations in the Boeing Evaluation Areas and are not limited to sample locations within suitable habitats for the receptor.
- Location-specific Site HIs and Incremental HIs for each exposure scenario/CPEC/receptor. A summary of the number of locations with chemical group HIs within the risk ranges at the Low and High EcoRBSLs are summarized in Table 4-4. Counts include all sample locations in the Boeing Evaluation Areas and are not limited to sample locations within suitable habitats for the receptor.
- GIS-based interpolated risks for each exposure scenario/CPEC/receptor. CPECs with at least 1 location-specific Site HQ exceeding 1 at the High EcoRBSL were retained for GIS-based risk interpolation for the exposure scenario/receptor with the exceedance. CPECs without any location-specific Site HQs exceeding 1 at the High EcoRBSL were not retained for interpolation. The results of the GIS-based interpolation figures for each exposure scenario are summarized in Table 4-7 and risk contour figures are presented in Appendixes C, D, and E. Included in the summary in Table 4-7 is whether estimated risks occur within suitable habitat for each receptor.
- Potential presence of Federal- or State-listed T&E bird or mammal species. Federal- or State-listed T&E bird or mammal species as well as other state or local species of special concern that have been observed at the SSFL were presented in Table 2-1. Most of these species are small home range receptors and were addressed in the individual RFI Site ERAs. Federal or State T&E bird species with large home ranges include golden eagle (BEPA), Swainson's hawk (ST), American peregrine falcon (FD/SD), California condor (FE/SE), and bank swallow (ST). T&E mammal species that may have larger foraging ranges include Townsend's big-eared bat (SC).
- Qualitative data evaluation for the Shooting Range Area. Data not selected for use in the quantitative evaluations were reviewed against BTVs and EcoRBSLs to support recommendations for bioaccumulative shooting range-related constituents.
- Uncertainties in data, exposure, and/or toxicity assumptions (Section 5).

All CPECs with at least 1 location-specific Site HQ exceeding 1 at the Low EcoRBSL for any LHR receptor are presented in Table 4-8 with the results of the GIS-based risk interpolations (where completed), an assessment of potential risks versus suitable habitat for the receptor, and a recommendation for retention or exclusion as a COEC for risk management consideration. CPECs without any location-specific Site HQs exceeding 1 at the Low EcoRBSL were considered to not pose a potential risk to ecological receptors and are not included in the WOE evaluation.

4.3.1 Soil and Lakebed Sediment

Location-specific risk exceeding 1 are summarized in Table 4-3 (CPEC HQs) and Table 4-4 (chemical group HIs). Interpolation figures are presented in Appendix C (Baseline), Appendix D (Subarea-level) and Appendix E (Facility-wide) and are summarized in Table 4-7 for each CPEC/receptor retained for interpolation. The WOE evaluation for CPECs in soil and lakebed sediment is presented in Table 4-8. Each CPEC is discussed in the following subsections with a final recommendation for retention or exclusion as a COEC.

4.3.1.1 Cadmium

Potential risks for cadmium under each exposure scenario and the overall WOE conclusion for cadmium are presented below.

Baseline Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for most of the Boeing Evaluation Areas under the Baseline exposure scenario. Site and Incremental HQs exceeding 1 occurred primarily at the Low EcoRBSL with most HQs in the 1 to 5 range. The mule deer and bobcat each had 1 location (CNBS0102 in Subarea 1A South) with a Site HQ exceeding 100 at the Low EcoRBSL. Site and Incremental HQs exceeding 1 at the High EcoRBSL were limited to a small number of locations (2 to 6) with the highest HQs less than 10 for each receptor. Site and Incremental HQs exceeding 1 for the great blue heron were limited to only 2 locations at the Low EcoRBSL and none at the High EcoRBSL.

Risk interpolations for cadmium under the Baseline exposure scenario are presented for the red-tailed hawk (Figure C-1), mule deer (Figure C-11), and bobcat (Figure C-16). Cadmium was not retained for interpolation for the great blue heron as there were no exceedances of the High EcoRBSL.

Interpolated Site and Incremental HQs at the Low EcoRBSL for the red-tailed hawk (Figure C-1) were less than 1 across much of the Boeing Evaluation Areas, however, a localized area with estimated risks up to 100 is found in Subarea 1A South. Interpolated Site and Incremental HQs at the High EcoRBSL were below 1 across much of the Boeing Evaluation Areas and the area with elevated risks in Subarea 1A South fell to below 5. This area is not within suitable habitat for the red-tailed hawk.

Interpolated Site and Incremental risks for the mule deer (Figure C-11) indicate that most risks exceeding 1 at the Low EcoRBSL are in scattered patches throughout the historically developed portions of Subareas 5/9 South, 5/9 North, 1B Southeast, 1B Southwest, 1B North, 1A South, 1A Central, and 1A North. Estimated risks in these areas range up to 100, except Subareas 5/9 North and 1B North, for which risks range up to 10. A larger area with estimated risks over 100 occurs in Subarea 1A South. Interpolated Site and Incremental HQs at the High EcoRBSL are less than 1 throughout the Boeing Evaluation Areas, with the exception of the area within the Subarea 1A South where estimated risks are less than 5.

Interpolated Site and Incremental risks for the bobcat (Figure C-16) indicate that most risks exceeding 1 at the Low EcoRBSL are in scattered patches throughout the historically developed areas in Subareas 5/9 South, 5/9 North, 1B Southeast, 1B Southwest, 1B North, 1A South, 1A Central, and 1A North. Each of these subareas, with the exception of 5/9 North, has a small localized area with estimated risks up to 100 at the Low EcoRBSL. A larger area with estimated risks over 100 occurs in Subarea 1A South. Interpolated Site and Incremental HQs at the High EcoRBSL are less than 1 throughout the Boeing Evaluation Areas with the exception of the area within the Subarea 1A South where estimated risks are less than 5.

Subarea-level Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for most of the Boeing Evaluation Areas under the Subarea-level exposure scenario. Site and Incremental HQs exceeding 1 occurred primarily at the Low EcoRBSL with most HQs in the 1 to 5 range. The mule deer and bobcat each had one location (CNBS0102 in Subarea 1A South) with a Site HQ exceeding 100 at the Low EcoRBSL. Site and Incremental HQs exceeding 1 at the High EcoRBSL were limited to a small number of locations (1 to 3 locations) with the highest HQs less than 5 for the red-tailed hawk and bobcat and less than 10 for the mule deer. There were no Site HQs exceeding 1 for the great blue heron at either the Low or High EcoRBSLs.

Risk interpolation for cadmium under the Subarea-level exposure scenario are presented in the following figures: red-tailed hawk (Figure D-1), mule deer (Figure D-8), and bobcat (Figure D-13). Cadmium was not retained for interpolation for the great blue heron as there were no location-specific exceedances of either the Low or High EcoRBSL.

Interpolated Site and Incremental HQs at the Low EcoRBSL for the red-tailed hawk (Figure D-1) were less than 1 across much of the Boeing Evaluation Areas, however an area with estimated risks up to 100 is found in Subarea 1A South. Interpolated Site and Incremental HQs at the High EcoRBSL were less than 1 with the exception of the area around location CNBS0102 in Subarea 1A South. However, this location is not within the habitat types typically suitable for the red-tailed hawk.

Interpolated Site and Incremental risks for the mule deer (Figure D-8) indicate that most estimated risks at the Low EcoRBSL are in scattered patches throughout the historically developed areas in Subareas 5/9 South, 5/9 North, 1B Southeast, 1B North, 1A North, and 1A South. Interpolated Site and Incremental HQs at the Low EcoRBSL for the mule deer are predominantly less than 5 with localized areas of estimated risks up to 100 in Subareas 1B Southeast and 5/9 South. A larger area of potential risk is found in Subarea 1A South where estimated risks exceed 100. Estimated risks in this area are driven by the 1 sample location with an HQ exceeding 100. Interpolated Site and Incremental HQs at the High EcoRBSL are less than 1 throughout the Boeing Evaluation Areas with the exception of the area within the Subarea 1A South where estimated risks are less than 5.

Interpolated Site and Incremental HQs at the Low EcoRBSL for the bobcat (Figure D-13) are predominantly less than 1 across the Boeing Evaluation Areas, with very small areas with HQs less than 5, and the small area within Subarea 1A South where estimated risks range up to 100. Interpolated Site and Incremental HQs at the High EcoRBSL are less than 1 except for the area within Subarea 1A South where estimated risks are less than 5.

Facility-wide Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for most of the Boeing Evaluation Areas under the Facility-wide exposure scenario. Site and Incremental HQs exceeding 1 occurred primarily at the Low EcoRBSL with most HQs in the 1 to 5 range. The mule deer and bobcat each had one location (CNBS0102 in Subarea 1A South) with a Site HQ exceeding 100 at the Low EcoRBSL. Site and Incremental HQs exceeding 1 at the High EcoRBSL were limited to a small number of locations (1 to 6 locations) with the highest HQs less than 5 for the red-tailed hawk and less than 10 for the mule deer and bobcat. There were no Site HQs exceeding 1 for the great blue heron at either the Low or High EcoRBSLs.

Risk interpolations for cadmium under the Facility-wide exposure scenario are presented in the following figures: red-tailed hawk (Figure E-1), mule deer (Figure E-8), and bobcat (Figure E-13). Cadmium was not retained for interpolation for the great blue heron as there were no exceedances of either the Low or High EcoRBSL.

Interpolated Site and Incremental HQs at the Low EcoRBSL for the red-tailed hawk (Figure E-1) were less than 1 across much of the Boeing Evaluation Areas, however a small area within Subarea 1A South has estimated risks up to 100. Interpolated Site and Incremental HQs at the High EcoRBSL were less than 1 with the exception of 1 sample location (CNBS0102) in Subarea 1A South (HQ<5) that is not within suitable habitat (Table 4-3).

Interpolated Site and Incremental HQs at the Low EcoRBSL for the mule deer (Figure E-8) are generally less than 1 with some areas with HQs up to 5. Localized areas of estimated risks up to 100 in Subareas 5/9 South, 1B Southeast, 1B Southwest, 1A North, and 1A Central, with a larger area in Subarea 1A South where estimated risks exceed 100. Estimated risks in this area are driven by 1 sample location (CNBS0102). Interpolated Site and Incremental HQs at the High EcoRBSL are less than 1 except for Subarea 1A South where estimated risks are less than 5.

Interpolated Site and Incremental HQs at the Low EcoRBSL for the bobcat (Figure E-13) are predominantly less than 5 with smaller areas in Subareas 1B Southeast, 1B Southwest, 5/9 South, 1A North, and 1A Central where interpolated Site HQs range up to 100 and in Subarea 1A South, where estimated risks exceed 100. Estimated risks in this area are driven by 1 sample location (CNBS0102) with an HQ exceeding 100. Interpolated Site and Incremental HQs at the High EcoRBSL are less than 1 except for the small area in Subarea 1A South where estimated risks are less than 5.

Recommendation for Cadmium. Interpolated Site and Incremental risks are summarized in Table 4-7. Final COEC recommendations are summarized in Table 4-8, including a weighting of potential risks versus habitat suitability for the receptor. Interpolated risks for the red-tailed hawk under all three exposure scenarios are considered low, with most estimated risks occurring in areas with unsuitable habitat. Interpolated risks for the mule deer and bobcat are higher in a small portion of Subarea 1A South, however elevated risks in this area are driven by a single sample location (CNBS0102) and the HQs at the High EcoRBSL are less than 5 for both receptors. Some special status LHR species (primarily raptors) may be found in the SSFL. It is unlikely that estimated risks from the one high sample location would result in adverse effects to individual T&E species. Cadmium is not recommended for retention as a COEC.

4.3.1.2 Chromium

Potential risks for chromium under each exposure scenario and the overall WOE conclusion for chromium are presented below.

Baseline Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for most of the Boeing Evaluation Areas under the Baseline exposure scenario. Locations with Site and Incremental HQs greater than 1 at the Low EcoRBSL were limited for the red-tailed hawk and the bobcat. Only one location had a Site HQ greater than 1 at the Low EcoRBSL for the great blue heron and there were no exceedances for the mule deer. The red-tailed hawk was the only receptor with Site and Incremental HQs greater than 1 at the High EcoRBSL (Table 4-3).

Baseline risk interpolations for chromium are presented for the red-tailed hawk on Figure C-2. Chromium was not retained for interpolation for the mule deer, bobcat, or great blue heron as Site HQs because all sample locations were less than 1 at the High EcoRBSL.

Interpolated Site and Incremental HQs for the red-tailed hawk are predominantly below 1 for the Boeing Evaluation Areas. Small patches with estimated risks exceeding 1 at the Low EcoRBSL are found in Subareas 5/9 South, 5/9 North, 1B Southwest, 1B Southeast, 1B North, and 1A South. The highest HQs are found in Subarea 1B North (HQs up to 10). Interpolated Site and Incremental HQs at the High EcoRBSL are below 1 with the exception of the small area in 1B North.

Subarea-level Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for most of the Boeing Evaluation Areas for the Subarea-level exposure scenario (Table 4-3). Locations with Site and Incremental HQs greater than 1 at the Low EcoRBSL were limited to the red-tailed hawk (7 locations) and the bobcat (1 location). There were no locations with HQs exceeding 1 at either the Low EcoRBSL or the High EcoRBSL for the mule deer or great blue heron. The red-tailed hawk was the only receptor with a location-specific Site HQ exceeding 1 at the High EcoRBSL and was retained for risk interpolation (presented on Figure D-2). Chromium was not retained for interpolation for mule deer, bobcat, or great blue heron because Site HQs for all sample locations were less than 1 at the High EcoRBSL.

Interpolated Site and Incremental HQs for the red-tailed hawk are predominantly less than 1 for the Boeing Evaluation Areas (Figure D-2). Estimated risks greater than 1 at the Low EcoRBSL are found in Subareas 1B North (HQs up to 10) and 1A South (HQs up to 5). Interpolated Site and Incremental risks at the High EcoRBSL are below 1.

Facility-wide Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for most of the Boeing Evaluation Areas for the Facility-wide exposure scenario (Table 4-3). The red-tailed hawk and bobcat each had sample locations with Site HQs less than 5 at the Low EcoRBSL. No receptors had exceedances at the High EcoRBSL for either Site or Incremental risks. Consequently, chromium was not retained for interpolation for any LHR receptors when evaluated under the Facility-wide exposure scenario.

Recommendation for Chromium. Interpolated Site and Incremental risks are summarized in Table 4-7. Final COEC recommendations are summarized in Table 4-8, including a weighting of potential risks

versus habitat suitability for the receptor. Location-specific Site and Incremental HQs only exceeded 1 at the High EcoRBSL for the red-tailed hawk at 3 locations under the Baseline exposure scenario and 1 location under the Subarea-level exposure scenario. There were no exceedances of the High EcoRBSL for the red-tailed hawk under the Facility-wide exposure scenario. Interpolated risks for chromium are considered low and were less than 1 at the High EcoRBSL for the Subarea-level exposure scenario. Chromium is not recommended for retention as a COEC.

4.3.1.3 Copper

Potential risks for copper under each exposure scenario and the overall WOE conclusion for copper are presented below.

Baseline Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for most of the Boeing Evaluation Areas for the Baseline exposure scenario (Table 4-3). The red-tailed hawk, mule deer, and bobcat each had sample locations with Site HQs less than 100 and the great blue heron had Site HQs less than 10 at the Low EcoRBSL. Only one sample location had Site HQ exceeding 1 at the High EcoRBSL for the red-tailed hawk. There were no Site HQs exceeding 1 for the mule deer, bobcat, or great blue heron at the High EcoRBSL.

Baseline risk interpolations for copper are presented for the red-tailed hawk on Figure C-3. Copper was not retained for interpolation for the mule deer, bobcat, or great blue heron because Site HQs for all sample locations were less than 1 at the High EcoRBSL.

Interpolated Site and Incremental HQs for the red-tailed hawk are predominantly below 1 for the Boeing Evaluation Areas. Small areas with estimated risks exceeding 1 at the Low EcoRBSL are found in the locations of RFI sites in Subareas 1B Southeast, 1B North, 1A South, 1A North, and 1A Central. Estimated risks range up to 10 in Subarea 1B Southeast and up to 100 in Subarea 1A Central. Interpolated Site and Incremental risks fall below 5 at the High EcoRBSL.

Subarea-level Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for most of the Boeing Evaluation Areas for the Subarea-level exposure scenario (Table 4-3). The red-tailed hawk and bobcat each had sample locations with Site HQs less than 10 and less than 5, respectively. The mule deer had 1 location with Site HQ less than 100, and the great blue heron had no exceedances. There were no location-specific Site HQs exceeding 1 at the High EcoRBSL for any receptor. Consequently, copper was not retained for interpolation for any LHR receptors when evaluated under the Subarea-level exposure scenario.

Facility-wide Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for most of the Boeing Evaluation Areas for the Facility-wide exposure scenario (Table 4-3). The red-tailed hawk, mule deer, and bobcat each had 1 or more sample locations with Site HQs less than 100. The great blue heron had no exceedances. There was only 1 location-specific Site HQs exceeding 1 at the High EcoRBSL for the red-tailed hawk.

Risk interpolations for copper under the Facility-wide exposure scenario are presented on Figure E-2 for the red-tailed hawk. Copper was not retained for interpolation for the mule deer, bobcat, or great blue heron under the Facility-wide exposure scenario because Site HQs for all sample locations were less than 1 at the High EcoRBSL.

Interpolated Site and Incremental HQs for the red-tailed hawk are predominantly below 1 for the Boeing Evaluation Areas. Small areas with estimated risks between 1 and 5 at the Low EcoRBSL are found in in Subareas 1B Southeast, 1A South, and 1A Central, with a single location with Site HQs less than 100 located in Subarea 1A Central. Areas with higher potential risks are located in habitats not typically suitable for the red-tailed hawk. Interpolated Site and Incremental risks fall below 1 at the High EcoRBSL.

Recommendation for Copper. Interpolated Site and Incremental risks are summarized in Table 4-7. Final COEC recommendations are summarized in Table 4-8, including a weighting of potential risks versus habitat suitability for the receptor. Interpolated risks for copper are considered low. Location

specific Site HQs at the High EcoRBSL only exceeded 1 at a single location for the red-tailed hawk in a habitat not considered typically suitable. All other interpolated Site and Incremental risks were less than 1 at the High EcoRBSL for all exposure scenarios and receptors. Copper is not recommended for retention as a COEC.

4.3.1.4 Hexavalent Chromium

Potential risks for hexavalent chromium under each exposure scenario and the overall WOE conclusion are presented below.

Baseline Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for receptors except for 1 sample location for the mule deer with a Site HQ near 1 at the Low EcoRBSL. There were no exceedances of the High EcoRBSL. Consequently, hexavalent chromium was not retained for interpolation under the Baseline exposure scenario.

Subarea-level Exposure Scenario. There were no Site or Incremental HQs exceeding 1 at the Low or High EcoRBSLs for any LHR receptor for the Subarea-level exposure scenario. Consequently, hexavalent chromium was not retained for interpolation for any LHR receptors when evaluated under the Subarea-level exposure scenario.

Facility-wide Exposure Scenario. There were no Site or Incremental HQs exceeding 1 at the Low or High EcoRBSLs for any LHR receptor for the Facility-wide exposure scenario. Consequently, hexavalent chromium was not retained for interpolation for any LHR receptors when evaluated under the Facility-wide exposure scenario.

Recommendation for Hexavalent Chromium. Interpolated Site and Incremental risks are summarized in Table 4-7. Final COEC recommendations are summarized in Table 4-8, including a weighting of potential risks versus habitat suitability for the receptor. There was only a single sample location with a Site HQ close to 1 for the mule deer under the Baseline exposure scenario. There were no exceedances for any other receptor under any of the exposure scenarios. Hexavalent chromium was not retained for interpolation. Estimated risks are considered very low. Hexavalent chromium is not recommended for retention as a COEC.

4.3.1.5 Lead

Potential risks for lead under each exposure scenario and the overall WOE conclusions for lead are presented below.

Baseline Exposure Scenario. Location-specific Site and Incremental HQs for lead ranged from less than 1 to more than 1,000 for the red-tailed hawk, up to 1,000 for the mule deer and great blue heron, and up to 100 for the bobcat at the Low EcoRBSL. However, the red-tailed hawk was the only receptor with Site and Incremental risks exceeding 1 at the High EcoRBSL and was the only receptor retained for risk interpolation. Risk interpolations for lead under the Baseline exposure scenario are presented on Figure C-4 for the red-tailed hawk.

Interpolated Site risks at the Low EcoRBSL for the red-tailed hawk (Figure C-4) range up to 100 across most of the Boeing Evaluation Areas, based on interpolation, with HQs exceeding 1,000 in the Shooting Range Area and Subarea 1A South. Interpolated Incremental risks at the Low EcoRBSL range from less than 1 to more than 1,000. However, the lower sampling density in the unaffiliated areas may lead to overestimation of potential risks. Interpolated Site and Incremental risks for the red-tailed hawk were below 1 at the High EcoRBSL across much of the Boeing Evaluation Areas and are generally less than 5 at the High EcoRBSL in the Shooting Range Area and Subareas 1A North and 1A South.

Subarea-level Exposure Scenario. Location-specific Site and Incremental HQs for lead ranged from less than 1 to more than 1,000 for the red-tailed hawk, were less than 100 for the mule deer, were less than 10 for the bobcat, and were less than 5 for the great blue heron at the Low EcoRBSL. The red-tailed

hawk was the only receptor with location-specific Site and Incremental risks exceeding 1 at the High EcoRBSL and was the only receptor retained for risk interpolation.

Risk interpolations for lead under the Subarea-level exposure scenario are presented for the red-tailed hawk on Figure D-3. Interpolated risks for the red-tailed hawk were very similar to those shown for the Baseline exposure scenario with estimated risks decreasing by an order of magnitude for most areas. Interpolated Site and Incremental risks at the Low EcoRBSL were less than 1,000 for the Shooting Range Area, but remain greater than 1,000 in a small area in Subarea 1A South. Interpolated risks at the High EcoRBSL fall to less than 1 across most of the Boeing Evaluation Areas. Small areas with interpolated Site and Incremental HQs between 1 and 5 at the High EcoRBSL are found in Subarea 1A South but does not occur in habitats considered suitable for the red-tailed hawk.

Facility-wide Exposure Scenario. Location-specific Site and Incremental HQs for lead ranged from less than 1 to more than 1,000 for the red-tailed hawk, were less than 1,000 for the mule deer, less than 100 for the bobcat, and less than 10 for the great blue heron at the Low EcoRBSL. The red-tailed hawk was the only receptor with location-specific Site and Incremental risks exceeding 1 at the High EcoRBSL and was the only receptor retained for risk interpolation.

Risk interpolations for lead under the Facility-wide exposure scenario are presented for the red-tailed hawk on Figure E-3. Interpolated risks for the red-tailed hawk are reduced from those estimated in the Subarea-level exposure scenario. Interpolated Site and Incremental risks for the Shooting Range Area exceed 1,000, and small areas of Subareas 1A South, 1A Central, 1A North, 1B North, and 5/9 South range up to 1,000 at the Low EcoRBSL. Interpolated Site and Incremental risks are below 1 for most of the Boeing Evaluation Areas and below 5 for Subareas 1A North, 1A South, and the Shooting Range Area at the High EcoRBSL.

Recommendation for Lead. Interpolated Site and Incremental risks are summarized in Table 4-7. Final COEC recommendations are summarized in Table 4-8, including a weighting of potential risks versus habitat suitability for the receptor. Lead is retained as a COEC for birds in the Shooting Range Area. Interpolated Site and Incremental risks at the High EcoRBSL do not exceed 1 for mammals under the Baseline, Subarea-level, or Facility-wide exposure scenarios. Interpolated Site and Incremental risks for the red-tailed hawk range up to 5 at the High EcoRBSL in Subarea 1A South for the Subarea-level exposure scenario but were not located in suitable habitat for the red-tailed hawk. Interpolated Site and Incremental risks for the red-tailed hawk also range up to 5 at the High Eco RBSL in the Shooting Range Area under the Facility-wide exposure scenario. This area is within suitable habitat for the red-tailed hawk. Some special status LHR species (primarily raptors) may be found in the SSFL. Lead was retained as a COEC for areas with suitable habitat in the Shooting Range Area based on slightly elevated risks to the red-tailed hawk at the High EcoRBSL under the Facility-wide exposure scenario. Lead was not retained as a COEC for areas with interpolated Site and Incremental risks less than 5 at the High EcoRBSL that did not occur within suitable habitat for the red-tailed hawk (Subareas 1A North and 1A South).

4.3.1.6 Mercury

Potential risks for mercury under each exposure scenario and the overall WOE conclusion for mercury are presented below.

Baseline Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for most of the Boeing Evaluation Areas for the Baseline exposure scenario (Table 4-3). The red-tailed hawk and mule deer each had a small number of sample locations with Site HQs exceeding 1 at the Low EcoRBSL. The bobcat and great blue heron had no exceedances. Only one sample location had Site HQ exceeding 1 at the High EcoRBSL for the red-tailed hawk with an HQ less than 5. There were no Site HQs exceeding 1 at the High EcoRBSL for the mule deer, bobcat, or great blue heron.

Baseline risk interpolations for mercury are presented for the red-tailed hawk on Figure C-5. Mercury was not retained for interpolation for the mule deer, bobcat, or great blue heron because Site HQs for all

sample locations were less than 1 at the High EcoRBSL. Interpolated Site and Incremental HQs for the red-tailed hawk are below 1 at both the Low and High EcoRBSLs.

Subarea-level Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for most of the Boeing Evaluation Areas for the Subarea-level exposure scenario (Table 4-3). The red-tailed hawk and mule deer each had a small number of sample locations with Site HQs exceeding 1 at the Low EcoRBSL. The bobcat and great blue heron had no exceedances. There were no Site HQs exceeding 1 for any LHR receptor at the High EcoRBSL. Consequently, mercury was not retained for interpolation for any LHR receptors when evaluated under the Subarea-level exposure scenario.

Facility-wide Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for most of the Boeing Evaluation Areas for the Facility-wide exposure scenario (Table 4-3). The red-tailed hawk and mule deer each had a small number of sample locations with Site HQs exceeding 1 at the Low EcoRBSL. The bobcat and great blue heron had no exceedances. There were no Site HQs exceeding 1 for any LHR receptor at the High EcoRBSL.

Mercury was not retained for interpolation for any LHR receptors when evaluated under the Facility-wide exposure scenario as Site and Incremental HQs for all sample locations were less than 1 at the High EcoRBSL.

Recommendation for Mercury. Interpolated Site and Incremental risks are summarized in Table 4-7. Final COEC recommendations are summarized in Table 4-8, including a weighting of potential risks versus habitat suitability for the receptor. Mercury was not retained for evaluation under either the Subarea-level or Facility-wide exposure scenarios as there were no exceedances of the High EcoRBSL for any LHR receptor. Interpolated risks under the Baseline exposure scenario were less than 1 at the Low and High EcoRBSLs for the red-tailed hawk. Interpolations were not completed for the mule deer, bobcat, or great blue heron as there were no exceedances of the High EcoRBSL for any of these receptors. Mercury is not recommended for retention as a COEC.

4.3.1.7 Nickel

Potential risks for nickel under each exposure scenario and the overall WOE conclusions for nickel are presented below.

Baseline Exposure Scenario. Location-specific Site and Incremental HQs for nickel ranged from less than 1 to 1,000 for the mule deer and bobcat, and were less than 100 for the red-tailed hawk and great blue heron at the Low EcoRBSL (Table 4-3). The red-tailed hawk, mule deer, and bobcat all had location-specific Site and Incremental HQs less than 5 at the High EcoRBSL and were retained for risk interpolation. The great blue heron did not have Site HQs exceeding 1 at the High EcoRBSL and was not retained for risk interpolation.

Risk interpolations for nickel under the Baseline exposure scenario are presented for the red-tailed hawk (Figure C-6), mule deer (Figure C-12), and bobcat (Figure C-17).

Interpolated Site and Incremental risks for nickel at the Low EcoRBSL for the red-tailed hawk (Figure C-6) are less than 1 for much of the Boeing Evaluation Areas. However, small areas of interpolated risks from 10 to 100 are found in Subareas 1B Southeast, 1B Southwest, and 1B North. Interpolated Site and Incremental risks for the red-tailed hawk were below 1 at the High EcoRBSL across the Boeing Evaluation Areas including those areas with higher estimated risks at the Low EcoRBSL.

Interpolated Site risks for the mule deer (Figure C-12) are over 5 for much of the Boeing Evaluation Areas, but Incremental risks are predominantly below 1 at the Low EcoRBSL. However, there are small areas with interpolated Site and Incremental risks up to 1,000 in Subareas 1B North, 1B Southeast, and 1B Southwest at the Low EcoRBSL. Interpolated Site risks fall below 1 except one small portion of Subarea 1B Southeast at the High EcoRBSL. All interpolated Incremental risks are below 1 at the High EcoRBSL.

Interpolated Site risks for the bobcat (Figure C-17) are less than 5 and interpolated Incremental risks are less than 1 for the majority of the Boeing Evaluation Areas at the Low EcoRBSL. Areas of interpolated Site risks up to 100 are found in Subareas 5/9 South, 5/9 North, 1B North, 1B Southeast, 1B Southwest, 1A South, and 1A North at the Low EcoRBSL. Interpolated Incremental risks drop below 10 for Subareas 5/9 South, 1A South, and 1A North at the Low EcoRBSL. Interpolated Site and Incremental risks at the High EcoRBSL fall to below 1 across the Boeing Evaluation Areas.

Subarea-level Exposure Scenario. Location-specific Site and Incremental HQs for nickel were less than 1,000 for the mule deer and were less than 100 for the red-tailed hawk and bobcat at the Low EcoRBSL. The great blue heron had no locations with Site or Incremental HQs exceeding 1 at the Low EcoRBSL. The mule deer was the only receptor with location-specific Site and Incremental HQs greater than 1 at the High EcoRBSL and was the only receptor retained for risk interpolation.

Risk interpolations for nickel under the Subarea-level exposure scenario are presented for the mule deer on Figure D-9. Interpolated Site risks for the mule deer are less than 10 for most of the Boeing Evaluation Areas at the Low EcoRBSL, but areas with interpolated risks up to 100 are found in each subarea and interpolated risks up to 1,000 are found in Subareas 1B Southeast and 1B North. Interpolated Incremental risks at the Low EcoRBSL are predominantly below 1 other than in larger areas in Subareas 1B North, 1B Southeast, and 1B Southwest and smaller areas in Subareas 1A South, 1A North, 5/9 North, and 5/9 South. Interpolated Incremental risks at the Low EcoRBSL in these areas range from 1 to 100, with the exception of very small areas in Subarea 1B Southeast and 1B North that have interpolated Incremental risks over 1,000. Interpolated Site and Incremental risks drop below 1 at the High EcoRBSL.

Facility-wide Exposure Scenario. Location-specific Site and Incremental HQs for nickel under the Facility-wide exposure scenario were less than 1,000 for the mule deer and bobcat and were less than 100 for the red-tailed hawk at the Low EcoRBSL. The great blue heron had no locations with Site or Incremental HQs exceeding 1 at the Low EcoRBSL. The mule deer was the only receptor with location-specific Site and Incremental HQs greater than 1 at the High EcoRBSL and was the only receptor retained for risk interpolation.

Risk interpolations for nickel under the Facility-wide exposure scenario are presented for the mule deer on Figure E-9. Interpolated Site risks for the mule deer were below 10 for most of the Boeing Evaluation Areas at the Low EcoRBSL, but areas with interpolated risks up to 1,000 are present in Subareas 1B Southeast and 1B North. Interpolated Incremental risks at the Low EcoRBSL are predominantly below 1 other than in larger areas in Subareas 5/9 North, 1B North, 1B Southeast, and 1B Southwest, which have interpolated risks up to 100, and small areas in Subareas 1B Southeast and 1B North with interpolated incremental risks up to 1,000 at the Low EcoRBSL. Interpolated Site and Incremental risks drop below 1 at the High EcoRBSL.

Recommendation for Nickel. Interpolated Site and Incremental risks are summarized in Table 4-7. Final COEC recommendations are summarized in Table 4-8, including a weighting of potential risks versus habitat suitability for the receptor. Interpolated risks for the red-tailed hawk, mule deer, and bobcat are found at the Low EcoRBSL in the historically developed areas under the Baseline Exposure Scenario. Interpolated risks for the Subarea-level and Facility-wide level exposure scenarios were only found for the mule deer at the Low EcoRBSL. Interpolated Site and Incremental risks are less than 1 at the High EcoRBSL for all exposure scenarios (Table 4-8). Nickel is not retained as a COEC.

4.3.1.8 Selenium

Potential risks for selenium under each exposure scenario and the overall WOE conclusion for selenium are presented below.

Baseline Exposure Scenario. Location-specific Site and Incremental HQs were less than 5 for red-tailed hawk and mule deer, and less than 10 for the bobcat at the Low EcoRBSL (Table 4-3). The great blue heron had 1 location with Site and Incremental HQs less than 100, all other HQs were less than 5. The great blue heron was the only receptor with Site and Incremental HQs exceeding 1 at the High EcoRBSL

and was retained for risk interpolation. The red-tailed hawk, mule deer, and bobcat did not have any Site or Incremental HQs exceeding 1 at the High EcoRBSL and were not retained for interpolation.

Baseline risk interpolations for selenium are presented for the great blue heron on Figure C-23. Interpolated Site HQs for the great blue heron are less than 1 for the majority of the Boeing Evaluation Areas at the Low EcoRBSL, with small areas up to 5 in Subareas 5/9 North and 1B Southeast and small areas up to 10 in Subarea 1B North. Interpolated Incremental HQs for the great blue heron are up to 10 in Subarea 1B North and up to 5 in Subarea 1B Southeast and are otherwise less than 1 at the Low EcoRBSL. Interpolated Site and Incremental HQs are less than 1 at the High EcoRBSL except 1 location in Subarea 1B North with Site and Incremental HQ less than 5. This location is not within the habitats evaluated for the great blue heron.

Subarea-level Exposure Scenario. Location-specific Site and Incremental HQs were less than 5 for the red-tailed hawk, mule deer, and bobcat and less than 1 for the great blue heron at the Low EcoRBSL. There were no Site or Incremental HQs exceeding 1 for any LHR receptor at the High EcoRBSL. Consequently, selenium was not retained for interpolation for any LHR receptors when evaluated under the Subarea-level exposure scenario.

Facility-wide Exposure Scenario. Location-specific Site and Incremental HQs were less than 5 for the red-tailed hawk and mule deer, less than 10 for the bobcat, and less than 1 for the great blue heron at the Low EcoRBSL. There were no Site or Incremental HQs exceeding 1 for any LHR receptor at the High EcoRBSL. Consequently, selenium was not retained for interpolation for any LHR receptors when evaluated under the Facility-wide exposure scenario.

Recommendation for Selenium. Interpolated Site and Incremental risks are summarized in Table 4-7. Final COEC recommendations are summarized in Table 4-8, including a weighting of potential risks versus habitat suitability for the receptor. Selenium was not retained for evaluation under either the Subarea-level or Facility-wide exposure scenarios as there were no location-specific Site HQs exceeding 1 at the High EcoRBSL for any LHR receptor. Interpolated risks at the High EcoRBSL under the Baseline exposure scenario for the great blue heron were limited to a single sample with HQ less than 5 that does not occur in the habitat areas evaluated for the great blue heron. Selenium is not recommended for retention as a COEC.

4.3.1.9 Silver

Potential risks for silver under each exposure scenario and the overall WOE conclusion are presented below.

Baseline Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for the red-tailed hawk, mule deer, and bobcat at the Low EcoRBSL. The great blue heron had location-specific Site and Incremental HQs primarily less than 5 with 1 location HQ less than 10 and another location HQ less than 100. No LHR receptors had location-specific HQs exceeding 1 at the High EcoRBSL. Consequently, silver was not retained for interpolation under the Baseline exposure scenario.

Subarea-level Exposure Scenario. There were no Site or Incremental HQs exceeding 1 at the Low or High EcoRBSLs for any LHR receptor for the Subarea-level exposure scenario. Consequently, silver was not retained for interpolation for any LHR receptors when evaluated under the Subarea-level exposure scenario.

Facility-wide Exposure Scenario. There were no Site or Incremental HQs exceeding 1 at the Low or High EcoRBSLs for any LHR receptor for the Facility-wide exposure scenario. Consequently, silver was not retained for interpolation for any LHR receptors when evaluated under the Facility-wide exposure scenario.

Recommendation for Silver. There were no location-specific exceedances at the High EcoRBSL for any receptor and silver was not retained for interpolation under any of the exposure scenarios. Silver is not recommended for retention as a COEC.

4.3.1.10 Zinc

Potential risks for zinc under each exposure scenario and the overall WOE conclusions for zinc are presented below.

Baseline Exposure Scenario. Location-specific Site and Incremental HQs were less than 5 at the Low EcoRBSL for most of the Boeing Evaluation Areas for the Baseline exposure scenario (Table 4-3). The red-tailed hawk had 1 location with HQs exceeding 100; mule deer, bobcat and great blue heron were all less than 100 at the Low EcoRBSL. Location-specific Site and Incremental HQs for all receptors were less than 5 at the High EcoRBSL except 1 location less than 100 for the red-tailed hawk. All receptors were retained for risk interpolation.

Risk interpolations for zinc under the Baseline exposure scenario are presented for the red-tailed hawk (Figure C-7), mule deer (Figure C-13), bobcat (Figure C-18), and great blue heron (Figure C-24).

Interpolated Site and Incremental risks for the red-tailed hawk (Figure C-7) are less than 5 at the Low EcoRBSL for much of the Boeing Evaluation Areas. Areas of interpolated Site risks from 10 to 100 are found in Subareas 5/9 South, 5/9 North, 1B Southeast, 1B North, 1A South, and 1A Central at the Low EcoRBSL. Interpolated Incremental risks from 10 to 100 at the Low EcoRBSL are also found in each of these subareas except Subarea 5/9 North. Interpolated Site and Incremental risks at the High EcoRBSL are below 1 across most of the Boeing Evaluation Areas and are below 5 in small areas in Subareas 5/9 South, 1A Central, 1B North, and 1B Southeast.

Interpolated Site and Incremental risks for the mule deer (Figure C-13) are less than 1 at the Low EcoRBSL for most of the Boeing Evaluation Areas. Areas of interpolated Site and Incremental risks from 10 to 100 are found in Subareas 5/9 South, 1B Southeast, 1B North, 1A South, and 1A Central at the Low EcoRBSL. Interpolated Site and Incremental risks at the High EcoRBSL are below 1.

Interpolated Site and Incremental risks for the bobcat (Figure C-18) are less than 1 at the Low EcoRBSL for most of the Boeing Evaluation Areas. Areas of interpolated Site and Incremental risks from 10 to 100 are found in Subareas 5/9 South, 1B Southeast, 1B North, 1A South, and 1A Central at the Low EcoRBSL. Interpolated Site and Incremental risks at the High EcoRBSL are below 1.

Interpolated Site and Incremental risks for the great blue heron (Figure C-24) are less than 1 for the majority of the Boeing Evaluation Areas. Areas of interpolated Site and Incremental risks from 10 to 100 are found in Subareas 1B North and 1B Southeast. Interpolated Site and Incremental risks at the High EcoRBSL are below 1 for the majority of the Boeing Evaluation Areas, with HQs less than 5 in small areas in Subareas 1B North and 1B Southeast. However, these areas do not occur in habitat considered suitable for the great blue heron.

Subarea-level Exposure Scenario. Location-specific Site and Incremental HQs were generally less than 5 at the Low EcoRBSL for most of the Boeing Evaluation Areas for the Subarea-level exposure scenario (Table 4-3). However, location-specific Site and Incremental HQs ranged up to 100 for the red-tailed hawk, mule deer, and bobcat at the Low EcoRBSL. Location-specific Site and Incremental HQs for the red-tailed hawk and mule deer were less than 5 at the High EcoRBSL. The bobcat and great blue heron had no location-specific exceedances at the High EcoRBSL. The red-tailed hawk and mule deer were retained for risk interpolation.

Risk interpolations for zinc under the Subarea-level exposure scenario are presented for the red-tailed hawk (Figure D-4) and the mule deer (Figure D-10).

Interpolated Site and Incremental risks for the red-tailed hawk (Figure D-4) are less than 1 at the Low EcoRBSL for much of the Boeing Evaluation Areas. Areas of interpolated Site and Incremental risks from 10 to 100 are found in Subareas 1B North and 1A South. Interpolated Site and Incremental risks at the High EcoRBSL are below 1 across the majority of the Boeing Evaluation Areas. Interpolated Site and Incremental risk are below 5 at the High EcoRBSL for those small areas with elevated risks at the Low EcoRBSL, but are not within suitable habitat for the red-tailed hawk.

Interpolated Site and Incremental risks for the mule deer (Figure D-10) are less than 1 for most of the Boeing Evaluation Areas for the Low EcoRBSL. Small areas of interpolated Site and Incremental risks up to 100 are found in Subareas 5/9 South, 1B Southeast (Site risk only), and 1A South at the Low EcoRBSL. Interpolated Site and Incremental risks at the High EcoRBSL are below 1.

Facility-wide Exposure Scenario. Location-specific Site and Incremental HQs were generally less than 5 at the Low EcoRBSL for most of the Boeing Evaluation Areas for the Subarea-level exposure scenario (Table 4-3). However, location-specific Site and Incremental HQs ranged up to 100 for the red-tailed hawk, mule deer, and bobcat at the Low EcoRBSL. Location-specific Site and Incremental HQs for the red-tailed hawk, mule deer, and bobcat were less than 5 at the High EcoRBSL. The great blue heron had no location-specific exceedances at the Low or High EcoRBSLs. The red-tailed hawk, mule deer, and bobcat were retained for risk interpolation.

Risk interpolations for zinc under the Facility-wide exposure scenario are presented for the red-tailed hawk (Figure E-4), the mule deer (Figure E-10), and the bobcat (Figure E-14).

Interpolated Site and Incremental risks for the red-tailed hawk (Figure E-4) are less than 1 at the Low EcoRBSL for much of the Boeing Evaluation Areas. Areas of interpolated Site and Incremental risks up to 10 are found in several subareas, and 1 small area with Site HQs up to 100 is found in Subarea 1B Southeast at the Low EcoRBSL. Interpolated Incremental risks are all less than 10 at the Low EcoRBSL. Interpolated Site risks at the High EcoRBSL are below 1 except the small area in Subarea 1B Southeast that has Site HQ less than 5. This area is not in suitable habitats for the red-tailed hawk. Interpolated Incremental risks at the High EcoRBSL are below 1.

Interpolated Site and Incremental risks for the mule deer (Figure E-10) are less than 1 at the Low EcoRBSL for much of the Boeing Evaluation Areas. Areas of interpolated Site and Incremental risks up to 10 are found in several subareas, and 1 small area with Site HQs up to 100 is found in Subarea 1B Southeast at the Low EcoRBSL. Interpolated Site and Incremental risks are all less than 1 at the High EcoRBSL.

Interpolated Site and Incremental risks for the bobcat (Figure E-14) are less than 1 for most of the Boeing Evaluation Areas at the Low EcoRBSL. Areas of interpolated Site and Incremental risks up to 100 at the Low EcoRBSL are found in Subareas 5/9 South, 1B Southeast, 1B North, 1A South, and 1A Central. Interpolated Site and Incremental risks at the High EcoRBSL are below 1.

Recommendation for Zinc. Interpolated Site and Incremental risks are summarized in Table 4-7. Final COEC recommendations are summarized in Table 4-8, including a weighting of potential risks versus habitat suitability for the receptor. Interpolated risks for the red-tailed hawk and mule deer under all three exposure scenarios, as well as for the bobcat under the Baseline and Facility-wide exposure scenarios, indicate potential risks for selected areas at the Low EcoRBSL. Interpolated Site and Incremental risk estimates are equal to or less than 1 at the High EcoRBSL for the mule deer under all exposure scenarios and for the bobcat under the Baseline and Facility-wide exposure scenarios. Interpolated Site and Incremental risks are less than 5 for the red-tailed hawk at the High EcoRBSL under the Baseline and Subarea-level exposure scenarios but are not in areas with suitable habitats for this receptor. Interpolated Site risks are less than 5 and interpolated Incremental risks are less than 1 for the red-tailed hawk under the Facility-wide exposure scenario. The great blue heron was not retained for evaluation under the Subarea-level or Facility-wide exposure scenarios. Zinc is not retained as a COEC.

4.3.1.11 Aroclors

Potential risks for aroclors including Aroclor-1248, Aroclor-1254, Aroclor-1260, and total aroclors are discussed together under each exposure scenario and the overall WOE conclusion for aroclors is presented below.

Baseline Exposure Scenario. Location-specific Site HQs for Aroclor-1248, Aroclor-1254, and Aroclor-1260 were less than 1 for almost all locations at the Low EcoRBSL. A small number of locations had Site HQs up to 5 for the red-tailed hawk, up to 10 for the mule deer, and up to 100 for the bobcat and great

blue heron at the Low EcoRBSL. The bobcat (Aroclor-1248) and great blue heron (Aroclor-1254) each had 1 sample location with Site HQs exceeding 1 at the High EcoRBSL. Incremental risks were not estimated for the LHR receptors as BTVs are not available for aroclors. The bobcat and great blue heron were retained for risk interpolation for Aroclor-1248 and Aroclor-1254, respectively.

Location-specific Site chemical group HIs for aroclors exceeded 1 for limited sample locations for all LHR receptors at the Low EcoRBSLs, with HIs up to 10 for the red-tailed hawk and mule deer and up to 100 for the bobcat and great blue heron. Site chemical HIs exceeded 1 at the High EcoRBSL for the bobcat and great blue heron at 1 location each. Chemical group HIs for aroclors were retained for interpolation for both the bobcat and great blue heron.

Risk interpolations for individual aroclors under the Baseline exposure scenario are presented for the bobcat (Aroclor-1248) and great blue heron (Aroclor-1254) on Figure C-19 and Figure C-25, respectively. Aroclor chemical group HI risk interpolations for the bobcat and great blue heron are presented on Figure C-27 and Figure C-28, respectively.

Interpolated Site risks for the bobcat for Aroclor-1248 (Figure C-19) are less than 1 for most of the Boeing Evaluation Areas. A small number of areas have interpolated Site HQs below 5 at the Low EcoRBSL in Subareas 5/9 North, 1B Southwest, and 1A South. There are no interpolated Site HQs exceeding 1 at the High EcoRBSL.

Interpolated Site risks for the great blue heron for Aroclor-1254 (Figure C-25) are less than 1 at the Low EcoRBSL for most of the Boeing Evaluation Areas. A small number of areas have interpolated Site HQs below 5 at the Low EcoRBSL in Subareas 5/9 South, 5/9 North, and 1B North and interpolated Site HQs up to 100 in Subarea 1B Southeast. There are no interpolated Site HQs exceeding 1 at the High EcoRBSL.

Interpolated Site total aroclor HIs for the bobcat (Figure C-27) are less than 1 for most of the Boeing Evaluation Areas at the Low EcoRBSL, however interpolated risks up to 5 are found in small portions of Subareas 5/9 North, 1B Southeast, 1B Southwest, 1A South, and 1A Central. Interpolated Site total aroclor HIs for the bobcat at the High EcoRBSL are less than 1.

Interpolated Site total aroclor HIs for the great blue heron (Figure C-28) are less than 1 for most of the Boeing Evaluation Areas at the Low EcoRBSL, but small areas have interpolated risks up to 5 within Subareas 5/9 South, 5/9 North, and 1B North, and up to 100 in Subarea 1B Southeast, however none of these areas occur within suitable habitat for the great blue heron. Interpolated Site total aroclor HIs for the great blue heron at the High EcoRBSL are less than 1.

Subarea-level Exposure Scenario. Location-specific Site HQs for Aroclor-1248, Aroclor-1254, and Aroclor-1260 were less than 1 for all or almost all locations at the Low EcoRBSL depending on the receptor. A small number of locations had Site HQs up to 5 at the Low EcoRBSL for the red-tailed hawk (Aroclor-1254 and Aroclor-1260), mule deer (Aroclor-1248 and Aroclor-1254), and bobcat (Aroclor-1248). There were no location-specific Site HQs exceeding 1 at the High EcoRBSL for any receptor. Incremental risks were not estimated for the LHR receptors because BTVs are not available for aroclors. No aroclors/receptor were retained for interpolation under the Subarea-level exposure scenario.

Location-specific Site chemical group HIs for aroclors exceeded 1 for limited sample locations for the red-tailed hawk, mule deer, and bobcat at the Low EcoRBSLs. No Site chemical group HIs exceeded 1 at the High EcoRBSL. Chemical group HIs for aroclors were not retained for interpolation for any receptor for the Subarea-level exposure scenario.

Facility-wide Exposure Scenario. Location-specific Site HQs for Aroclor-1248, Aroclor-1254, and Aroclor-1260 were less than 1 for all or almost all locations at the Low EcoRBSL depending on the receptor for the Facility-wide exposure scenario. A small number of locations had Site HQs up to 5 at the Low EcoRBSL including the red-tailed hawk (Aroclor-1254 and Aroclor-1260), mule deer (Aroclor-1248 and Aroclor-1254), and bobcat (Aroclor-1254). In addition, the bobcat had 1 location with Site HQ less than 100 for Aroclor-1248 at the Low EcoRBSL. There were no location-specific Site HQs exceeding 1 at

the High EcoRBSL for the red-tailed hawk, mule deer, or great blue heron. These receptors were not retained for risk interpolation. The bobcat had 1 location with Site HQ exceeding 1 (Aroclor-1248) at the High EcoRBSL and was retained for risk interpolation. Incremental risks were not estimated for the LHR receptors as BTVs are not available for aroclors.

Location-specific Site chemical group HIs for aroclors exceeded 1 for limited sample locations for the red-tailed hawk, mule deer, and bobcat at the Low EcoRBSLs. For the bobcat, HIs ranged up to 100 at the Low EcoRBSL. Site chemical group HIs exceeded 1 for the bobcat only at the High EcoRBSL and was retained for interpolation. Chemical group HIs for aroclors were not retained for interpolation for the red-tailed hawk, mule deer, or great blue heron for the Facility-wide exposure scenario.

Interpolated Site risks for the bobcat for Aroclor-1248 (Figure E-15) are less than 1 for most of the Boeing Evaluation Areas. A small number of areas have interpolated Site HQs below 5 at the Low EcoRBSL in Subareas 5/9 North, 1B Southwest, and 1A South. There are no interpolated Site HQs exceeding 1 at the High EcoRBSL.

Interpolated Site total aroclor HIs for the bobcat (Figure E-20) are less than 1 for most of the Boeing Evaluation Areas at the Low EcoRBSL, but there are small areas with total aroclor HIs up to 5 in Subareas 5/9 North, 1B Southwest, 1B Southeast, 1A South, and 1A Central. Interpolated Site total aroclor HIs for the bobcat at the High EcoRBSL are less than 1.

Recommendation for Aroclors. Interpolated Site and Incremental risks for aroclors are summarized in Table 4-7. Final COEC recommendations are summarized in Table 4-8, including a weighting of potential risks versus habitat suitability for the receptor. Aroclors, as individual mixtures and as total aroclor HIs, did not have Site risks exceeding the High EcoRBSLs for any receptor. Exceedances at the Low EcoRBSL were limited. Aroclors are not recommended for retention as COECs.

4.3.1.12 2,3,7,8-TCDD Toxicity Equivalent

Potential risks for 2,3,7,8-TCDD_TEQ_Bird and 2,3,7,8-TCDD_TEQ_Mammal under each exposure scenario and the overall WOE conclusion for 2,3,7,8-TCDD_TEQ are presented below.

Baseline Exposure Scenario. Location-specific Site HQs for 2,3,7,8-TCDD_TEQs (_Bird and _Mammal) were less than 1 for almost all locations at the Low EcoRBSL. A small number of locations had Site and Incremental HQs up to 100 for the mule deer, up to 1,000 for the red-tailed hawk, and over 1,000 for the bobcat at the Low EcoRBSL. There were no location-specific exceedances for the great blue heron at the Low or High EcoRBSLs. Site and Incremental location-specific HQs at the High EcoRBSL ranged up to 100 for the red-tailed hawk, up to 10 for the mule deer, and up to 1,000 for the bobcat. The red-tailed hawk, mule deer, and bobcat were retained for risk interpolation under the Baseline exposure scenario.

Baseline risk interpolations for 2,3,7,8-TCDD_TEQ_Bird are presented for the red-tailed hawk on Figure C-8. Baseline risk interpolations for 2,3,7,8-TCDD_TEQ_Mammal are presented for the mule deer on Figure C-14 and the bobcat on Figure C-20.

Interpolated Site and Incremental risks for the red-tailed hawk (Figure C-8) are less than 1 for the majority of the Boeing Evaluation Areas at the Low EcoRBSL. Interpolated Site and Incremental HQs up to 5 are found in Subareas 5/9 North, 1B North, 1A South, 1A Central, and 1A North. Site and Incremental HQs up to 10 are found in Subareas 1B Southwest and 1B Southeast. Interpolated Site and Incremental HQs are below 1 for the majority of the Boeing Evaluation Areas at the High EcoRBSL, with 2 small areas in Subarea 1B Southwest with Site and Incremental HQs up to 5, one of which is located in habitat suitable for the red-tailed hawk.

Interpolated Site and Incremental risks for the mule deer (Figure C-14) are less than 1 at the Low EcoRBSL for the majority of the Boeing Evaluation Areas. Small areas of interpolated Site and Incremental HQs up to 10 are found in Subareas 5/9 North and 1B Southwest. Interpolated Site and Incremental risks fall below 1 at the High EcoRBSL.

Interpolated Site and Incremental risks for the bobcat (Figure C-20) are less than 5 at the Low EcoRBSL for much of the Boeing Evaluation Areas. However, interpolated Site and Incremental risks up to 1,000 are found in portions of Subareas 5/9 North and 1B Southwest; interpolated Site and Incremental risks up to 100 are found in Subareas 5/9 South, 1B North, 1B Southeast, 1A South, and 1A North; and interpolated Site and Incremental risks up to 10 are found in Subarea 1A Central at the Low EcoRBSL. Interpolated Site and Incremental risks at the High EcoRBSL are predominantly below 1, but areas with interpolated risks up to 100 are found in Subareas 5/9 North and 1B Southwest and up to 5 in Subareas 5/9 South, 1B North, 1A South, and 1A North.

Subarea-level Exposure Scenario. Location-specific Site HQs for 2,3,7,8-TCDD_TEQs (_Bird and _Mammal) were less than 1 for almost all locations at the Low EcoRBSL. A small number of locations had Site and Incremental HQs up to 100 for red-tailed hawk, mule deer, and bobcat at the Low EcoRBSL. There were no exceedances for the great blue heron at the Low or High EcoRBSLs. Location-specific Site and Incremental HQs at the High EcoRBSL were less than 5 for the red-tailed hawk (2,3,7,8-TCDD_TEQ_Bird) and mule deer (2,3,7,8-TCDD_TEQ_Mammal), and less than 10 for the bobcat (2,3,7,8-TCDD_TEQ_Mammal). The red-tailed hawk, mule deer, and bobcat were retained for risk interpolation under the Subarea-level exposure scenario.

Subarea-level risk interpolations for 2,3,7,8-TCDD_TEQ_Bird are presented for the red-tailed hawk on Figure D-5. Subarea-level risk interpolations for 2,3,7,8-TCDD_TEQ_Mammal are presented for the mule deer on Figure D-11 and the bobcat on Figure D-14.

Interpolated Site and Incremental risks for the red-tailed hawk (Figure D-5) are less than 1 at the Low EcoRBSL for the majority of the Boeing Evaluation Areas with small areas of Site and Incremental HQs up to 5 in Subareas 1B Southeast, 1B Southwest, 1B North, and 1A South. Interpolated Site and Incremental HQs for the Boeing Evaluation Areas are below 1 at the High EcoRBSL.

Interpolated Site and Incremental risks for the mule deer (Figure D-11) are less than 1 for the majority of the Boeing Evaluation Areas at the Low EcoRBSL. Subareas 5/9 North and 1B Southwest have small areas with interpolated Site and Incremental risks up to 5 at the Low EcoRBSL. Interpolated Site and Incremental risks for the Boeing Evaluation Areas are below 1 at the High EcoRBSL.

Interpolated Site and Incremental risks for the bobcat (Figure D-14) are less than 1 at the Low EcoRBSL for most of the Boeing Evaluation Areas. Small areas with interpolated Site and Incremental HQs up to 5 are found in Subareas 5/9 South, 1B North, 1A South, and 1A North and up to 10 in Subareas 5/9 North and 1B Southwest at the Low EcoRBSL. Interpolated Site and Incremental risks at the High EcoRBSL are below 1 except for a small area in Subarea 1B Southwest, which is below 5.

Facility-wide Exposure Scenario. Location-specific Site HQs for 2,3,7,8-TCDD_TEQs (_Bird and _Mammal) were less than 5 for most locations at the Low EcoRBSL. A small number of locations had Site and Incremental HQs up to 100 for the red-tailed hawk and mule deer and exceeding 1,000 for the bobcat at the Low EcoRBSL. There were no exceedances for the great blue heron at the Low or High EcoRBSLs. Location-specific Site and Incremental HQs at the High EcoRBSL were less than 10 for the red-tailed hawk (2,3,7,8-TCDD_TEQ_Bird), less than 5 for the mule deer (2,3,7,8-TCDD_TEQ_Mammal), and less than 1,000 for the bobcat (2,3,7,8-TCDD_TEQ_Mammal). The red-tailed hawk, mule deer, and bobcat were retained for risk interpolation under the Facility-wide exposure scenario.

Facility-wide risk interpolations for 2,3,7,8-TCDD_TEQ_Bird are presented for the red-tailed hawk on Figure E-5. Facility-wide risk interpolations for 2,3,7,8-TCDD_TEQ_Mammal are presented for the mule deer on Figure E-11 and the bobcat on Figure E-16.

Interpolated Site and Incremental risks for the red-tailed hawk (Figure E-5) are less than 1 for the majority of the Boeing Evaluation Areas at the Low EcoRBSL. Small areas with interpolated Site and Incremental HQs up to 5 are located in Subareas 5/9 North and 1B Southwest. Interpolated Site and Incremental HQs are below 1 at the High EcoRBSL for the red-tailed hawk.

Interpolated Site and Incremental risks for the mule deer (Figure E-11) are less than 1 at the Low EcoRBSL for most of the Boeing Evaluation Areas. Interpolated Site and Incremental HQs up to 10 are found in small portions of Subareas 5/9 North and 1B Southwest at the Low EcoRBSL. Interpolated Site and Incremental risks for the Boeing Evaluation Areas are below 1 at the High EcoRBSL for the mule deer.

Interpolated Site and Incremental risks for the bobcat (Figure E-16) are less than 5 at the Low EcoRBSL for much of the Boeing Evaluation Areas. However, interpolated Site and Incremental risks up to 1,000 are found in portions of Subareas 5/9 North and 1B Southwest; up to 100 in Subareas 5/9 South, 1B Southeast, 1B North, 1A South, and 1A North; and up to 10 in Subarea 1A Central at the Low EcoRBSL. Interpolated Site and Incremental risks at the High EcoRBSL are predominantly below 1, but areas with interpolated risks up to 100 are found in Subareas 5/9 North and 1B Southwest. Areas with interpolated Site and Incremental risks up to 5 at the High EcoRBSL are found in Subareas 5/9 South, 1B North, 1A South, and 1A North.

Recommendation for 2,3,7,8-TCDD_TEQ. Interpolated Site and Incremental risks are summarized in Table 4-7. Final COEC recommendations are summarized in Table 4-8, including a weighting of potential risks versus habitat suitability for the receptor. Interpolated risks for 2,3,7,8-TCDD_TEQs under each exposure scenario were elevated for Subarea 5/9 North and Subarea 1B Southwest at the Low EcoRBSL. Interpolated Site and Incremental risks for each receptor fell below 1 at the High EcoRBSL for the majority of the Boeing Evaluation Areas for the red-tailed hawk and mule deer. Interpolated Site and Incremental risks for the bobcat remained high (HQs up to 100) in Subareas 5/9 North and 1B Southwest at the High EcoRBSL for the Facility-wide exposure scenario, and were also elevated (HQs up to 5) in Subareas 5/9 South, 1B North, 1A South, and 1A North at the High EcoRBSL. Areas with elevated interpolated risks were within suitable habitat for the bobcat. 2,3,7,8-TCDD_TEQ is recommended for retention as a COEC for mammals.

4.3.1.13 2,4,6-Trinitrotoluene

Potential risks for 2,4,6-Trinitrotoluene under each exposure scenario and the overall WOE conclusion are presented below.

Baseline Exposure Scenario. Location-specific Site HQs were less than 1 for red-tailed hawk, bobcat, and great blue heron at the Low EcoRBSL for the Baseline exposure scenario (Table 4-3). The mule deer had 1 location-specific Site HQ less than 5 at the Low EcoRBSL. No LHR receptors had location-specific Site HQs exceeding 1 at the High EcoRBSL and background values are not available to calculate Incremental HQs for any LHR receptor. 2,4,6-Trinitrotoluene was not retained for interpolation under the Baseline exposure scenario.

Subarea-level Exposure Scenario. Location-specific Site HQs were less than 1 for the red-tailed hawk, bobcat, and great blue heron at the Low EcoRBSL for the Subarea-level exposure scenario (Table 4-3). The mule deer had 1 location-specific Site HQ less than 5 at the Low EcoRBSL. No LHR receptors had location-specific Site HQs exceeding 1 at the High EcoRBSL and background values are not available to calculate Incremental HQs for any LHR receptor. 2,4,6-Trinitrotoluene was not retained for interpolation under the Subarea-level exposure scenario.

Facility-wide Exposure Scenario. Location-specific Site HQs were less than 1 for the red-tailed hawk, bobcat, and great blue heron at the Low EcoRBSL for the Facility-wide exposure scenario (Table 4-3). The mule deer had 1 location-specific Site HQ less than 5 at the Low EcoRBSL. No LHR receptors had location-specific Site HQs exceeding 1 at the High EcoRBSL and background values are not available to calculate Incremental HQs for any LHR receptor. 2,4,6-Trinitrotoluene was not retained for interpolation under the Facility-wide exposure scenario.

Recommendation for 2,4,6-Trinitrotoluene. There was only a single sample location with Site HQ exceeding 1 at the Low EcoRBSL for the mule deer. There were no location-specific exceedances at the High EcoRBSL for any receptor and 2,4,6-trinitrotoluene was not retained for interpolation under any of the exposure scenarios. 2,4,6-Trinitrotoluene is not recommended for retention as a COEC (Table 4-8).

4.3.1.14 High Molecular Weight PAHs

Potential risks for high MW PAHs as individual chemicals as well as the chemical group HI for High MW PAHs are presented below for each exposure scenario followed by the overall WOE conclusion.

Baseline Exposure Scenario. Location-specific Site and Incremental HQs for individual High MW PAHs were generally less than 1 across the Boeing Evaluation Areas at the Low EcoRBSLs except for pyrene (mule deer and bobcat); and benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene (bobcat), which each had a small number of locations (1 to 5) with Site and Incremental HQs up to 5 at the Low EcoRBSLs under the Baseline exposure scenario (Table 4-3). No LHR receptors had location-specific Site or Incremental HQs exceeding 1 at the High EcoRBSL for any High MW PAH. Individual High MW PAHs were not retained for interpolation for any LHR receptor under the Baseline exposure scenario.

Location-specific Site and Incremental chemical group HIs for High MW PAHs for the mule deer and bobcat were less than 10 at the Low EcoRBSL. There were no Site or Incremental High MW PAH HIs exceeding 1 at the High EcoRBSL for any LHR receptor. High MW PAH chemical group HIs were not retained for interpolation under the Baseline exposure scenario.

Subarea-level Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for all individual High MW PAHs except pyrene for the mule deer, which had HQs less than 5 at the Low EcoRBSL. There were no location-specific Site or Incremental HQs exceeding 1 at the High EcoRBSLs for any LHR receptor for the Subarea-level exposure scenario. No High MW PAHs were retained for interpolation for any LHR receptor under the Subarea-level exposure scenario.

Location-specific Site and Incremental chemical group HIs for High MW PAHs were less than 5 for the mule deer at the Low EcoRBSL. There were no Site or Incremental High MW PAH HIs exceeding 1 at the High EcoRBSL for any LHR receptor. High MW PAH HIs were not retained for interpolation under the Subarea-level exposure scenario.

Facility-wide Exposure Scenario. Location-specific Site and Incremental HQs for individual High MW PAHs were generally less than 1 across the Boeing Evaluation Areas at the Low EcoRBSLs except for pyrene (mule deer and bobcat); and benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene (bobcat), which each had a small number of locations (1 to 5) with Site and Incremental HQs up to 5 at the Low EcoRBSLs under the Facility-wide exposure scenario (Table 4-3). No LHR receptors had location-specific Site or Incremental HQs exceeding 1 at the High EcoRBSL for any High MW PAH. Individual High MW PAHs were not retained for interpolation for any LHR receptor under the Facility-wide exposure scenario.

Location-specific Site and Incremental chemical group HIs for High MW PAHs were less than 5 for the mule deer and less than 10 for the bobcat at the Low EcoRBSL. There were no Site or Incremental High MW PAH HIs exceeding 1 at the High EcoRBSL for any LHR receptor. High MW PAH chemical group HIs were not retained for interpolation under the Facility-wide exposure scenario.

Recommendation for High Molecular Weight PAHs. There were small numbers of location-specific Site and Incremental HQs exceeding 1 at the Low EcoRBSLs for the mule deer and bobcat depending on the exposure scenario. There were no location-specific Site or Incremental HQs exceeding 1 at the High EcoRBSL and individual High MW PAHs were not retained for interpolation for any LHR receptor under any of the exposure scenarios. The High MW PAH HI exceeded 1 for the mule deer and bobcat for the Baseline and Facility-wide exposure scenarios and for the mule deer under the Subarea-level exposure scenario. There were no High MW PAH HIs exceeding 1 at the High EcoRBSLs for any LHR receptor. High MW PAHs as Individual chemicals, and as a total group, are not recommended for retention as COECs (Table 4-8).

4.3.1.15 Low Molecular Weight PAHs

Potential risks for Low MW PAHs as individual chemicals as well as the chemical group HI for Low MW PAHs are presented below for each exposure scenario followed by the overall WOE conclusion.

Baseline Exposure Scenario. Location-specific Site and Incremental HQs for individual Low MW PAHs were generally less than 1 across the Boeing Evaluation Areas at the Low EcoRBSLs. The only exceedances at the Low EcoRBSLs were for anthracene (red-tailed hawk) and phenanthrene (red-tailed hawk and great blue heron), which each had a small number of locations (1 to 6) with Site and Incremental HQs up to 5 at the Low EcoRBSLs under the Baseline exposure scenario (Table 4-3). There were no location-specific exceedances for the mule deer or bobcat for any Low MW PAH at the Low or High EcoRBSL. No LHR receptors had location-specific Site or Incremental HQs exceeding 1 at the High EcoRBSL for any Low MW PAH. Individual Low MW PAHs were not retained for interpolation for any LHR receptor under the Baseline exposure scenario.

Location-specific Site and Incremental chemical group HIs for Low MW PAHs were less than 10 for the red-tailed hawk and less than 5 for great blue heron. There were no location-specific exceedances for the mule deer or bobcat at either the Low or High EcoRBSLs. There were no Site or Incremental Low MW PAH HIs exceeding 1 at the High EcoRBSL for any LHR receptor. Low MW PAH chemical group HIs were not retained for interpolation under the Baseline exposure scenario.

Subarea-level Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for all individual Low MW PAHs for all LHR receptors except phenanthrene for the red-tailed hawk, which had 1 location with Site and Incremental HQs less than 5 at the Low EcoRBSL. There were no location-specific Site or Incremental HQs exceeding 1 at the High EcoRBSLs for any LHR receptor for the Subarea-level exposure scenario. No Low MW PAHs were retained for interpolation for any LHR receptor under the Subarea-level exposure scenario.

Location-specific Site and Incremental chemical group HIs for Low MW PAHs were less than 5 for the red-tailed hawk at the Low EcoRBSL. There were no Site or Incremental Low MW PAH HIs exceeding 1 at the High EcoRBSL for any LHR receptor. Low MW PAH HIs were not retained for interpolation under the Subarea-level exposure scenario.

Facility-wide Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for all individual Low MW PAHs for all LHR receptors except phenanthrene for the red-tailed hawk, which had 2 locations with Site and Incremental HQs less than 5 at the Low EcoRBSL. There were no location-specific Site or Incremental HQs exceeding 1 at the High EcoRBSLs for any LHR receptor for the Facility-wide exposure scenario. No Low MW PAHs were retained for interpolation for any LHR receptor under the Facility-wide exposure scenario.

Location-specific Site and Incremental chemical group HIs for Low MW PAHs were less than 5 for the red-tailed hawk at the Low EcoRBSL. There were no Site or Incremental Low MW PAH HIs exceeding 1 at the High EcoRBSL for any LHR receptor. Low MW PAH HIs were not retained for interpolation under the Facility-wide exposure scenario.

Recommendation for Low Molecular Weight PAHs. There were small numbers of location-specific Site and Incremental HQs exceeding 1 at the Low EcoRBSLs for the red-tailed hawk and great blue heron depending on the exposure scenario. There were no location-specific Site or Incremental HQs exceeding 1 at the High EcoRBSL and individual Low MW PAHs were not retained for interpolation for any LHR receptor under any of the exposure scenarios. The Low MW PAH HI exceeded 1 for red-tailed hawk (Baseline, Subarea-level, and Facility-wide exposure scenarios) and for the great blue heron (Baseline exposure scenario). There were no Low MW PAH HIs exceeding 1 at the High EcoRBSLs for any LHR receptor. Low MW PAHs as individual chemicals and as a chemical group are not recommended for retention as COECs (Table 4-8).

4.3.1.16 Polychlorinated Biphenyl Toxicity Equivalent

Potential risks for PCB_TEQ_Bird and PCB_TEQ_Mammal under each exposure scenario and the overall WOE conclusion for PCB_TEQ are presented below.

Baseline Exposure Scenario. Location-specific Site HQs for PCB_TEQs (_Bird and _Mammal) exceeded 1 at small number of locations (1 to 4) for the red-tailed hawk (Site HQ less than 100), mule deer (Site HQ less than 10), and bobcat (Site HQ less than 100) at the Low EcoRBSL (Table 4-3). Location-specific Site HQs at the High EcoRBSL exceeded 1 for the red-tailed hawk (Site HQs less than 10), and bobcat (Site HQ less than 100). There were no location-specific Site HQs exceeding 1 at either the Low or High EcoRBSLs for the great blue heron. Incremental risks were not calculated for PCB_TEQs because background values were not available. The red-tailed hawk and bobcat were retained for risk interpolation under the Baseline exposure scenario.

The Baseline risk for PCB_TEQ_Bird is presented for the red-tailed hawk on Figure C-9, and the Baseline risk for PCB_TEQ_Mammal is presented for the bobcat on Figure C-21. Note: due to the small number of sample locations analyzed for PCBs, interpolations could not be completed as the spatial distance between known results was too large to accurately interpolate the unknown areas between. The risk figures show the risk for the individual sample locations.

Site risks for the red-tailed hawk (Figure C-9) greater than 1 in Subareas 5/9 North (HQs less than 5 and less than 100) and 1B Southwest (HQ less than 100) at the Low EcoRBSL. Site HQs are less than 5 in Subarea 5/9 North and less than 10 in Subarea 1B Southwest at the High EcoRBSL. Neither location with estimated risks at the High EcoRBSL occur in habitat suitable for the red-tailed hawk.

Site risks for the bobcat (Figure C-21) are greater than 1 at the Low EcoRBSL in Subareas 5/9 North (HQs less than 5 and less than 100), 1B Southwest (HQ less than 100), and 1B North (HQ less than 5). Site HQs are less than 5 at 1 location in Subarea 5/9 North and less than 10 at 1 location in Subarea 1B Southwest at the High EcoRBSL. Other locations had HQs less than 1 at the High EcoRBSL.

Subarea-level Exposure Scenario. Location-specific Site HQs for PCB_TEQs (_Bird and _Mammal) exceeded 1 at 2 locations for the red-tailed hawk (Site HQ less than 100), 1 location for the mule deer (Site HQ less than 5), and 2 locations for the bobcat (Site HQ less than 10) at the Low EcoRBSL (Table 4-3). Location-specific Site HQs at the High EcoRBSL exceeded 1 only for red-tailed hawk (Site HQs less than 5), There were no location-specific Site HQs exceeding 1 at either the Low or High EcoRBSLs for the great blue heron. Incremental risks were not calculated for PCB_TEQs because background values were not available. The red-tailed hawk was retained for risk interpolation under the Subarea-level exposure scenario.

The Subarea-level risk for PCB_TEQ_Bird is presented for the red-tailed hawk on Figure D-6. Note: due to the small number of sample locations analyzed for PCBs, interpolations could not be completed because the spatial distance between known results was too large to accurately interpolate the unknown areas between. The risk figure shows the risk for the individual sample locations.

Site risks for the red-tailed hawk (Figure D-6) exceed 1 in Subareas 5/9 North (HQs less than 5) and Subarea 1B Southwest (HQ less than 100) at the Low EcoRBSL. Site HQs are less than 1 in Subarea 5/9 North and less than 5 in Subarea 1B Southwest at the High EcoRBSL. The location with estimated risks at the High EcoRBSL does not occur in habitat suitable for the red-tailed hawk.

Facility-wide Exposure Scenario. Location-specific Site HQs for PCB_TEQs (_Bird and _Mammal) exceeded 1 at a small number of locations (2 to 4) for red-tailed hawk and bobcat (Site HQ less than 100) and mule deer (Site HQ less than 5) at the Low EcoRBSL (Table 4-3). Location-specific Site HQs at the High EcoRBSL exceeded 1 for red-tailed hawk (Site HQs less than 5) and bobcat (Site HQ less than 100). There were no location-specific Site HQs exceeding 1 at either the Low or High EcoRBSLs for the great blue heron. Incremental risks were not calculated for PCB_TEQs because background values were not available. The red-tailed hawk and bobcat were retained for risk interpolation under the Facility-wide exposure scenario.

The Facility-wide risk for PCB_TEQ_Bird is presented for the red-tailed hawk on Figure E-6 and the risk for PCB_TEQ_Mammal is presented for the bobcat on Figure E-17. Note: due to the small number of sample locations analyzed for PCBs, interpolations could not be completed because the spatial distance between known results was too large to accurately interpolate the unknown areas between. The risk figures show the risk for the individual sample locations.

Site risks for the red-tailed hawk (Figure E-6) are greater than 1 in Subareas 5/9 North and 1B Southwest (HQs less than 100) at the Low EcoRBSL. Site HQs are less than 5 at both locations at the High EcoRBSL, and do not occur in habitat suitable for the red-tailed hawk.

Site risks for the bobcat (Figure E-17) are greater than 1 at the Low EcoRBSL in Subareas 5/9 North (HQs less than 5 and less than 100), 1B Southwest (HQ less than 100), and 1B North (HQ less than 5). Site HQs were less than 5 at 1 location in Subarea 5/9 North and less than 100 at 1 location in Subarea 1B Southwest at the High EcoRBSL. Other locations had HQs less than 1 at the High EcoRBSL.

Recommendation for PCB_TEQ. Site risks are summarized in Table 4-7. Final COEC recommendations are summarized in Table 4-8, including a weighting of potential risks versus habitat suitability for the receptor. Location-specific risks for PCB_TEQs under each exposure scenario were elevated for Subareas 5/9 North, 1B North, and/or 1B Southwest at the Low EcoRBSL. Location-specific Site risks were below 1 at the High EcoRBSL for the mule deer. Locations with exceedances at the High EcoRBSL for the red-tailed hawk do not occur within areas of suitable habitat. However, locations with HQs up to 5 and 100 for the bobcat are found in Subareas 5/9 North and 1B Southwest, respectively, under the Facility-wide exposure scenario. PCB_TEQ_Mammal is recommended for retention as a COEC for mammals in Subarea 5/9 North and Subarea 1B Southwest.

4.3.1.17 4,4'-DDT

Potential risks for 4,4'-DDT as well as the organochlorine pesticide group HI are presented below for each exposure scenario followed by the overall WOE conclusion.

Baseline Exposure Scenario. Location-specific Site and Incremental HQs exceed 1 but were less than 5 for the red-tailed hawk and great blue heron at the Low EcoRBSL for the Baseline exposure scenario (Table 4-3). The mule deer and bobcat Site and Incremental HQs did not exceed 1 for any location at the Low EcoRBSL. No LHR receptors had location-specific Site or Incremental HQs exceeding 1 at the High EcoRBSL. 4,4'-DDT was not retained for interpolation for any LHR receptor under the Baseline exposure scenario.

Location-specific Site and Incremental organochlorine pesticide HIs for the red-tailed hawk and great blue heron were less than 5 at the Low EcoRBSL. There were no Site or Incremental organochlorine pesticide HIs exceeding 1 at the High EcoRBSL for any LHR receptor. Organochlorine pesticide HIs were not retained for interpolation under the Baseline exposure scenario.

Subarea-Level Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for all LHR receptors at both the Low EcoRBSL and High EcoRBSLs for the Subarea-level exposure scenario. No receptors were retained for interpolation under the Subarea-level exposure scenario.

Location-specific Site and Incremental organochlorine pesticide HIs did not exceed 1 at either the Low or High EcoRBSLs for any LHR receptor. Organochlorine pesticide HIs were not retained for interpolation under the Subarea-level exposure scenario.

Facility-wide Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for all LHR receptors except the red-tailed hawk (HQs less than 5) at the Low EcoRBSL for the Facility-wide exposure scenario (Table 4-3). No LHR receptors had location-specific Site or Incremental HQs exceeding 1 at the High EcoRBSL. 4,4'-DDT was not retained for interpolation under the Facility-wide exposure scenario.

Location-specific Site and Incremental organochlorine pesticide HIs for the red-tailed hawk exceeded 1 for 2 locations at the Low EcoRBSL. There were no Site or Incremental organochlorine pesticide HIs exceeding 1 at the High EcoRBSL for any LHR receptor. Organochlorine pesticide HIs were not retained for interpolation under the Facility-wide exposure scenario.

Recommendation for 4,4'-DDT. There were only 1 or 2 location-specific Site and Incremental HQs exceeding 1 at the Low EcoRBSLs for the red-tailed hawk or great blue heron depending on the exposure scenario. There were no location-specific Site or Incremental HQs exceeding 1 at the High EcoRBSL for any receptor and 4,4'-DDT was not retained for interpolation for any LHR receptor under any of the exposure scenarios. The organochlorine pesticide HI exceeded 1 for the red-tailed hawk and great blue heron under the Baseline exposure scenario and for the red-tailed hawk under the Facility-wide exposure scenario. No organochlorine pesticide HIs exceeded the High EcoRBSLs for any LHR receptor. 4,4'-DDT and organochlorine pesticides as a chemical group are not recommended for retention as COECs.

4.3.1.18 Bis(2-Ethylhexyl) phthalate

Potential risks for bis(2-ethylhexyl) phthalate under each exposure scenario and the overall WOE conclusion are presented below.

Baseline Exposure Scenario. Location-specific Site and Incremental HQs exceeded 1 but were less than 100 for red-tailed hawk at the Low EcoRBSL for the Baseline exposure scenario (Table 4-3). The mule deer, bobcat, and great blue heron Site and Incremental HQs did not exceed 1 for any location at the Low EcoRBSL. No LHR receptors had location-specific Site or Incremental HQs exceeding 1 at the High EcoRBSL. Consequently, bis(2-ethylhexyl) phthalate was not retained for interpolation for any LHR receptor under the Baseline exposure scenario.

Subarea-level Exposure Scenario. Location-specific Site and Incremental HQs were less than 5 for the red-tailed hawk at the Low EcoRBSL for the Subarea-level exposure scenario (Table 4-3). The mule deer, bobcat, and great blue heron Site and Incremental HQs did not exceed 1 for any location at the Low EcoRBSL. No LHR receptors had location-specific Site or Incremental HQs exceeding 1 at the High EcoRBSL. Consequently, bis(2-ethylhexyl) phthalate was not retained for interpolation for any LHR receptor under the Subarea-level exposure scenario.

Facility-wide Exposure Scenario. Location-specific Site and Incremental HQs were less than 10 for the red-tailed hawk at the Low EcoRBSL for the Facility-wide exposure scenario (Table 4-3). The mule deer, bobcat, and great blue heron Site and Incremental HQs did not exceed 1 for any location at the Low EcoRBSL. No LHR receptors had location-specific Site or Incremental HQs exceeding 1 at the High EcoRBSL. Consequently, bis(2-ethylhexyl) phthalate was not retained for interpolation for any LHR receptor under the Baseline exposure scenario.

Recommendation for Bis(2-Ethylhexyl) Phthalate. There were only a few location-specific Site and Incremental HQs exceeding 1 at the Low EcoRBSLs for the red-tailed hawk for each exposure scenario. There were no location-specific Site or Incremental HQs exceeding 1 at the High EcoRBSL for any receptor and bis(2-ethylhexyl) phthalate was not retained for interpolation under any of the exposure scenarios. Bis(2-ethylhexyl) phthalate is not recommended for retention as a COEC.

4.3.1.19 Di-n-butyl phthalate

Potential risks for di-n-butyl phthalate under each exposure scenario and the overall WOE conclusion for di-n-butyl phthalate are presented below.

Baseline Exposure Scenario. Location-specific Site and Incremental HQs were less than 10 for the red-tailed hawk, but ranged up to 1,000 for the great blue heron at the Low EcoRBSL under the Baseline exposure scenario (Table 4-3). Location-specific Site and Incremental HQs do not exceed 1 for the red-tailed hawk at the High EcoRBSL, but range up to 100 for the great blue heron. Location-specific Site and Incremental HQs did not exceed 1 for any location at the Low or High EcoRBSLs for the mule deer or

bobcat. Di-n-butyl phthalate was retained for risk interpolation for the great blue heron under the Baseline exposure scenario.

Baseline risk interpolations for di-n-butyl phthalate are presented for the great blue heron on Figure C-26. Interpolated Site and Incremental HQs for the great blue heron (Figure C-26) are up to 1,000 in Subareas 1B North and 1B Southeast, up to 100 in Subareas 5/9 North, 1A South, and 1B Southwest, and up to 5 in Subarea 5/9 South at the Low EcoRBSL. Interpolated Site and Incremental HQs are generally below 1 at the High EcoRBSL, with small areas showing Interpolated Site and Incremental risk up to 100 in Subareas 1B North and 1B Southeast and up to 5 in Subareas 5/9 North, 1B Southwest, and 1A South. A small portion of R-1 Pond with interpolated risks (HQ less than 5) at the High EcoRBSL is within habitats considered suitable for the great blue heron. It should be noted that limited number of sample locations where di-n-phthalate was sampled result in some overestimation of risk during the interpolation process due to spatial distance between samples.

Subarea-level Exposure Scenario. Location-specific Site and Incremental HQs were less than 5 for the red-tailed hawk and great blue heron at the Low EcoRBSL under the Subarea-level exposure scenario (Table 4-3). Location-specific Site and Incremental HQs did not exceed 1 at the Low or High EcoRBSLs for the mule deer or bobcat and there were no exceedances of the High EcoRBSL for any LHR receptor. Consequently, di-n-butyl phthalate was not retained for interpolation for any LHR receptors when evaluated under the Subarea-level exposure scenario.

Facility-wide Exposure Scenario. Location-specific Site and Incremental HQs were less than 5 for the red-tailed hawk, but ranged up to 100 for the great blue heron at the Low EcoRBSL under the Facility-wide exposure scenario (Table 4-3). Location-specific Site and Incremental HQs exceeded 1 for the great blue heron only at the High EcoRBSL with Site and Incremental HQs less than 5. Location-specific Site and Incremental HQs did not exceed 1 for any location at the Low or High EcoRBSLs for the mule deer or bobcat. Di-n-butyl phthalate was retained for risk interpolation for the great blue heron under the Facility-wide exposure scenario.

Facility-wide risk interpolations for di-n-butyl phthalate are presented for the great blue heron on Figure E-19. Interpolated Site and Incremental HQs for the great blue heron (Figure E-19) are below 1 at the Low EcoRBSL for the majority of the Boeing Evaluation Areas. Small areas in Subareas 1B Southeast and 1B North have interpolated Site and Incremental risks up to 10 and 100, respectively, at the Low EcoRBSL. Interpolated Site and Incremental HQs are below 1 at the High EcoRBSL except for a small location in Subarea 1B North with interpolated Site and Incremental risks up to 5, however this area is not within suitable habitats for the great blue heron.

Recommendation for Di-n-butyl phthalate. Interpolated Site and Incremental risks are summarized in Table 4-7. Final COEC recommendations are summarized in Table 4-8, including a weighting of potential risks versus habitat suitability for the receptor. Di-n-butyl phthalate was not retained for evaluation under the Subarea-level exposure scenario as there were no exceedances of the High EcoRBSL for any LHR receptor. Interpolated risks under the Baseline and Facility-wide exposure scenarios were less than 1 for the red-tailed hawk, mule deer, and bobcat at the High EcoRBSL. Interpolated Site and Incremental risks for the great blue heron under the Facility-wide exposure scenario were less than 5 for 1 small area in Subarea 1B North, however, this area is not within habitats suitable for the great blue heron. Di-n-butyl phthalate is not recommended for retention as a COEC.

4.3.1.20 Pentachlorophenol

Potential risks for pentachlorophenol under each exposure scenario and the overall WOE conclusion are presented below.

Baseline Exposure Scenario. Location-specific Site HQs exceeded 1 at a single sample location for the red-tailed hawk (HQ less than 100), mule deer (HQ less than 1,000), and bobcat (HQ less than 100) at the Low EcoRBSL under the Baseline exposure scenario. Site HQs at the High EcoRBSL exceeded 1 for a single sample location for the red-tailed hawk and bobcat (HQ less than 10) and for the mule deer (HQ less than 100). Incremental risks were not calculated as background values were not available for

pentachlorophenol. Pentachlorophenol was retained for risk interpolation for the red-tailed hawk, mule deer, and bobcat under the Baseline exposure scenario.

Baseline risk interpolations for pentachlorophenol are presented for the red-tailed hawk on Figure C-10, the mule deer on Figure C-15, and the bobcat on Figure C-22.

Interpolated Site risks for the red-tailed hawk (Figure C-10) are less than 1 for the majority of the Boeing Evaluation Areas at the Low EcoRBSL. One small area with interpolated Site HQs up to 5 is located in Subarea 1B Southwest. Interpolated Site HQs are below 1 at the High EcoRBSL for the red-tailed hawk.

Interpolated Site risks for the mule deer (Figure C-15) are less than 1 for the majority of the Boeing Evaluation Areas at the Low EcoRBSL. One small area with interpolated Site HQs up to 10 is found in Subarea 1B Southwest. Interpolated Site HQs for this area are less than 5 at the High EcoRBSL for the mule deer.

Interpolated Site risks for the bobcat (Figure C-22) are less than 1 for the majority of the Boeing Evaluation Areas at the Low EcoRBSL. One small area with interpolated Site HQs up to 5 is found in Subarea 1B Southwest. Interpolated Site HQs for this area are less than 1 at the High EcoRBSL for the bobcat.

Subarea-level Exposure Scenario. Location-specific Site HQs exceeded 1 at a single sample location for the red-tailed hawk and mule deer (HQ less than 100) and bobcat (HQ less than 5) at the Low EcoRBSL under the Subarea-level exposure scenario. Site HQs at the High EcoRBSL exceeded 1 for a single sample location and the Site HQ was less than 5 for the red-tailed hawk and less than 100 for the mule deer. There were no exceedances of the High EcoRBSL for the bobcat and no exceedances at either the Low or High EcoRBSLs for the great blue heron. Incremental risks were not calculated as background values were not available for pentachlorophenol. Pentachlorophenol was retained for risk interpolation for the red-tailed hawk and mule deer under the Subarea-level exposure scenario.

Subarea-level risk interpolations for pentachlorophenol are presented for the red-tailed hawk on Figure D-7 and for the mule deer on Figure D-12.

Interpolated Site risks for the red-tailed hawk (Figure D-7) are less than 1 at both the Low and High EcoRBSLs for the Boeing Evaluation Areas.

Interpolated Site risks for the mule deer (Figure D-12) are less than 1 for the majority of the Boeing Evaluation Areas at the Low EcoRBSL. One small area with interpolated Site HQs up to 5 is found in Subarea 1B Southwest. Interpolated Site HQs for this area are less than 1 at the High EcoRBSL for the mule deer.

Facility-wide Exposure Scenario. Location-specific Site HQs exceeded 1 at a single sample location for the red-tailed hawk, mule deer, and bobcat (HQs less than 100) at the Low EcoRBSL under the Facility-wide exposure scenario. Location-specific Site HQs also exceeded the High EcoRBSL at that same sample location with Site HQ less than 5 for the red-tailed hawk, less than 10 for bobcat, and less than 100 for mule deer. There were no exceedances at either the Low or High EcoRBSLs for the great blue heron. Incremental risks were not calculated as background values were not available for pentachlorophenol. Pentachlorophenol was retained for risk interpolation for the red-tailed hawk, mule deer, and bobcat under the Facility-wide exposure scenario.

Facility-wide risk interpolations for pentachlorophenol are presented for the red-tailed hawk on Figure E-7, for the mule deer on Figure E-12, and for the bobcat on Figure E-18.

Interpolated Site risks for the red-tailed hawk (Figure E-7) are less than 1 for the majority of the Boeing Evaluation Areas at the Low EcoRBSL. One small area with interpolated Site HQs up to 5 is found in Subarea 1B Southwest. Interpolated Site HQs for this area are less than 1 at the High EcoRBSL for the red-tailed hawk.

Interpolated Site risks for the mule deer (Figure E-12) are less than 1 for the majority of the Boeing Evaluation Areas at the Low EcoRBSL. One small area with interpolated Site HQs up to 10 is found in Subarea 1B Southwest. Interpolated Site HQs for this area are less than 5 at the High EcoRBSL for the mule deer.

Interpolated Site risks for the bobcat (Figure E-18) are less than 1 for the majority of the Boeing Evaluation Areas at the Low EcoRBSL. One small area with interpolated Site HQs up to 5 is found in Subarea 1B Southwest. Interpolated Site HQs for this area are less than 1 at the High EcoRBSL for the bobcat.

Recommendation for Pentachlorophenol. Interpolated Site risks are summarized in Table 4-7. Final COEC recommendations are summarized in Table 4-8, including a weighting of potential risks versus habitat suitability for the receptor. Interpolated Site risks for pentachlorophenol were less than 1 at the High EcoRBSL for most receptors and exposure scenarios. Interpolated risks around a single sample location in Subarea 1B Southwest were less than 5 at the High EcoRBSL for mule deer under the Baseline and Facility-wide exposure scenarios. All other interpolated Site risks at the High EcoRBSL were less than 1. Pentachlorophenol was not detected in most samples collected across the Boeing Evaluation Areas. Only 1 sample of over 645 exceeded the High EcoRBSL. Potential risk due to a single sample location is expected to be low for LHR receptors. Pentachlorophenol is not recommended for retention as a COEC.

4.3.1.21 Sec-Butylbenzene

Potential risks for sec-butylbenzene under each exposure scenario and the overall WOE conclusion are presented below.

Baseline Exposure Scenario. Location-specific Site and Incremental HQs were less than 1 for the red-tailed hawk, mule deer, and bobcat at the Low EcoRBSL. The great blue heron had a single location with Site and Incremental HQs less than 10. No LHR receptors had location-specific Site or Incremental HQs exceeding 1 at the High EcoRBSL. Sec-butylbenzene was not retained for interpolation under the Baseline exposure scenario.

Subarea-level Exposure Scenario. There were no location-specific Site or Incremental HQs exceeding 1 at the Low or High EcoRBSLs for any LHR receptor for the Subarea-level exposure scenario. Consequently, sec-butylbenzene was not retained for interpolation for any LHR receptors when evaluated under the Subarea-level exposure scenario.

Facility-wide Exposure Scenario. There were no location-specific Site or Incremental HQs exceeding 1 at the Low or High EcoRBSLs for any LHR receptor for the Facility-wide exposure scenario. Consequently, sec-butylbenzene was not retained for interpolation for any LHR receptors when evaluated under the Facility-wide exposure scenario.

Recommendation for Sec-butylbenzene. There were no location-specific Site or Incremental HQs exceeding 1 at the High EcoRBSL for any LHR receptor under any of the exposure scenarios. Consequently, sec-butylbenzene was not retained for interpolation under any of the exposure scenarios and is not recommended for retention as a COEC.

4.3.2 Surface Water

Potential risk from ingestion of surface water was presented for birds and mammals in Table 4-5 and Table 4-6, respectively. There were no exceedances of the Low EcoRBSL for any CPEC in waters from Perimeter Pond, Silvernale Reservoir, and R-1 Pond. CPECs in surface water do not pose a potential risk to ecological receptors and are not recommended for further evaluation.

4.3.3 Qualitative Evaluation for Shooting Range Area

Site and Incremental risks for LHR receptors were calculated using the fine-fraction ISM data from the Shooting Range Area. As described in Section 2.2.2, other data for samples collected from the Shooting Range Area were evaluated qualitatively. Shooting range-related constituents that were considered bioaccumulative (that is, arsenic, lead, and PAHs) from the qualitative dataset were reviewed to support recommendations for the Shooting Range Area through comparison of the maximum detected concentrations to BTVs and EcoRBSLs for the LHR receptors (Table 4-9). Arsenic and lead were the only analytes with qualitative concentrations exceeding EcoRBSLs.

The maximum detected concentration for arsenic only exceeded the Low EcoRBSL for the mule deer. This detection was also the only sample location exceeding a Low EcoRBSL, with an HQ of 2. Arsenic was not evaluated further.

The maximum detected concentration for lead exceeded both the Low and High EcoRBSLs for all LHR receptors and was further evaluated under each of the exposure scenarios considered for the LHR ERA: Baseline, Subarea-level, and Facility-wide. A summary of the number of lead samples with Site exceedances in each of the risk ranges is presented in Table 4-10 and sample-specific risk estimates for the qualitative data are included in Appendix B. Incremental risks were not estimated or counted.

- Under the Baseline exposure scenario, all samples exceeded the Low EcoRBSL for the red-tailed hawk and less than half of the samples exceeded the Low EcoRBSLs for the mule deer and bobcat. Exceedances of the High EcoRBSL were primarily for the red-tailed hawk with limited exceedances for the mule deer (three sample locations) and bobcat (one sample location).
- Under the Subarea-level exposure scenario, fewer exceedances were noted for all receptors at the Low EcoRBSLs except for the red-tailed hawk, which had a similar number of exceedances. The number of samples with exceedances for the red-tailed hawk at the High EcoRBSL was less than one third that of the Baseline exposure scenario and there were no samples exceeding the High EcoRBSLs for the mule deer and bobcat.
- Under the Facility-wide exposure scenario, exceedances were similar to those for the Baseline exposure scenario, with all samples exceeding the Low EcoRBSL for the red-tailed hawk and approximately one-third of the samples exceeding the Low EcoRBSLs for the mule deer and bobcat. A smaller number of samples exceeded the High EcoRBSL for the red-tailed hawk, but a similar number exceeded for the mule deer and bobcat. Exceedances of the High EcoRBSLs for mule deer and bobcat were limited to a very small number of samples (2 and 1 sample locations, respectively, out of 324 total samples) and HQs are less than 5.

The Shooting Range Area was recommended for risk management consideration for potential impacts of lead to birds (Section 4.3.1.5). Although the qualitative data indicate a small potential for risk to mule deer and bobcat at the High EcoRBSL, the red-tailed hawk is the most sensitive receptor and will drive potential remedial goals. In addition, incremental risks were not estimated for the qualitative data. The results of the qualitative data screening support the recommendations for lead in the Shooting Range Area.

5. Uncertainty Analysis

Uncertainties associated with the results of the ERA are a function of both the “state of the practice” of risk assessment in general and uncertainty factors specific to the site. The LHR ERA is subject to uncertainty with regard to a variety of factors that include:

- Environmental sampling and analysis
- Fate and transport estimation
- Exposure assessment
- Toxicity assessment
- Risk characterization

Uncertainties inherent in the current state of practice for ERAs and those specific to the LHR ERA are summarized in Table 5-1.

6. Conclusions and Recommendations

This LHR ERA was conducted in accordance with risk assessment guidance provided in the SRAM Rev. 3 (Stantec, 2018a). Potential risks from chemicals in soil, lakebed sediment, and surface water were evaluated for LHR receptors, including the red-tailed hawk, mule deer, bobcat, and great blue heron. The following analytes were retained as COECs.

- Lead was retained as a COEC for birds (red-tailed hawk) in the Shooting Range Area. Interpolated Site and Incremental risks at the High EcoRBSL do not exceed 1 for mammals under the Subarea or Facility-wide exposure scenarios. Potential Site risks at the High EcoRBSL in areas with suitable habitat for the red-tailed hawk range up to 5 under the Facility-wide exposure scenario. The recommended area for CMS consideration for lead is presented on Figure 6-1. This area will be adjusted as needed during CMS because ISM data (representing an area rather than a point) were used for interpolation of risks in the LHR ERA.
- 2,3,7,8-TCDD_TEQ_Mammal was retained as a COEC for mammals (bobcat) in Subareas 5/9 North, 5/9 South, 1B Southeast, 1B North, 1B Southwest, 1A South, and 1A North. Interpolated Site and Incremental risks exceed the High EcoRBSL with risks ranging up to 100 in portions of Subareas 5/9 North and 1B Southwest under the Facility-wide exposure scenario. Other areas with Interpolated Site and Incremental risks that exceed the High EcoRBSL include Subareas 5/9 South, 1B Southeast, 1B North, 1A South, and 1A North. The recommended areas for CMS consideration for 2,3,7,8-TCDD_TEQ_Mammal are presented on Figure 6-2.
- PCB_TEQ_Mammal was retained as a COEC for mammals (bobcat) in Subarea 5/9 North and Subarea 1B Southwest. Location-specific risks range up to 100 at the High EcoRBSL for the bobcat under the Facility-wide exposure scenario in Subarea 5/9 North (HQs up to 5) and 1B Southwest (HQs up to 100). The recommended areas for CMS consideration for PCB_TEQ_Mammal are presented on Figure 6-3.

All other CPECs were considered to not pose a significant risk to LHR receptors and are recommended for no further evaluation in the CMS based on the results of the WOE presented in Section 4.3.

The areas shown on Figures 6-1, 6-2, and 6-3 for lead, 2,3,7,8-TCDD_TEQ_Mammal, and PCB_TEQ_Mammal, respectively, will be carried forward for further evaluation during the CMS. Lead, 2,3,7,8-TCDD_TEQ_Mammal, and PCB_TEQ_Mammal were also retained as COECs in the small home range receptor RFI Site ERAs and will be further evaluated during the CMS for small home range receptors. The small home range receptor EcoRBSLs are more conservative than those for the LHR receptors and as such, reduction of potential risk to the small home range receptors is expected to also reduce potential risks to LHR receptors to acceptable levels.

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Tables

Table 2-1. Special Status Bird and Mammal Species that May Occur at the SSFL

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Common Name	Scientific Name	Federal ESA[a]	California ESA[b]	California State Ranking[c]	CDFW Listing[d]
Birds					
Cooper's Hawk	*Accipiter cooperi*	--	--	S4	WL (nesting)
Sharp-Shinned Hawk	*Accipiter striatus*	--	--	S4	WL (nesting)
Southern California Rufous-Crowned Sparrow	*Aimophila ruficeps canescens*	--	--	S2	WL
Grasshopper Sparrow[e]	*Ammodramus savannarum*	--	--	S3 (nesting)	SSC
Golden Eagle	*Aquila chrysaetos*	BEPA	--	S3	FP/WL
Bell's Sage Sparrow	*Artemisiospiza belli belli*	--	--	S3	WL
Burrowing Owl[e]	*Athene Cunicularia*	--	--	S3	SSC
Swainson's Hawk[e]	*Buteo swainsonii*	--	ST	S3	--
White-Tailed Kite	*Elanus caerulus*	--	--	S3S4 (nesting)	FP
American Peregrine Falcon	*Falco peregrinus anatum*	FD	SD	S3S4 (nesting)	FP
California Condor[e]	*Gymnogyps californianus*	FE	SE	S1	FP
Loggerhead Shrike	*Lanius ludovicianus*	--	--	S4 (nesting)	SSC
Double-Crested Cormorant	*Phalacrocorax auritus*	--	--	S4 (nesting colony)	WL
Coastal California Gnatcatcher	*Polioptila californica californica*	FT	--	S2	SSC
Bank Swallow[e]	*Riparia riparia*	--	ST	S2 (nesting)	--
Yellow Warbler	*Setophaga (Dendrioca) petechia brewsteri*	--	--	S3S4 (nesting)	SSC
Least Bell's Vireo	*Vireo bellii pusillus*	FE	SE	S2 (nesting)	--
Mammals					
Pallid Bat	*Antrozous pallidus*	--	--	S3	SSC
Ringtail	*Bassariscus astutus*	--	--	--	FP
Townsend's Big-Eared Bat	*Corynorhinus townsendii*	--	SC	S2	SSC
Spotted bat[e]	*Euderma maculatum*	--	--	S3	SSC
Western Mastiff Bat	*Eumops perotis californicus*	--	--	S3S4	SSC
Western Red Bat	*Lasiurus blossevillii*	--	--	S3	SSC
Hoary Bat	*Lasiurus cinereus*	--	--	S4	--
San Diego Black-Tailed Jackrabbit	*Lepus californicus bennettii*	--	--	S3S4	SSC
California Leaf-Nosed Bat	*Macrotus californicus*	--	--	S3	SSC
Yuma Myotis	*Myotis yumanensis*	--	--	S4	--
San Diego Desert Woodrat	*Neotoma lepida intermedia*	--	--	S3S4	SSC
Los Angeles Little Pocket Mouse	*Perognathus longimembris brevinasus*	--	--	S1S2	SSC
American Badger[e]	*Taxidea taxus*	--	--	S3	SSC

Notes:

[a]**Federal Endangered Species Act (ESA) Listing Status (CDFW, 2019a,b)**
BEPA = Bald and Golden Eagle Protection Act
FD = Federal delisted species
FE = Federally endangered species
FT = Federally threatened species

[b]**California Endagered Species Act (CDFW, 2019a,b)**
SC = California state candiate species (threatened or endangered)
SD = California state delisted
SE = California state endangered species
ST = California state threatened species

[c]**California State Ranking (CDFW, 2019a)**
S1 = Critically Imperiled—Extreme rarity (often 5 or fewer occurrences) or vulnerable to extirpation.
S2 = Imperiled— Rarity due to restricted range, very few populations (often 20 or fewer), or vulnerable to extirpation.
S3 = Vulnerable—Few populations (often 80 or fewer), recent/widespread declines, or vulnerable to extirpation.
S4 = Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.

[d]**California Department of Fish and Wildlife (CDFW) Species Lists (CDFW, 2019a)**
FP = Fully protected
SSC = Species of special concern
WL = Watch list

[e]Source report did not specify whether species was observed onsite, but sutable habitat is found at the SSFL.
Species included were listed in Padre Associates Inc. (2016), DTSC (2017), Forde Biological Consultants (2014), the Gold Copy (CH2M, 2016 as updated thru 2020), and DOE (2018). This list may not represent an exhaustive list of threatened and endangered species that may occur at the SSFL.

Table 2-2. Summary of Habitats and Representative Species Evaluated

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Habitat	Media Designation	Representative Species	the LHR ERA	Notes
Terrestrial	Soil[a]	Terrestrial Plants	No	Evaluated in the small home range ERAs completed for each RFI Site.
		Soil invertebrates		
	Soil[a]	Hermit thrush	No	Evaluated in the small home range ERAs completed for each RFI Site.
		Deer mouse		
	Soil[a]	Red tailed hawk	**Yes**	Evaluated for food chain uptake
		Mule deer	**Yes**	Evaluated for food chain uptake
		Bobcat	**Yes**	Evaluated for food chain uptake
	Soil Vapor	Deer mouse	No	Evaluated in the small home range ERAs where applicable
	Shallow Groundwater	Terrestrial Plants	No	Evaluated in the small home range ERAs where applicable
Aquatic/Wetland	Sediment[b]	Benthic Macroinvertebrates	No	Evaluated in the small home range ERAs where applicable
	Lakebed Sediment[c]	Great blue heron	**Yes**	Evaluated for food chain uptake from lakebed sediments
	Surface Water	Aquatic Plants	No	Evaluated in the small home range ERAs where applicable
		Aquatic	No	Evaluated in the small home range ERAs where applicable
		Fish	No	Evaluated in the small home range ERAs where applicable
		Terrestrial Plants	No	Evaluated in the small home range ERAs where applicable
		Hermit thrush	No	Evaluated in the small home range ERAs where applicable
		Deer mouse	No	Evaluated in the small home range ERAs where applicable
		Great blue heron	**Yes**	Evaluated for potential drinking water sources.
		Red tailed hawk	No	Hawks satisfy moisture needs from prey
		Mule deer	**Yes**	Evaluated for potential drinking water sources.
		Bobcat	**Yes**	Evaluated for potential drinking water sources.

Notes:

[a] Soil - includes both soils and ephemeral sediments to provide estimate of potential exposures when conditions are dry.

[b] Sediment - For small home range, sediments include all ephemeral sediments as well as those within the footprint of the larger ponds.

[c] Lakebed Sediment - For LHR, sediment evaluation is limited to samples from within the footprint of the larger ponds that may provide potential habitat for the great blue heron: Silvernale Reservoir, Perimeter Pond, and R-1 Pond.

ERA = ecological risk assessment
LHR = large home range
RCRA = Resource Conservation and Recovery Act
RFI = RCRA facility investigation
Yes = evaluated quantitatively in the LHR ERA

Table 2-3. Identification of Chemicals of Potential Ecological Concern in Soil and Lakebed Sediment

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Matrix	EcoRAClass	Analyte	Bioaccumulative Potential			Background Screen			LHR CPEC[b]
			logKow	Bioaccu-mulative[a]	Source	Maximum Detect in Soil or Lakebed sediment for Boeing Evaluation Areas (mg/kg)	BTV (mg/kg)	Exceed?	
Soil	Inorganics	Acetic Acid	0.09	No	--	--	--	--	No
Soil	Inorganics	Aluminum	0.33	No	--	--	--	--	No
Soil	Inorganics	Antimony	0.73	No	--	--	--	--	No
Soil	Inorganics	Arsenic	0.68	Yes	NAVFAC	1.1E+02	2.4E+01	Yes	**Yes**
Soil	Inorganics	Barium	0.23	No	--	--	--	--	No
Soil	Inorganics	Beryllium	-0.57	No	--	--	--	--	No
Soil	Inorganics	Boron	0.23	No	--	--	--	--	No
Soil	Inorganics	Cadmium	-0.07	Yes	NAVFAC, TNRCC	2.0E+02	4.4E-01	Yes	**Yes**
Soil	Inorganics	Cerium	0.23	No	--	--	--	--	No
Soil	Inorganics	Chloride	0.54	No	--	--	--	--	No
Soil	Inorganics	Chromium	0.23	Yes	TNRCC	9.2E+02	6.0E+01	Yes	**Yes**
Soil	Inorganics	Cobalt	0.23	No	--	--	--	--	No
Soil	Inorganics	Copper	-0.57	Yes	NAVFAC, TNRCC	8.7E+03	4.2E+01	Yes	**Yes**
Soil	Inorganics	Cyanides	-0.25	No	--	--	--	--	No
Soil	Inorganics	Fluoride	0.22	No	--	--	--	--	No
Soil	Inorganics	Hexavalent Chromium	--	Yes	NAVFAC	2.8E+01	1.1E+00	Yes	**Yes**
Soil	Inorganics	Lead	0.73	Yes	NAVFAC, TNRCC	5.5E+03	3.4E+01	Yes	**Yes**
Soil	Inorganics	Lithium	-0.77	No	--	--	--	--	No
Soil	Inorganics	Manganese	0.23	No	--	--	--	--	No
Soil	Inorganics	Mercury	-0.47	Yes	EPA, TNRCC	1.1E+02	2.8E-02	Yes	**Yes**
Soil	Inorganics	Methyl Mercury	0.08	Yes	NAVFAC	--	--	--	No
Soil	Inorganics	Molybdenum	0.23	No	--	--	--	--	No
Soil	Inorganics	Nickel	-0.57	Yes	NAVFAC, TNRCC	1.6E+03	6.4E+01	Yes	**Yes**
Soil	Inorganics	Nitrate-N	--	No	--	--	--	--	No
Soil	Inorganics	Nitrate-NO3	--	No	--	--	--	--	No
Soil	Inorganics	Nitrite-NO2	0.06	No	--	--	--	--	No
Soil	Inorganics	Orthophosphate – PO4	-0.77	No	--	--	--	--	No
Soil	Inorganics	Selenium	0.24	Yes	NAVFAC, TNRCC	9.0E+00	5.4E-01	Yes	**Yes**
Soil	Inorganics	Silver	0.23	Yes	NAVFAC	6.1E+02	9.5E-02	Yes	**Yes**
Soil	Inorganics	Strontium	0.23	No	--	--	--	--	No
Soil	Inorganics	Sulfate	-2.2	No	--	--	--	--	No
Soil	Inorganics	Thallium	0.23	No	--	--	--	--	No
Soil	Inorganics	Tin	1.29	No	--	--	--	--	No
Soil	Inorganics	Titanium	0.23	No	--	--	--	--	No
Soil	Inorganics	Tungsten	0.23	No	--	--	--	--	No
Soil	Inorganics	Uranium	0.23	No	--	--	--	--	No
Soil	Inorganics	Vanadium	1.98	No	--	--	--	--	No

Table 2-3. Identification of Chemicals of Potential Ecological Concern in Soil and Lakebed Sediment

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Matrix	EcoRAClass	Analyte	Bioaccumulative Potential			Background Screen			LHR CPEC[b]
			logKow	Bioaccu-mulative[a]	Source	Maximum Detect in Soil or Lakebed sediment for Boeing Evaluation Areas (mg/kg)	BTV (mg/kg)	Exceed?	
Soil	Inorganics	Zinc	-0.47	Yes	NAVFAC	8.5E+03	1.5E+02	Yes	**Yes**
Soil	Inorganics	Zirconium	-0.57	No	--	--	--	--	No
Soil	General Chemistry	Ammonia-N	0.23	No	--	--	--	--	No
Soil	ARCL	Aroclor-1016	5.62	Yes	EPA, NAVFAC	--	--	--	No
Soil	ARCL	Aroclor-1242	6.29	Yes	EPA, NAVFAC	5.5E-02	--	--	**Yes**
Soil	ARCL	Aroclor-1248	6.2	Yes	EPA, NAVFAC	3.1E+00	--	--	**Yes**
Soil	ARCL	Aroclor-1254	6.5	Yes	EPA, NAVFAC	9.8E+00	--	--	**Yes**
Soil	ARCL	Aroclor-1260	7.55	Yes	EPA, NAVFAC	6.7E+00	--	--	**Yes**
Soil	ARCL	Aroclor-5460	6.34	Yes	EPA	1.1E-01	--	--	**Yes**
Soil	Dioxin_Furans	2,3,7,8-TCDD_TEQ_Bird	6.8	Yes	EPA, NAVFAC, TNRCC	3.1E-03	8.3E-07	Yes	**Yes**
Soil	Dioxin_Furans	2,3,7,8-TCDD_TEQ_Mammal	6.8	Yes	EPA, NAVFAC, TNRCC	5.4E-03	5.9E-07	Yes	**Yes**
Soil	Energetics	1,1-Dimethylhydrazine	-1.19	No	--	--	--	--	No
Soil	Energetics	1,2-Dinitrobenzene	1.69	No	--	--	--	--	No
Soil	Energetics	1,3-Dinitrobenzene	1.63	No	--	--	--	--	No
Soil	Energetics	2,4,6-Trinitrotoluene	1.6	Yes	EPA	5.9E-01	--	--	**Yes**
Soil	Energetics	2-Amino-4,6-dinitrotoluene	1.84	No	--	--	--	--	No
Soil	Energetics	HMX	0.16	No	--	--	--	--	No
Soil	Energetics	Hydrazine	-1.47	No	--	--	--	--	No
Soil	Energetics	Monomethylhydrazine	-1.05	No	--	--	--	--	No
Soil	Energetics	Nitroglycerin	1.51	No	--	--	--	--	No
Soil	Energetics	Perchlorate	--	Yes	Suspected	6.7E-01	6.5E-04	Yes	**Yes**
Soil	Energetics	p-Nitroaniline	1.39	No	--	--	--	--	No
Soil	Energetics	RDX	0.68	Yes	Suspected	4.6E-01	--	--	**Yes**
Soil	Herbicides	2,4,5-T	3.26	No	--	--	--	--	No
Soil	Herbicides	2,4-Dichlorophenoxyacetic Acid (2,4-D)	2.62	No	--	--	--	--	No
Soil	Herbicides	2,4-Dichlorophenoxybutyric acid	3.53	No	--	--	--	--	No
Soil	Herbicides	Dalapon	0.78	No	--	--	--	--	No
Soil	Herbicides	Dicamba	2.14	No	--	--	--	--	No
Soil	Herbicides	Dichlorprop	3.03	No	--	--	--	--	No
Soil	Herbicides	Dinoseb	3.56	No	--	--	--	--	No
Soil	Herbicides	MCPA	3.25	No	--	--	--	--	No
Soil	Herbicides	MCPP	3.13	No	--	--	--	--	No
Soil	Herbicides	Silvex	3.68	No	--	--	--	--	No
Soil	PAH-HighMW	Benzo(a)anthracene	5.76	Yes	EPA, NAVFAC	2.6E+01	1.2E-03	Yes	**Yes**
Soil	PAH-HighMW	Benzo(a)pyrene	6.13	Yes	EPA, NAVFAC	2.0E+01	1.6E-03	Yes	**Yes**
Soil	PAH-HighMW	Benzo(b)fluoranthene	5.78	Yes	EPA, NAVFAC	3.1E+01	3.3E-03	Yes	**Yes**
Soil	PAH-HighMW	Benzo(e)pyrene	6.44	Yes	EPA	1.1E+00	--	--	**Yes**

Table 2-3. Identification of Chemicals of Potential Ecological Concern in Soil and Lakebed Sediment

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Matrix	EcoRAClass	Analyte	Bioaccumulative Potential			Background Screen			LHR CPEC[b]
			logKow	Bioaccu-mulative[a]	Source	Maximum Detect in Soil or Lakebed sediment for Boeing Evaluation Areas (mg/kg)	BTV (mg/kg)	Exceed?	
Soil	PAH-HighMW	Benzo(ghi)perylene	6.63	Yes	EPA, NAVFAC	9.8E+00	1.2E-03	Yes	**Yes**
Soil	PAH-HighMW	Benzo(k)fluoranthene	6.11	Yes	EPA, NAVFAC	8.5E+00	3.5E-03	Yes	**Yes**
Soil	PAH-HighMW	Chrysene	5.81	Yes	EPA, NAVFAC	2.6E+01	2.5E-03	Yes	**Yes**
Soil	PAH-HighMW	Dibenzo(a,h)anthracene	6.75	Yes	EPA, NAVFAC	2.8E+00	1.0E-03	Yes	**Yes**
Soil	PAH-HighMW	Indeno(1,2,3-cd)pyrene	6.7	Yes	EPA, NAVFAC	8.9E+00	7.9E-04	Yes	**Yes**
Soil	PAH-HighMW	Pyrene	4.88	Yes	EPA, NAVFAC	7.1E+01	2.6E-03	Yes	**Yes**
Soil	PAH-LowMW	1-Methyl naphthalene	3.87	No	--	--	--	--	No
Soil	PAH-LowMW	2-Methylnaphthalene	3.86	No	--	--	--	--	No
Soil	PAH-LowMW	Acenaphthene	3.92	Yes	NAVFAC	7.0E+00	1.8E-03	Yes	**Yes**
Soil	PAH-LowMW	Acenaphthylene	3.94	Yes	NAVFAC	1.8E+00	8.2E-04	Yes	**Yes**
Soil	PAH-LowMW	Anthracene	4.45	Yes	NAVFAC	2.5E+01	6.5E-04	Yes	**Yes**
Soil	PAH-LowMW	Fluoranthene	5.16	Yes	EPA, NAVFAC	7.9E+01	2.5E-03	Yes	**Yes**
Soil	PAH-LowMW	Fluorene	4.18	Yes	NAVFAC	8.7E+00	1.8E-03	Yes	**Yes**
Soil	PAH-LowMW	Naphthalene	3.3	Yes	EPA	2.5E+00	1.7E-03	Yes	**Yes**
Soil	PAH-LowMW	Perylene	6.25	Yes	EPA	--	--	--	No
Soil	PAH-LowMW	Phenanthrene	4.46	Yes	NAVFAC	6.9E+01	1.9E-03	Yes	**Yes**
Soil	PCBs (coplanar)	PCB_TEQ_Bird	6.8	Yes	EPA, NAVFAC, TNRCC	1.3E-03	--	--	**Yes**
Soil	PCBs (coplanar)	PCB_TEQ_Mammal	6.8	Yes	EPA, NAVFAC, TNRCC	4.2E-04	--	--	**Yes**
Soil	Pesticides	4,4'-DDD	6.02	Yes	EPA, NAVFAC, TNRCC	5.5E-03	1.9E-04	Yes	**Yes**
Soil	Pesticides	4,4'-DDE	6.51	Yes	EPA, NAVFAC, TNRCC	9.6E-02	4.2E-03	Yes	**Yes**
Soil	Pesticides	4,4'-DDT	6.91	Yes	EPA, NAVFAC, TNRCC	4.2E-01	6.1E-03	Yes	**Yes**
Soil	Pesticides	Aldrin	6.5	Yes	EPA, NAVFAC, TNRCC	6.3E-04	9.1E-04	No	No
Soil	Pesticides	alpha-BHC	3.8	Yes	NAVFAC, TNRCC	8.4E-04	8.7E-04	No	No
Soil	Pesticides	beta-BHC	3.78	Yes	NAVFAC, TNRCC	5.5E-03	1.3E-04	Yes	**Yes**
Soil	Pesticides	delta-BHC	4.14	Yes	NAVFAC, TNRCC	3.1E-03	1.2E-04	Yes	**Yes**
Soil	Pesticides	Dieldrin	5.4	Yes	EPA, NAVFAC, TNRCC	3.2E-03	1.3E-04	Yes	**Yes**
Soil	Pesticides	Endosulfan I	3.83	Yes	NAVFAC	6.6E-03	8.3E-05	Yes	**Yes**
Soil	Pesticides	Endosulfan II	3.83	Yes	NAVFAC	1.3E-03	2.1E-04	Yes	**Yes**
Soil	Pesticides	Endosulfan sulfate	3.66	Yes	Similar	7.1E-03	1.8E-04	Yes	**Yes**
Soil	Pesticides	Endrin	5.2	Yes	EPA, NAVFAC, TNRCC	1.1E-01	1.6E-04	Yes	**Yes**
Soil	Pesticides	Endrin aldehyde	4.8	Yes	EPA	2.2E-03	3.7E-04	Yes	**Yes**
Soil	Pesticides	Endrin ketone	4.99	Yes	EPA	1.5E-03	3.2E-04	Yes	**Yes**
Soil	Pesticides	gamma-BHC	3.72	Yes	NAVFAC, TNRCC	1.3E-03	6.0E-05	Yes	**Yes**
Soil	Pesticides	Heptachlor	6.1	Yes	EPA, NAVFAC, TNRCC	3.7E-04	1.2E-04	Yes	**Yes**
Soil	Pesticides	Heptachlor epoxide	4.98	Yes	EPA, NAVFAC, TNRCC	2.3E-02	1.1E-04	Yes	**Yes**
Soil	Pesticides	Methoxychlor	5.08	Yes	EPA, NAVFAC	5.9E-03	7.4E-04	Yes	**Yes**
Soil	Pesticides	Mirex	6.89	Yes	EPA, NAVFAC, TNRCC	4.7E-03	2.8E-04	Yes	**Yes**

Table 2-3. Identification of Chemicals of Potential Ecological Concern in Soil and Lakebed Sediment

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Matrix	EcoRAClass	Analyte	Bioaccumulative Potential			Background Screen			LHR CPEC[b]
			logKow	Bioaccu-mulative[a]	Source	Maximum Detect in Soil or Lakebed sediment for Boeing Evaluation Areas (mg/kg)	BTV (mg/kg)	Exceed?	
Soil	Pesticides	Toxaphene	5.9	Yes	EPA, TNRCC	6.7E-03	3.5E-02	No	No
Soil	SVOC	1,4-Dioxane	-0.27	No	--	--	--	--	No
Soil	SVOC	2,4,5-Trichlorophenol	3.45	No	--	--	--	--	No
Soil	SVOC	2,4,6-Trichlorophenol	3.45	No	--	--	--	--	No
Soil	SVOC	2,4-Dimethylphenol	2.3	No	--	--	--	--	No
Soil	SVOC	3,5-Dimethylphenol	2.35	No	--	--	--	--	No
Soil	SVOC	4,6-Dinitro-o-cresol	2.27	No	--	--	--	--	No
Soil	SVOC	Aniline	1.08	No	--	--	--	--	No
Soil	SVOC	Benzidine	1.34	No	--	--	--	--	No
Soil	SVOC	Benzoic acid	1.87	No	--	--	--	--	No
Soil	SVOC	Benzyl alcohol	1.1	No	--	--	--	--	No
Soil	SVOC	bis(2-Ethylhexyl) phthalate	7.6	Yes	EPA	2.8E+02	2.8E-02	Yes	**Yes**
Soil	SVOC	Butyl benzyl phthalate	4.73	Yes	EPA	3.0E+00	4.3E-02	Yes	**Yes**
Soil	SVOC	Carbazole	3.72	No	--	--	--	--	No
Soil	SVOC	Dibenzofuran	4.12	No	--	--	--	--	No
Soil	SVOC	Diethyl phthalate	2.42	No	--	--	--	--	No
Soil	SVOC	Diethylene Glycol	-1.47	No	--	--	--	--	No
Soil	SVOC	Dimethyl phthalate	1.6	No	--	--	--	--	No
Soil	SVOC	Di-n-butyl phthalate	4.5	Yes	EPA	1.0E+01	8.4E-03	Yes	**Yes**
Soil	SVOC	Di-n-octyl phthalate	8.1	Yes	EPA	1.5E+01	6.4E-03	Yes	**Yes**
Soil	SVOC	Ethylene Glycol	-1.2	No	--	--	--	--	No
Soil	SVOC	Formaldehyde	0.35	No	--	--	--	--	No
Soil	SVOC	m-Cresol	1.96	No	--	--	--	--	No
Soil	SVOC	n-Nitrosodimethylamine	-0.57	No	--	--	--	--	No
Soil	SVOC	n-Nitrosodiphenylamine	3.13	No	--	--	--	--	No
Soil	SVOC	o-Cresol	1.95	No	--	--	--	--	No
Soil	SVOC	p-Chloro-m-cresol	3.1	No	--	--	--	--	No
Soil	SVOC	p-Cresol	1.94	No	--	--	--	--	No
Soil	SVOC	Pentachlorophenol	5.12	Yes	EPA, NAVFAC, TNRCC	4.0E+03	--	--	**Yes**
Soil	SVOC	Phenol	1.46	No	--	--	--	--	No
Soil	SVOC	Tetrachlorophenol	4.45	Yes	EPA	2.3E+01	--	--	**Yes**
Soil	SVOC	Tetralin	3.96	No	--	--	--	--	No
Soil	SVOC	Triethylene glycol	-1.75	No	--	--	--	--	No
Soil	Terphenyls	m-Terphenyl	5.52	Yes	EPA	3.7E-01	--	--	**Yes**
Soil	Terphenyls	o-Terphenyl	5.52	Yes	EPA	--	--	--	No
Soil	Terphenyls	p-Terphenyl	6.03	Yes	EPA	--	--	--	No
Soil	VOC	1,1,1,2-Tetrachloroethane	2.93	No	--	--	--	--	No

Table 2-3. Identification of Chemicals of Potential Ecological Concern in Soil and Lakebed Sediment

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Matrix	EcoRAClass	Analyte	Bioaccumulative Potential			Background Screen			LHR CPEC[b]
			logKow	Bioaccu-mulative[a]	Source	Maximum Detect in Soil or Lakebed sediment for Boeing Evaluation Areas (mg/kg)	BTV (mg/kg)	Exceed?	
Soil	VOC	1,1,1-Trichloroethane	2.49	No	--	--	--	--	No
Soil	VOC	1,1,2,2-Tetrachloroethane	2.39	No	--	--	--	--	No
Soil	VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	3.16	No	--	--	--	--	No
Soil	VOC	1,1,2-Trichloroethane	1.89	No	--	--	--	--	No
Soil	VOC	1,1-Dichloroethane	1.79	No	--	--	--	--	No
Soil	VOC	1,1-Dichloroethene	2.13	No	--	--	--	--	No
Soil	VOC	1,2,3-Trichlorobenzene	4.05	No	--	--	--	--	No
Soil	VOC	1,2,4-Trichlorobenzene	4.02	Yes	NAVFAC	5.5E-03	--	--	**Yes**
Soil	VOC	1,2,4-Trimethylbenzene	3.63	No	--	--	--	--	No
Soil	VOC	1,2-Dibromo-3-chloropropane	2.96	No	--	--	--	--	No
Soil	VOC	1,2-Dibromoethane	1.96	No	--	--	--	--	No
Soil	VOC	1,2-Dichlorobenzene	3.43	Yes	NAVFAC	6.6E+00	--	--	**Yes**
Soil	VOC	1,2-Dichloroethane	1.48	No	--	--	--	--	No
Soil	VOC	1,2-Dichloroethene	2	No	--	--	--	--	No
Soil	VOC	1,2-Dichloropropane	1.98	No	--	--	--	--	No
Soil	VOC	1,3,5-Trimethylbenzene	3.42	No	--	--	--	--	No
Soil	VOC	1,3-Dichlorobenzene	3.53	Yes	NAVFAC	4.3E-04	--	--	**Yes**
Soil	VOC	1,4-Dichlorobenzene	3.44	Yes	NAVFAC	3.4E-03	--	--	**Yes**
Soil	VOC	2-Chloroethylvinyl ether	1.17	No	--	--	--	--	No
Soil	VOC	2-Hexanone	1.38	No	--	--	--	--	No
Soil	VOC	Acetone	-0.24	No	--	--	--	--	No
Soil	VOC	Benzene	2.13	No	--	--	--	--	No
Soil	VOC	Bromide	0.63	No	--	--	--	--	No
Soil	VOC	Bromobenzene	2.99	No	--	--	--	--	No
Soil	VOC	Bromodichloromethane	2	No	--	--	--	--	No
Soil	VOC	Bromoform	2.4	No	--	--	--	--	No
Soil	VOC	Bromomethane	1.19	No	--	--	--	--	No
Soil	VOC	Carbon disulfide	1.94	No	--	--	--	--	No
Soil	VOC	Carbon tetrachloride	2.83	No	--	--	--	--	No
Soil	VOC	Chlorobenzene	2.84	No	--	--	--	--	No
Soil	VOC	Chloroform	1.97	No	--	--	--	--	No
Soil	VOC	Chloromethane	0.91	No	--	--	--	--	No
Soil	VOC	cis-1,2-Dichloroethene	1.86	No	--	--	--	--	No
Soil	VOC	Cumene	3.66	No	--	--	--	--	No
Soil	VOC	Dibromochloromethane	2.16	No	--	--	--	--	No
Soil	VOC	Dibromomethane	1.7	No	--	--	--	--	No
Soil	VOC	Dichlorodifluoromethane	2.16	No	--	--	--	--	No

Table 2-3. Identification of Chemicals of Potential Ecological Concern in Soil and Lakebed Sediment

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Matrix	EcoRAClass	Analyte	Bioaccumulative Potential			Background Screen			LHR CPEC[b]
			logKow	Bioaccu-mulative[a]	Source	Maximum Detect in Soil or Lakebed sediment for Boeing Evaluation Areas (mg/kg)	BTV (mg/kg)	Exceed?	
Soil	VOC	Ethylbenzene	3.15	No	--	--	--	--	No
Soil	VOC	Hexachlorobutadiene	4.78	Yes	EPA, NAVFAC	1.0E-03	--	--	**Yes**
Soil	VOC	Methyl ethyl ketone	0.29	No	--	--	--	--	No
Soil	VOC	Methyl isobutyl ketone (MIBK)	1.31	No	--	--	--	--	No
Soil	VOC	Methylene chloride	1.25	No	--	--	--	--	No
Soil	VOC	m-Xylene & p-Xylene	3.2	No	--	--	--	--	No
Soil	VOC	n-Butyl alcohol	0.84	No	--	--	--	--	No
Soil	VOC	n-Butylbenzene	4.38	Yes	EPA	3.5E-01	--	--	**Yes**
Soil	VOC	Nitrobenzene	1.81	No	--	--	--	--	No
Soil	VOC	n-Propylbenzene	3.69	No	--	--	--	--	No
Soil	VOC	o-Chlorotoluene	3.42	No	--	--	--	--	No
Soil	VOC	o-Xylene	3.12	No	--	--	--	--	No
Soil	VOC	p-Chlorotoluene	3.33	No	--	--	--	--	No
Soil	VOC	p-Cymene	4.1	No	--	--	--	--	No
Soil	VOC	sec-Butylbenzene	4.57	Yes	EPA	2.1E-01	--	--	**Yes**
Soil	VOC	Styrene	2.95	No	--	--	--	--	No
Soil	VOC	tert-Butylbenzene	4.11	No	--	--	--	--	No
Soil	VOC	Tetrachloroethene	3.4	No	--	--	--	--	No
Soil	VOC	Toluene	2.73	No	--	--	--	--	No
Soil	VOC	trans-1,2-Dichloroethene	2.09	No	--	--	--	--	No
Soil	VOC	Trichloroethene	2.42	No	--	--	--	--	No
Soil	VOC	Trichlorofluoromethane	2.53	No	--	--	--	--	No
Soil	VOC	Vinyl chloride	1.62	No	--	--	--	--	No
Soil	VOC	Xylenes, Total	3.16	No	--	--	--	--	No
Lakebed sediment	Inorganics	Arsenic	0.68	Yes	NAVFAC	9.8E+01	2.4E+01	Yes	**Yes**
Lakebed sediment	Inorganics	Cadmium	-0.07	Yes	NAVFAC, TNRCC	2.9E+01	4.4E-01	Yes	**Yes**
Lakebed sediment	Inorganics	Chromium	0.23	Yes	TNRCC	8.2E+02	6.0E+01	Yes	**Yes**
Lakebed sediment	Inorganics	Copper	-0.57	Yes	NAVFAC, TNRCC	1.5E+03	4.2E+01	Yes	**Yes**
Lakebed sediment	Inorganics	Lead	0.73	Yes	NAVFAC, TNRCC	3.9E+02	3.4E+01	Yes	**Yes**
Lakebed sediment	Inorganics	Mercury	-0.47	Yes	EPA, TNRCC	6.3E+00	2.8E-02	Yes	**Yes**
Lakebed sediment	Inorganics	Nickel	-0.57	Yes	NAVFAC, TNRCC	1.1E+03	6.4E+01	Yes	**Yes**
Lakebed sediment	Inorganics	Selenium	0.24	Yes	NAVFAC, TNRCC	9.0E+00	5.4E-01	Yes	**Yes**
Lakebed sediment	Inorganics	Silver	0.23	Yes	NAVFAC	4.7E+02	9.5E-02	Yes	**Yes**
Lakebed sediment	Inorganics	Zinc	-0.47	Yes	NAVFAC	2.4E+03	1.5E+02	Yes	**Yes**
Lakebed sediment	ARCL	Aroclor-1016	5.62	Yes	EPA, NAVFAC	--	--	--	No
Lakebed sediment	ARCL	Aroclor-1254	6.5	Yes	EPA, NAVFAC	4.5E+00	--	--	**Yes**
Lakebed sediment	Dioxin_Furans	2,3,7,8-TCDD_TEQ_Bird	6.8	Yes	EPA, NAVFAC, TNRCC	2.2E-04	8.3E-07	Yes	**Yes**

Table 2-3. Identification of Chemicals of Potential Ecological Concern in Soil and Lakebed Sediment

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

			Bioaccumulative Potential			Background Screen			
Matrix	EcoRAClass	Analyte	logKow	Bioaccu-mulative[a]	Source	Maximum Detect in Soil or Lakebed sediment for Boeing Evaluation Areas (mg/kg)	BTV (mg/kg)	Exceed?	LHR CPEC[b]
Lakebed sediment	Energetics	2,4,6-Trinitrotoluene	1.6	Yes	EPA	5.9E-01	--	--	**Yes**
Lakebed sediment	Energetics	Perchlorate	--	Yes	Suspected	1.3E-01	6.5E-04	Yes	**Yes**
Lakebed sediment	Energetics	RDX	0.68	Yes	Suspected	4.6E-01	--	--	**Yes**
Lakebed sediment	PAH-HighMW	Benzo(a)anthracene	5.76	Yes	EPA, NAVFAC	2.6E+01	1.2E-03	Yes	**Yes**
Lakebed sediment	PAH-HighMW	Benzo(a)pyrene	6.13	Yes	EPA, NAVFAC	2.0E+01	1.6E-03	Yes	**Yes**
Lakebed sediment	PAH-HighMW	Benzo(b)fluoranthene	5.78	Yes	EPA, NAVFAC	3.1E+01	3.3E-03	Yes	**Yes**
Lakebed sediment	PAH-HighMW	Benzo(e)pyrene	6.44	Yes	EPA	4.6E-02	--	--	**Yes**
Lakebed sediment	PAH-HighMW	Benzo(ghi)perylene	6.63	Yes	EPA, NAVFAC	7.2E+00	1.2E-03	Yes	**Yes**
Lakebed sediment	PAH-HighMW	Benzo(k)fluoranthene	6.11	Yes	EPA, NAVFAC	6.1E+00	3.5E-03	Yes	**Yes**
Lakebed sediment	PAH-HighMW	Chrysene	5.81	Yes	EPA, NAVFAC	2.6E+01	2.5E-03	Yes	**Yes**
Lakebed sediment	PAH-HighMW	Dibenzo(a,h)anthracene	6.75	Yes	EPA, NAVFAC	2.8E+00	1.0E-03	Yes	**Yes**
Lakebed sediment	PAH-HighMW	Pyrene	4.88	Yes	EPA, NAVFAC	7.1E+01	2.6E-03	Yes	**Yes**
Lakebed sediment	PAH-LowMW	Acenaphthene	3.92	Yes	NAVFAC	7.0E+00	1.8E-03	Yes	**Yes**
Lakebed sediment	PAH-LowMW	Anthracene	4.45	Yes	NAVFAC	2.5E+01	6.5E-04	Yes	**Yes**
Lakebed sediment	PAH-LowMW	Fluoranthene	5.16	Yes	EPA, NAVFAC	7.9E+01	2.5E-03	Yes	**Yes**
Lakebed sediment	PAH-LowMW	Fluorene	4.18	Yes	NAVFAC	8.7E+00	1.8E-03	Yes	**Yes**
Lakebed sediment	PAH-LowMW	Phenanthrene	4.46	Yes	NAVFAC	6.9E+01	1.9E-03	Yes	**Yes**
Lakebed sediment	PCBs (coplanar)	PCB_TEQ_Bird	6.8	Yes	EPA, NAVFAC, TNRCC	7.3E-04	--	--	**Yes**
Lakebed sediment	Pesticides	4,4'-DDD	6.02	Yes	EPA, NAVFAC, TNRCC	5.5E-03	1.9E-04	Yes	**Yes**
Lakebed sediment	Pesticides	4,4'-DDT	6.91	Yes	EPA, NAVFAC, TNRCC	4.2E-01	6.1E-03	Yes	**Yes**
Lakebed sediment	SVOC	bis(2-Ethylhexyl) phthalate	7.6	Yes	EPA	5.3E+00	2.8E-02	Yes	**Yes**
Lakebed sediment	SVOC	Di-n-butyl phthalate	4.5	Yes	EPA	2.1E+00	8.4E-03	Yes	**Yes**
Lakebed sediment	SVOC	Di-n-octyl phthalate	8.1	Yes	EPA	2.5E-01	6.4E-03	Yes	**Yes**
Lakebed sediment	Terphenyls	o-Terphenyl	5.52	Yes	EPA	--	--	--	No
Lakebed sediment	Terphenyls	p-Terphenyl	6.03	Yes	EPA	--	--	--	No
Lakebed sediment	VOC	sec-Butylbenzene	4.57	Yes	EPA	2.1E-01	--	--	**Yes**

Notes:

-- = not available, not applicable

ARCL = aroclor

Boeing = The Boeing Company

CPEC = chemical of ecological concern

EPA = U.S. Environmental Protection Agency

LHR = large home range

MW = molecular weight

NAVFAC = Naval Facilities Engineering Command

PAH = polycyclic aromatic hydrocarbon

PCB = polychlorinated biphenyl

SVOC = semivolatile organic compound

TCDD = tetrachlorodibenzo-p-dioxin

TEQ = toxicity equivalent

TNRCC = Texas Natural Resource Conservation Commission

VOC = volatile organic compound

Table 2-3. Identification of Chemicals of Potential Ecological Concern in Soil and Lakebed Sediment

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

			Bioaccumulative Potential			Background Screen			
Matrix	EcoRAClass	Analyte	logKow	Bioaccu-mulative[a]	Source	Maximum Detect in Soil or Lakebed sediment for Boeing Evaluation Areas (mg/kg)	BTV (mg/kg)	Exceed?	LHR CPEC[b]

[a] Chemicals were considered bioaccumulative if they met one of the following criteria:
-NAVFAC - chemical is listed in Appendix A Table 1 of NAVFAC (2001)
-TNRCC - chemical is listed in Table 3-1 of TNRCC (2006)
-EPA - log Kow was greater than 4.2 (a value above which chemicals tend to bioaccumulate) (EPA, 2000) or bioaccumulation factor (BAF) was greater than 1 (EPA, 2007)
-Suspected to be bioaccumulative
-Similar to bioaccumulative chemical

[b] Chemicals were identified as CPECs under the following conditions:
-Soil - Chemical is considered bioaccumulative, was detected within the Boeing evaluation areas, and exceeded background threshold value (where available)
-Lakebed sediment - Chemical is considered bioaccumulative; was detected in Silvernale Reservoir, Perimeter Pond, or R-1 Pond; and exceeded background threshold value (where available)

Table 2-4. Summary Statistics for Detected Analytes in Surface Water

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Boeing Evaluation Area	Site	Matrix	EcoRAClass	Analyte	Units	Number of Detects	Number of Analyses	Frequency of Detects	Percent Detects	Minimum Detected Value	Maximum Detected Value	Minimum SQL for Non-detects	Maximum SQL for Non-detects	Arithmetic Mean Value	Standard Deviation
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Arsenic, Dissolved	µg/L	1	1	1/1	100%	2.0E+00	2.0E+00	N/A	N/A	2.0E+00	N/A
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Barium	µg/L	2	2	2/2	100%	1.6E+01	2.4E+01	N/A	N/A	2.0E+01	5.7E+00
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Boron	µg/L	1	2	1/2	50%	1.5E+02	1.5E+02	1.4E+02	1.4E+02	1.5E+02	N/A
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Chromium	µg/L	1	2	1/2	50%	1.8E+00	1.8E+00	6.4E+00	6.4E+00	1.8E+00	N/A
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Copper	µg/L	1	2	1/2	50%	1.0E+01	1.0E+01	8.7E+00	8.7E+00	1.0E+01	N/A
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Lead	µg/L	2	2	2/2	100%	2.0E+00	5.4E+00	N/A	N/A	3.7E+00	2.4E+00
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Manganese	µg/L	1	2	1/2	50%	5.4E+01	5.4E+01	1.8E+01	1.8E+01	5.4E+01	N/A
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Nickel	µg/L	1	2	1/2	50%	3.9E+00	3.9E+00	7.3E+00	7.3E+00	3.9E+00	N/A
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Zinc	µg/L	2	2	2/2	100%	3.5E+01	1.6E+02	N/A	N/A	9.8E+01	8.8E+01
Subarea 1B North	R-1 Pond	Surface Water	General Chemistry	Chloride	µg/L	1	1	1/1	100%	2.6E+03	2.6E+03	N/A	N/A	2.6E+03	N/A
Subarea 1B North	R-1 Pond	Surface Water	General Chemistry	Nitrate/Nitrite as N	µg/L	1	1	1/1	100%	1.6E+03	1.6E+03	N/A	N/A	1.6E+03	N/A
Subarea 1B North	R-1 Pond	Surface Water	General Chemistry	Sulfate	µg/L	1	1	1/1	100%	1.8E+04	1.8E+04	N/A	N/A	1.8E+04	N/A
Subarea 1B North	R-1 Pond	Surface Water	Energetics	Perchlorate	µg/L	2	8	2/8	25%	3.0E+00	4.5E+00	4.0E+00	4.0E+00	3.8E+00	1.1E+00
Subarea 1B North	R-1 Pond	Surface Water	VOC	Acetone	µg/L	1	1	1/1	100%	5.5E+00	5.5E+00	N/A	N/A	5.5E+00	N/A
Subarea 1B North	R-1 Pond	Surface Water	VOC	Chloroform	µg/L	1	2	1/2	50%	2.8E-01	2.8E-01	2.0E+00	2.0E+00	2.8E-01	N/A
Subarea 1B North	R-1 Pond	Surface Water	VOC	Methylene chloride	µg/L	1	2	1/2	50%	2.2E+00	2.2E+00	5.0E+00	5.0E+00	2.2E+00	N/A
Subarea 1B North	R-1 Pond	Surface Water	VOC	m-Xylene	µg/L	1	1	1/1	100%	9.7E-02	9.7E-02	N/A	N/A	9.7E-02	N/A
Subarea 1B North	R-1 Pond	Surface Water	VOC	Xylenes, Total	µg/L	1	2	1/2	50%	1.0E-01	1.0E-01	4.0E+00	4.0E+00	1.0E-01	N/A
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Antimony	µg/L	1	2	1/2	50%	2.0E+00	2.0E+00	2.0E+00	2.0E+00	2.0E+00	NA
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Arsenic	µg/L	1	2	1/2	50%	1.6E+00	1.6E+00	5.0E+00	5.0E+00	1.6E+00	NA
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Barium	µg/L	2	2	2/2	100%	1.5E+01	2.8E+01	NA	NA	2.1E+01	9.1E+00
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Boron	µg/L	1	2	1/2	50%	9.8E+01	9.8E+01	1.5E+02	1.5E+02	9.8E+01	NA
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Chromium	µg/L	1	2	1/2	50%	1.9E+00	1.9E+00	6.4E+00	6.4E+00	1.9E+00	NA
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Copper	µg/L	1	2	1/2	50%	6.2E+00	6.2E+00	8.7E+00	8.7E+00	6.2E+00	NA
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Lead	µg/L	1	2	1/2	50%	1.6E+00	1.6E+00	1.8E+00	1.8E+00	1.6E+00	NA
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Manganese	µg/L	1	2	1/2	50%	2.1E+01	2.1E+01	2.3E+01	2.3E+01	2.1E+01	NA
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Nickel	µg/L	2	2	2/2	100%	2.5E+00	8.3E+00	NA	NA	5.4E+00	4.1E+00
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Vanadium	µg/L	1	1	1/1	100%	4.8E+00	4.8E+00	NA	NA	4.8E+00	NA
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Zinc	µg/L	2	2	2/2	100%	2.6E+01	3.6E+01	NA	NA	3.1E+01	7.4E+00
Subarea 1B Southeast	Perimeter Pond	Surface Water	General Chemistry	Chloride	µg/L	1	1	1/1	100%	4.2E+03	4.2E+03	NA	NA	4.2E+03	NA
Subarea 1B Southeast	Perimeter Pond	Surface Water	General Chemistry	Nitrate-N	µg/L	1	1	1/1	100%	2.6E+03	2.6E+03	NA	NA	2.6E+03	NA
Subarea 1B Southeast	Perimeter Pond	Surface Water	General Chemistry	Sulfate	µg/L	1	1	1/1	100%	8.9E+03	8.9E+03	NA	NA	8.9E+03	NA
Subarea 1B Southeast	Perimeter Pond	Surface Water	VOC	Acetone	µg/L	1	1	1/1	100%	3.8E+00	3.8E+00	NA	NA	3.8E+00	NA
Subarea 1B Southeast	Perimeter Pond	Surface Water	VOC	Methylene chloride	µg/L	1	2	1/2	50%	1.9E+00	1.9E+00	5.0E+00	5.0E+00	1.9E+00	NA
Subarea 1B Southeast	Perimeter Pond	Surface Water	VOC	Trichloroethene	µg/L	1	2	1/2	50%	7.7E-02	7.7E-02	2.0E+00	2.0E+00	7.7E-02	NA
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Aluminum	µg/L	4	5	4/5	80%	1.8E+02	9.8E+02	2.6E+02	2.6E+02	5.3E+02	3.7E+02
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Arsenic	µg/L	4	6	4/6	67%	1.4E+00	2.2E+00	1.0E+00	5.0E+00	1.8E+00	3.5E-01
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Barium	µg/L	6	6	6/6	100%	3.0E+01	5.8E+01	NA	NA	4.4E+01	1.0E+01
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Boron	µg/L	5	6	5/6	83%	1.1E+02	1.3E+02	1.0E+02	1.0E+02	1.2E+02	7.9E+00
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Cadmium	µg/L	4	6	4/6	67%	2.3E-01	4.0E-01	3.5E-01	1.0E+00	3.1E-01	7.2E-02
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Chloramines	µg/L	1	1	1/1	100%	4.0E+01	4.0E+01	NA	NA	4.0E+01	NA
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Chromium	µg/L	1	6	1/6	17%	1.6E+00	1.6E+00	1.0E+00	6.4E+00	1.6E+00	NA
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Cobalt	µg/L	4	5	4/5	80%	2.2E+00	3.0E+00	3.3E+00	3.3E+00	2.5E+00	3.4E-01
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Copper	µg/L	5	6	5/6	83%	2.9E+00	4.0E+00	8.7E+00	8.7E+00	3.5E+00	4.2E-01
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Fluoride	µg/L	4	5	4/5	80%	3.3E+02	3.4E+02	5.0E+02	5.0E+02	3.3E+02	5.0E+00
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Lead	µg/L	5	6	5/6	83%	3.0E-01	2.2E+00	1.0E+00	1.0E+00	9.2E-01	7.8E-01
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Manganese	µg/L	6	6	6/6	100%	4.8E+01	6.6E+02	NA	NA	4.0E+02	2.5E+02
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Molybdenum	µg/L	4	5	4/5	80%	5.3E+00	6.0E+00	8.8E+00	8.8E+00	5.6E+00	3.3E-01
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Nickel	µg/L	5	6	5/6	83%	4.5E+00	8.0E+00	7.3E+00	7.3E+00	6.5E+00	1.3E+00
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Silver	µg/L	4	6	4/6	67%	1.1E-01	2.5E-01	1.0E+00	6.1E+00	1.7E-01	6.5E-02
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Strontium	µg/L	4	4	4/4	100%	7.6E+02	9.2E+02	NA	NA	8.3E+02	6.6E+01
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Titanium	µg/L	4	4	4/4	100%	1.1E+01	5.5E+01	NA	NA	3.0E+01	2.0E+01
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Vanadium	µg/L	1	5	1/5	20%	3.7E+00	3.7E+00	2.5E+00	4.5E+00	3.7E+00	NA
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Zinc	µg/L	6	6	6/6	100%	2.4E+01	4.6E+01	NA	NA	3.0E+01	8.5E+00
Subarea 5/9 North	Silvernale	Surface Water	General Chemistry	Chloride	µg/L	5	5	5/5	100%	2.7E+04	4.1E+04	NA	NA	3.1E+04	5.8E+03
Subarea 5/9 North	Silvernale	Surface Water	General Chemistry	Nitrate-N	µg/L	1	1	1/1	100%	1.4E+03	1.4E+03	NA	NA	1.4E+03	NA
Subarea 5/9 North	Silvernale	Surface Water	General Chemistry	Sulfate	µg/L	5	5	5/5	100%	2.1E+05	4.4E+05	NA	NA	3.9E+05	9.9E+04
Subarea 5/9 North	Silvernale	Surface Water	Dioxin_Furans	2,3,7,8-TCDD_TEQ_Bird	µg/L	5	5	5/5	100%	3.9E-09	1.8E-07	NA	NA	6.0E-08	7.3E-08

Table 2-4. Summary Statistics for Detected Analytes in Surface Water

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Boeing Evaluation Area	Site	Matrix	EcoRAClass	Analyte	Units	Number of Detects	Number of Analyses	Frequency of Detects	Percent Detects	Minimum Detected Value	Maximum Detected Value	Minimum SQL for Non-detects	Maximum SQL for Non-detects	Arithmetic Mean Value	Standard Deviation
Subarea 5/9 North	Silvernale	Surface Water	Dioxin_Furans	2,3,7,8-TCDD_TEQ_Mammal	µg/L	5	5	5/5	100%	3.9E-08	6.6E-07	NA	NA	2.2E-07	2.5E-07
Subarea 5/9 North	Silvernale	Surface Water	Herbicides	2,4,5-T	µg/L	1	1	1/1	100%	3.0E-02	3.0E-02	NA	NA	3.0E-02	NA
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Benzo(a)anthracene	µg/L	1	5	1/5	20%	4.9E-03	4.9E-03	4.8E-02	1.0E+01	4.9E-03	NA
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Benzo(ghi)perylene	µg/L	1	5	1/5	20%	4.2E-03	4.2E-03	4.8E-02	1.0E+01	4.2E-03	NA
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Chrysene	µg/L	1	5	1/5	20%	1.2E-02	1.2E-02	4.9E-02	1.0E+01	1.2E-02	NA
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Dibenzo(a,h)anthracene	µg/L	1	5	1/5	20%	6.0E-02	6.0E-02	4.8E-02	2.0E+01	6.0E-02	NA
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Indeno(1,2,3-cd)pyrene	µg/L	1	5	1/5	20%	6.0E-02	6.0E-02	4.8E-02	2.0E+01	6.0E-02	NA
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Pyrene	µg/L	2	5	2/5	40%	9.3E-03	2.0E-02	4.9E-02	1.0E+01	1.5E-02	7.6E-03
Subarea 5/9 North	Silvernale	Surface Water	PAH-LowMW	Fluoranthene	µg/L	2	5	2/5	40%	1.1E-02	2.1E-02	4.9E-02	1.0E+01	1.6E-02	7.1E-03
Subarea 5/9 North	Silvernale	Surface Water	PAH-LowMW	Phenanthrene	µg/L	2	5	2/5	40%	8.2E-03	1.2E-02	4.9E-02	1.0E+01	1.0E-02	2.7E-03
Subarea 5/9 North	Silvernale	Surface Water	PCBs	PCB_TEQ_Bird	µg/L	3	3	3/3	100%	2.1E-08	2.1E-07	NA	NA	8.3E-08	1.1E-07
Subarea 5/9 North	Silvernale	Surface Water	PCBs	PCB_TEQ_Mammal	µg/L	3	3	3/3	100%	1.5E-08	5.1E-06	NA	NA	1.7E-06	3.0E-06
Subarea 5/9 North	Silvernale	Surface Water	SVOC	bis(2-Ethylhexyl) phthalate	µg/L	4	5	4/5	80%	7.0E-02	1.1E-01	5.0E+01	5.0E+01	8.6E-02	1.7E-02
Subarea 5/9 North	Silvernale	Surface Water	SVOC	Diethyl phthalate	µg/L	3	5	3/5	60%	6.2E-02	7.6E-02	9.7E-01	1.0E+01	7.0E-02	7.4E-03
Subarea 5/9 North	Silvernale	Surface Water	VOC	Acetone	µg/L	2	5	2/5	40%	2.2E+00	4.6E+00	2.0E+01	2.0E+01	3.4E+00	1.7E+00
Subarea 5/9 North	Silvernale	Surface Water	VOC	Formaldehyde	µg/L	1	4	1/4	25%	1.0E+01	1.0E+01	5.0E+01	5.0E+01	1.0E+01	NA
Subarea 5/9 North	Silvernale	Surface Water	VOC	Methylene chloride	µg/L	1	6	1/6	17%	1.8E+00	1.8E+00	5.0E+00	5.0E+00	1.8E+00	NA

Notes:
Statistics calculated using ProUCL Version 5.1.
Dissolved metals data are only used if metal was not detected in total fraction.
µg/L = microgram(s) per liter
Boeing = The Boeing Company
EcoRA = ecological risk assessment
MW = molecular weight
NA = not available
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SQL = sample quantitation limit
SVOC = semivolatile organic compound
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxicity equivalent
VOC = volatile organic compound

Table 3-1. Suitable Habitats for Large Home Range Receptors

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Boeing Evaluation Area	Habitat Type	Acres	Receptor			
			Red-tailed Hawk	Mule Deer	Bobcat	Great Blue Heron
Subarea 10	Chaparral	3.5E+02		Yes	Yes	
Subarea 10	Coast live oak riparian woodland	1.2E+01		Yes	Yes	
Subarea 10	Coast live oak woodland	5.5E+01		Yes	Yes	
Subarea 10	Coyoto brush scrub	2.1E-01		Yes	Yes	
Subarea 10	Developed areas	5.4E+00	Yes	Yes	Yes	
Subarea 10	Disturbed	1.9E+00	Yes	Yes	Yes	
Subarea 10	Grassland	2.2E+01	Yes	Yes	Yes	
Subarea 10	Laurel sumac scrub	2.7E+02		Yes	Yes	
Subarea 10	Rock outcrop/vegetated	6.0E+01	Yes		Yes	
Subarea 10	Southern willow scrub	4.0E-01		Yes	Yes	
Subarea 10	Venturan coastal sage scrub	1.4E+01		Yes	Yes	
Subarea 1A Central	Chaparral	1.6E+00		Yes	Yes	
Subarea 1A Central	Coast live oak woodland	6.1E+00		Yes	Yes	
Subarea 1A Central	Coyoto brush scrub	3.0E+00		Yes	Yes	
Subarea 1A Central	Developed areas	2.5E+00	Yes	Yes	Yes	
Subarea 1A Central	Mulefat scrub	1.1E-01		Yes	Yes	
Subarea 1A Central	Rock outcrop/vegetated	7.0E+00	Yes		Yes	
Subarea 1A Central	Undifferentiated exotic vegetation	3.7E-01				
Subarea 1A Central	Venturan coastal sage scrub	1.2E+00		Yes	Yes	
Subarea 1A North	Chaparral	2.2E+01		Yes	Yes	
Subarea 1A North	Coast live oak woodland	1.0E+01		Yes	Yes	
Subarea 1A North	Coyoto brush scrub	1.5E-01		Yes	Yes	
Subarea 1A North	Developed areas	1.8E+01	Yes	Yes	Yes	
Subarea 1A North	Disturbed	2.0E+00	Yes	Yes	Yes	
Subarea 1A North	Mulefat scrub	1.2E+00		Yes	Yes	
Subarea 1A North	Not surveyed	2.4E+00				
Subarea 1A North	Rock outcrop	4.7E-03	Yes		Yes	
Subarea 1A North	Rock outcrop/vegetated	5.8E+01	Yes		Yes	
Subarea 1A North	Undifferentiated exotic vegetation	3.5E+00				
Subarea 1A North	Venturan coastal sage scrub	7.5E+00		Yes	Yes	
Subarea 1A North Offsite Areas	Chaparral	5.0E+00		Yes	Yes	
Subarea 1A North Offsite Areas	Coast live oak woodland	8.9E-01		Yes	Yes	
Subarea 1A North Offsite Areas	Developed areas	2.6E+00	Yes	Yes	Yes	
Subarea 1A North Offsite Areas	Disturbed	1.3E+00	Yes	Yes	Yes	
Subarea 1A North Offsite Areas	Rock outcrop/vegetated	3.3E+01	Yes		Yes	
Subarea 1A North Offsite Areas	Undifferentiated exotic vegetation	7.7E-01				
Subarea 1A North Offsite Areas	Venturan coastal sage scrub	4.0E-01		Yes	Yes	
Subarea 1A South	Chaparral	1.5E+02		Yes	Yes	
Subarea 1A South	Coast live oak woodland	1.0E+01		Yes	Yes	
Subarea 1A South	Developed areas	5.0E+00	Yes	Yes	Yes	
Subarea 1A South	Disturbed	4.7E-01	Yes	Yes	Yes	
Subarea 1A South	Grassland	9.3E-01	Yes	Yes	Yes	
Subarea 1A South	Laurel sumac scrub	2.3E+01		Yes	Yes	
Subarea 1A South	Mulefat scrub	3.1E-01		Yes	Yes	
Subarea 1A South	Rock outcrop/vegetated	1.6E+02	Yes		Yes	
Subarea 1A South	Southern willow scrub	4.3E-02		Yes	Yes	
Subarea 1A South	Undifferentiated exotic vegetation	2.2E-01				
Subarea 1A South	Venturan coastal sage scrub	4.8E+00		Yes	Yes	
Subarea 1B North	Chaparral	7.0E+01		Yes	Yes	
Subarea 1B North	Coast live oak riparian woodland	4.2E-01		Yes	Yes	
Subarea 1B North	Coast live oak woodland	7.3E+00		Yes	Yes	
Subarea 1B North	Coyoto brush scrub	2.9E-01		Yes	Yes	
Subarea 1B North	Developed areas	5.5E+00	Yes	Yes	Yes	
Subarea 1B North	Disturbed	2.4E+00	Yes	Yes	Yes	
Subarea 1B North	Grassland	9.3E-01	Yes	Yes	Yes	Yes
Subarea 1B North	Laurel sumac scrub	3.2E+00		Yes	Yes	
Subarea 1B North	Mulefat scrub	1.1E+00		Yes	Yes	Yes[a]

Table 3-1. Suitable Habitats for Large Home Range Receptors

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Boeing Evaluation Area	Habitat Type	Acres	Receptor			
			Red-tailed Hawk	Mule Deer	Bobcat	Great Blue Heron
Subarea 1B North	Rock outcrop/vegetated	1.3E+02	Yes		Yes	
Subarea 1B North	Southern willow scrub	3.7E-01		Yes	Yes	
Subarea 1B North	Undifferentiated exotic vegetation	4.8E-01				
Subarea 1B North	Venturan coastal sage scrub	8.4E+00		Yes	Yes	
Subarea 1B Southeast	Chaparral	4.7E+01		Yes	Yes	
Subarea 1B Southeast	Coast live oak woodland	6.4E+00		Yes	Yes	
Subarea 1B Southeast	Coyoto brush scrub	9.9E-01		Yes	Yes	
Subarea 1B Southeast	Developed areas	2.4E+00	Yes	Yes	Yes	
Subarea 1B Southeast	Disturbed	1.0E+01	Yes	Yes	Yes	
Subarea 1B Southeast	Grassland	9.1E+00	Yes	Yes	Yes	Yes
Subarea 1B Southeast	Mulefat scrub	7.9E-01		Yes	Yes	Yes[a]
Subarea 1B Southeast	Rock outcrop/vegetated	1.8E+01	Yes		Yes	
Subarea 1B Southeast	Southern willow scrub	6.4E-01		Yes	Yes	
Subarea 1B Southeast	Venturan coastal sage scrub	5.9E+00		Yes	Yes	
Subarea 1B Southwest	Chaparral	2.3E+01		Yes	Yes	
Subarea 1B Southwest	Coast live oak woodland	2.3E+00		Yes	Yes	
Subarea 1B Southwest	Developed areas	5.2E+00	Yes	Yes	Yes	
Subarea 1B Southwest	Disturbed	2.6E+00	Yes	Yes	Yes	
Subarea 1B Southwest	Grassland	4.6E+00	Yes	Yes	Yes	
Subarea 1B Southwest	Mulefat scrub	1.1E-03		Yes	Yes	
Subarea 1B Southwest	Rock outcrop/vegetated	4.2E+01	Yes		Yes	
Subarea 1B Southwest	Southern willow scrub	7.9E-02		Yes	Yes	
Subarea 1B Southwest	Venturan coastal sage scrub	3.0E+00		Yes	Yes	
Subarea 59 North	Chaparral	1.4E+01		Yes	Yes	
Subarea 59 North	Coast live oak riparian woodland	8.9E-01		Yes	Yes	
Subarea 59 North	Coast live oak woodland	6.2E+00		Yes	Yes	
Subarea 59 North	Developed areas	5.5E+00	Yes	Yes	Yes	
Subarea 59 North	Disturbed	2.5E-01	Yes	Yes	Yes	
Subarea 59 North	Grassland	2.5E+00	Yes	Yes	Yes	Yes
Subarea 59 North	Mulefat scrub	9.3E-01		Yes	Yes	
Subarea 59 North	Open water	7.8E-01				Yes
Subarea 59 North	Potential wetland	7.0E-01		Yes	Yes	Yes
Subarea 59 North	Rock outcrop/vegetated	1.9E+01	Yes		Yes	
Subarea 59 North	Southern willow scrub	1.0E+00		Yes	Yes	
Subarea 59 North	Venturan coastal sage scrub	3.2E+00		Yes	Yes	
Subarea 59 South	Chaparral	3.1E+01		Yes	Yes	
Subarea 59 South	Coast live oak riparian woodland	8.1E+00		Yes	Yes	
Subarea 59 South	Coast live oak woodland	3.7E+01		Yes	Yes	
Subarea 59 South	Coyoto brush scrub	1.0E-01		Yes	Yes	
Subarea 59 South	Developed areas	3.7E+00	Yes	Yes	Yes	
Subarea 59 South	Disturbed	2.3E+00	Yes	Yes	Yes	
Subarea 59 South	Grassland	1.3E+01	Yes	Yes	Yes	
Subarea 59 South	Laurel sumac scrub	1.1E+01		Yes	Yes	
Subarea 59 South	Mulefat scrub	4.0E-01		Yes	Yes	
Subarea 59 South	Rock outcrop/vegetated	5.3E+01	Yes		Yes	
Subarea 59 South	Undifferentiated exotic vegetation	1.7E+00				
Subarea 59 South	Venturan coastal sage scrub	6.3E+00		Yes	Yes	
Shooting Range Area	Chaparral	6.4E+00		Yes	Yes	
Shooting Range Area	Coast live oak woodland	1.7E-01		Yes	Yes	
Shooting Range Area	Developed areas	7.4E-01	Yes	Yes	Yes	
Shooting Range Area	Disturbed	6.7E-01	Yes	Yes	Yes	
Shooting Range Area	Rock outcrop	4.1E-01	Yes		Yes	
Shooting Range Area	Rock outcrop/vegetated	2.5E+01	Yes		Yes	
Shooting Range Area	Undifferentiated exotic vegetation	1.7E-01				

Notes:

[a] Where this habitat type borders Silvernale Reservoir, Perimeter Pond, or R-1 Pond

Boeing = The Boeing Company

Table 3-2. Subarea-level Area Use Factors

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Boeing Evaluation Area		Red-tailed Hawk			Mule Deer			Bobcat			Great Blue Heron		
	Evaluation Area (Acres)	Suitable Habitat (Acres)	Foraging Range (Acres)	Subarea AUF[a]	Suitable Habitat (Acres)	Foraging Range (Acres)	Subarea AUF[a]	Suitable Habitat (Acres)	Foraging Range (Acres)	Subarea AUF[a]	Suitable Habitat (Acres)	Foraging Range (Acres)	Subarea AUF[a]
Subarea 10	7.9E+02	8.9E+01	1.9E+02	4.7E-01	7.3E+02	1.3E+02	1.0E+00	7.9E+02	1.2E+03	6.9E-01	--	--	--
Subarea 1A Central	2.2E+01	9.5E+00	1.9E+02	5.0E-02	1.5E+01	1.3E+02	1.1E-01	2.2E+01	1.2E+03	1.9E-02	--	--	--
Subarea 1A North	1.3E+02	7.8E+01	1.9E+02	4.1E-01	6.1E+01	1.3E+02	4.8E-01	1.2E+02	1.2E+03	1.0E-01	--	--	--
Subarea 1A North Off-Site Areas	4.8E+01	3.7E+01	1.9E+02	1.9E-01	1.0E+01	1.3E+02	8.0E-02	4.3E+01	1.2E+03	3.8E-02	--	--	--
Subarea 1A South	3.5E+02	1.6E+02	1.9E+02	8.4E-01	1.9E+02	1.3E+02	1.0E+00	3.5E+02	1.2E+03	3.0E-01	--	--	--
Subarea 1B North	2.3E+02	1.4E+02	1.9E+02	7.4E-01	1.0E+02	1.3E+02	7.8E-01	2.3E+02	1.2E+03	2.0E-01	2.0E+00	1.7E+03	1.2E-03
Subarea 1B Southeast	1.0E+02	4.0E+01	1.9E+02	2.1E-01	8.4E+01	1.3E+02	6.5E-01	1.0E+02	1.2E+03	8.8E-02	9.9E+00	1.7E+03	5.7E-03
Subarea 1B Southwest	8.3E+01	5.4E+01	1.9E+02	2.8E-01	4.1E+01	1.3E+02	3.2E-01	8.3E+01	1.2E+03	7.2E-02	--	--	--
Subarea 5/9 North	5.5E+01	2.8E+01	1.9E+02	1.4E-01	3.5E+01	1.3E+02	2.8E-01	5.5E+01	1.2E+03	4.7E-02	4.4E+00	1.7E+03	2.6E-03
Subarea 5/9 South	1.7E+02	7.2E+01	1.9E+02	3.7E-01	1.1E+02	1.3E+02	8.8E-01	1.7E+02	1.2E+03	1.4E-01	--	--	--
Shooting Range Area	3.4E+01	2.7E+01	1.9E+02	1.4E-01	8.0E+00	1.3E+02	6.2E-02	3.4E+01	1.2E+03	2.9E-02	--	--	--

Notes:

[a]Foraging range-based AUF was used for Subarea-level exposure scenario. AUFs larger than 1 are defaulted to 1 for risk estimates.

$$\text{Foraging range-based AUF} = \frac{\text{Receptor-suitable habitat in Exposure Area (acres)}}{\text{Receptor foraging range (acres)}}$$

-- = The heron was only evaluated for potential exposures around Silvernale Reservoir, Perimeter Pond, and R-1 Pond.
AUF = area use factor
Boeing = The Boeing Company
ERA = ecological risk assessment

Table 3-3. Facility-wide Area Use Factors

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Exposure Area	Red-tailed Hawk			Mule Deer			Bobcat			Great Blue Heron		
	Acres of Habitat	Suitable Habitat (Acres)	Facility-wide AUF[a]	Acres of Habitat	Suitable Habitat (Acres)	Facility-wide AUF[a]	Acres of Habitat	Suitable Habitat (Acres)	Facility-wide AUF[a]	Acres of Habitat	Suitable Habitat (Acres)	Facility-wide AUF[a]
SSFL Facility	2.9E+03	1.2E+03	4.2E-01	2.9E+03	2.0E+03	6.9E-01	2.9E+03	2.9E+03	9.9E-01	2.9E+03	7.5E+01	2.6E-02

Notes:

[a] Habitat-based AUF will be used for the facilitywide ERA.

$$\text{Habitat-based AUF} = \frac{\text{Receptor-suitable habitat in SSFL Facility (acres)}}{\text{Total habitat in SSFL Facility (acres)}}$$

AUF = area use factor

ERA = ecological risk assessment

SSFL = Santa Susana Field Laboratory

Table 3-4. Surface Water Exposure Point Concentrations

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Boeing Evaluation Area	Site	Matrix	EcoRAClass	Analyte	Units	RME EPC	RME EPC Basis
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Arsenic, Dissolved	µg/L	2.0E+00	Maximum Result
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Barium	µg/L	2.4E+01	Maximum Result
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Boron	µg/L	1.5E+02	Maximum Result
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Chromium	µg/L	1.8E+00	Maximum Result
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Copper	µg/L	1.0E+01	Maximum Result
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Lead	µg/L	5.4E+00	Maximum Result
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Manganese	µg/L	5.4E+01	Maximum Result
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Nickel	µg/L	3.9E+00	Maximum Result
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Zinc	µg/L	1.6E+02	Maximum Result
Subarea 1B North	R-1 Pond	Surface Water	General Chemistry	Chloride	µg/L	2.6E+03	Maximum Result
Subarea 1B North	R-1 Pond	Surface Water	General Chemistry	Nitrate/Nitrite as N	µg/L	1.6E+03	Maximum Result
Subarea 1B North	R-1 Pond	Surface Water	General Chemistry	Sulfate	µg/L	1.8E+04	Maximum Result
Subarea 1B North	R-1 Pond	Surface Water	Energetics	Perchlorate	µg/L	3.5E+00	KM H-UCL
Subarea 1B North	R-1 Pond	Surface Water	VOC	Acetone	µg/L	5.5E+00	Maximum Result
Subarea 1B North	R-1 Pond	Surface Water	VOC	Chloroform	µg/L	2.8E-01	Maximum Result
Subarea 1B North	R-1 Pond	Surface Water	VOC	Methylene chloride	µg/L	2.2E+00	Maximum Result
Subarea 1B North	R-1 Pond	Surface Water	VOC	m-Xylene	µg/L	9.7E-02	Maximum Result
Subarea 1B North	R-1 Pond	Surface Water	VOC	Xylenes, Total	µg/L	1.0E-01	Maximum Result
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Antimony	µg/L	2.0E+00	Maximum Result
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Arsenic	µg/L	1.6E+00	Maximum Result
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Barium	µg/L	2.8E+01	Maximum Result
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Boron	µg/L	9.8E+01	Maximum Result
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Chromium	µg/L	1.9E+00	Maximum Result
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Copper	µg/L	6.2E+00	Maximum Result
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Lead	µg/L	1.6E+00	Maximum Result
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Manganese	µg/L	2.1E+01	Maximum Result
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Nickel	µg/L	8.3E+00	Maximum Result
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Vanadium	µg/L	4.8E+00	Maximum Result
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Zinc	µg/L	3.6E+01	Maximum Result
Subarea 1B Southeast	Perimeter Pond	Surface Water	General Chemistry	Chloride	µg/L	4.2E+03	Maximum Result
Subarea 1B Southeast	Perimeter Pond	Surface Water	General Chemistry	Nitrate-N	µg/L	2.6E+03	Maximum Result
Subarea 1B Southeast	Perimeter Pond	Surface Water	General Chemistry	Sulfate	µg/L	8.9E+03	Maximum Result
Subarea 1B Southeast	Perimeter Pond	Surface Water	VOC	Acetone	µg/L	3.8E+00	Maximum Result
Subarea 1B Southeast	Perimeter Pond	Surface Water	VOC	Methylene chloride	µg/L	1.9E+00	Maximum Result
Subarea 1B Southeast	Perimeter Pond	Surface Water	VOC	Trichloroethene	µg/L	7.7E-02	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Aluminum	µg/L	8.1E+02	95% KM (t) UCL
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Arsenic	µg/L	2.0E+00	95% KM (t) UCL
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Barium	µg/L	5.3E+01	95% Student's-t UCL
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Boron	µg/L	1.3E+02	95% KM (t) UCL
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Cadmium	µg/L	3.7E-01	95% KM (t) UCL
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Chloramines	µg/L	4.0E+01	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Chromium	µg/L	1.6E+00	Maximum Result

Table 3-4. Surface Water Exposure Point Concentrations

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Boeing Evaluation Area	Site	Matrix	EcoRAClass	Analyte	Units	RME EPC	RME EPC Basis
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Cobalt	µg/L	2.9E+00	95% KM (t) UCL
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Copper	µg/L	3.9E+00	95% KM (t) UCL
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Fluoride	µg/L	3.4E+02	95% KM (t) UCL
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Lead	µg/L	1.4E+00	95% KM (t) UCL
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Manganese	µg/L	6.1E+02	95% Student's-t UCL
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Molybdenum	µg/L	6.0E+00	95% KM (t) UCL
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Nickel	µg/L	7.5E+00	95% KM (t) UCL
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Silver	µg/L	2.3E-01	95% KM (t) UCL
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Strontium	µg/L	9.2E+02	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Titanium	µg/L	5.5E+01	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Vanadium	µg/L	3.7E+00	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Zinc	µg/L	3.7E+01	95% Student's-t UCL
Subarea 5/9 North	Silvernale	Surface Water	General Chemistry	Chloride	µg/L	3.6E+04	95% Student's-t UCL
Subarea 5/9 North	Silvernale	Surface Water	General Chemistry	Nitrate-N	µg/L	1.4E+03	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	General Chemistry	Sulfate	µg/L	4.4E+05	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	Dioxin_Furans	2,3,7,8-TCDD_TEQ_Bird	µg/L	1.3E-07	95% Student's-t UCL
Subarea 5/9 North	Silvernale	Surface Water	Dioxin_Furans	2,3,7,8-TCDD_TEQ_Mammal	µg/L	6.6E-07	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	Herbicides	2,4,5-T	µg/L	3.0E-02	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Benzo(a)anthracene	µg/L	4.9E-03	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Benzo(ghi)perylene	µg/L	4.2E-03	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Chrysene	µg/L	1.2E-02	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Dibenzo(a,h)anthracene	µg/L	6.0E-02	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Indeno(1,2,3-cd)pyrene	µg/L	6.0E-02	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Pyrene	µg/L	2.0E-02	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	PAH-LowMW	Fluoranthene	µg/L	2.1E-02	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	PAH-LowMW	Phenanthrene	µg/L	1.2E-02	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	PCBs	PCB_TEQ_Bird	µg/L	2.1E-07	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	PCBs	PCB_TEQ_Mammal	µg/L	5.1E-06	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	SVOC	bis(2-Ethylhexyl) phthalate	µg/L	1.0E-01	95% KM (t) UCL
Subarea 5/9 North	Silvernale	Surface Water	SVOC	Diethyl phthalate	µg/L	7.6E-02	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	VOC	Acetone	µg/L	4.6E+00	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	VOC	Formaldehyde	µg/L	1.0E+01	Maximum Result
Subarea 5/9 North	Silvernale	Surface Water	VOC	Methylene chloride	µg/L	1.8E+00	Maximum Result

Notes:

Statistics calculated using ProUCL Version 5.1.

µg/L = microgram(s) per liter
Boeing = The Boeing Company
EcoRA = ecological risk assessment
EPC = exposure point concentration
MW = molecular weight
NA = not available
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RME = reasonable maximum exposure
SVOC = semivolatile organic compound
TCDD = tetrachlorodibenzo-p-dioxin
TEQ =toxicity equivalent
UCL = upper confidence limit on the mean
VOC = volatile organic compound

Table 3-5. Ecological Risk-based Screening Levels for CPECs in Soil and Lakebed Sediment

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

EcoRAClass	Analyte	Soil EcoRBSLs						Lakebed Sediment EcoRBSLs	
		Red-tailed Hawk		Mule Deer		Bobcat		Great Blue Heron	
		Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL
Inorganics	Arsenic	4.8E+03	1.9E+04	1.4E+02	2.0E+03	6.5E+02	9.5E+03	1.4E+03	5.7E+03
Inorganics	Cadmium	2.3E+00	3.4E+01	4.6E-01	2.0E+01	4.5E-01	2.0E+01	1.5E+01	2.5E+02
Inorganics	Chromium	1.0E+02	6.2E+02	9.8E+02	2.4E+04	2.2E+02	5.3E+03	7.2E+02	4.7E+03
Inorganics	Copper	1.5E+02	3.5E+03	1.0E+02	2.5E+04	4.1E+02	9.7E+04	2.1E+02	7.4E+03
Inorganics	Hexavalent Chromium	--	--	2.4E+01	1.0E+02	1.9E+03	7.9E+03	--	--
Inorganics	Lead	6.3E-01	4.0E+02	5.1E+01	1.2E+04	1.1E+02	2.5E+04	1.3E+00	8.1E+02
Inorganics	Mercury	3.0E+01	6.1E+01	5.0E+00	--	1.6E+02	--	7.0E+00	1.4E+01
Inorganics	Nickel	3.0E+01	1.2E+03	2.3E+00	5.5E+02	6.8E+00	1.6E+03	3.0E+01	1.2E+03
Inorganics	Selenium	2.5E+00	1.0E+01	2.2E+00	4.0E+01	1.3E+00	3.1E+01	8.4E-01	3.4E+00
Inorganics	Silver	6.5E+03	1.9E+05	4.4E+03	8.7E+04	4.5E+04	9.0E+05	3.1E+01	9.3E+02
Inorganics	Zinc	8.3E+01	8.3E+02	1.3E+02	5.6E+03	1.1E+02	4.6E+03	8.3E+01	8.3E+02
ARCL	Aroclor-1242	2.3E+00	2.3E+01	4.3E+00	4.3E+01	2.1E+00	2.1E+01	NC	NC
ARCL	Aroclor-1248	2.3E+00	2.3E+01	5.9E-01	5.9E+00	3.0E-01	3.0E+00	NC	NC
ARCL	Aroclor-1254	2.3E+00	2.3E+01	4.7E+00	4.7E+01	2.1E+00	2.1E+01	2.3E-01	2.6E+00
ARCL	Aroclor-1260	2.3E+00	2.3E+01	7.8E+00	7.8E+01	2.1E+00	2.1E+01	NC	NC
ARCL	Aroclor-5460	2.3E+00	2.3E+01	4.3E+00	4.3E+01	2.1E+00	2.1E+01	NC	NC
Dioxin_Furans	2,3,7,8-TCDD_TEQ_Bird	2.5E-05	2.0E-04	--	--	--	--	8.2E-04	8.2E-03
Dioxin_Furans	2,3,7,8-TCDD_TEQ_Mammal	--	--	8.0E-05	8.0E-04	4.9E-06	3.9E-05	--	--
Energetics	2,4,6-Trinitrotoluene	9.1E-01	2.3E+01	2.9E-01	1.5E+00	1.5E+00	7.5E+00	1.1E+00	2.8E+01
Energetics	Perchlorate	1.7E+02	3.4E+02	2.7E+00	4.0E+01	1.9E+02	9.6E+02	2.0E+02	4.0E+02
Energetics	RDX	4.7E+01	1.1E+02	1.7E+01	8.3E+01	9.0E+00	4.5E+01	5.6E+01	1.3E+02
PAH-HighMW	Benzo(a)anthracene	2.5E+02	--	4.5E+01	2.8E+03	1.9E+01	1.2E+03	6.0E+02	--
PAH-HighMW	Benzo(a)pyrene	2.5E+02	--	1.3E+02	7.9E+03	1.9E+01	1.2E+03	8.2E+02	--
PAH-HighMW	Benzo(b)fluoranthene	2.5E+02	--	4.7E+01	2.9E+03	1.9E+01	1.2E+03	5.4E+02	--
PAH-HighMW	Benzo(e)pyrene	2.5E+02	--	7.3E+01	4.5E+03	1.9E+01	1.2E+03	8.2E+02	--
PAH-HighMW	Benzo(ghi)perylene	2.5E+02	--	6.7E+01	4.1E+03	1.9E+01	1.2E+03	7.8E+02	--
PAH-HighMW	Benzo(k)fluoranthene	2.5E+02	--	6.0E+01	3.7E+03	1.9E+01	1.2E+03	7.1E+02	--
PAH-HighMW	Chrysene	2.5E+02	--	4.5E+01	2.8E+03	1.9E+01	1.2E+03	6.2E+02	--
PAH-HighMW	Dibenzo(a,h)anthracene	2.5E+02	--	1.0E+02	6.3E+03	1.9E+01	1.2E+03	3.0E+02	--
PAH-HighMW	Indeno(1,2,3-cd)pyrene	--	--	1.2E+02	7.3E+03	1.9E+01	1.2E+03	--	--
PAH-HighMW	Pyrene	2.5E+02	--	2.1E+01	1.3E+03	1.9E+01	1.2E+03	8.1E+02	--
PAH-LowMW	Acenaphthene	1.3E+01	1.3E+02	2.2E+02	1.2E+03	2.0E+03	1.1E+04	6.4E+01	6.4E+02
PAH-LowMW	Acenaphthylene	1.3E+01	1.3E+02	3.2E+03	1.7E+04	2.0E+03	1.1E+04	NC	NC
PAH-LowMW	Anthracene	1.4E+01	1.4E+02	1.1E+03	5.9E+03	2.0E+03	1.1E+04	7.1E+01	7.1E+02
PAH-LowMW	Fluoranthene	2.5E+02	--	3.2E+03	1.7E+04	2.0E+03	1.1E+04	7.0E+02	--
PAH-LowMW	Fluorene	1.3E+01	1.3E+02	2.2E+02	1.2E+03	2.0E+03	1.1E+04	6.3E+01	6.3E+02
PAH-LowMW	Naphthalene	5.4E+02	2.7E+03	1.3E+02	7.3E+02	2.0E+03	1.1E+04	NC	NC

Table 3-5. Ecological Risk-based Screening Levels for CPECs in Soil and Lakebed Sediment

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

EcoRAClass	Analyte	Soil EcoRBSLs						Lakebed Sediment EcoRBSLs	
		Red-tailed Hawk		Mule Deer		Bobcat		Great Blue Heron	
		Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL
PAH-LowMW	Phenanthrene	1.5E+01	1.5E+02	7.7E+02	4.2E+03	2.0E+03	1.1E+04	2.9E+01	2.9E+02
PCBs (coplanar)	PCB_TEQ_Bird	2.5E-05	2.0E-04	--	--	--	--	8.2E-04	8.2E-03
PCBs (coplanar)	PCB_TEQ_Mammal	--	--	8.0E-05	8.0E-04	4.9E-06	3.9E-05	--	--
Pesticides	4,4'-DDD	1.2E-01	1.9E+01	4.3E+01	8.7E+02	2.4E+01	4.8E+02	2.1E-01	3.4E+01
Pesticides	4,4'-DDE	1.2E-01	7.8E+00	5.5E+01	1.1E+03	2.4E+01	4.8E+02	NC	NC
Pesticides	4,4'-DDT	1.2E-01	1.9E+01	6.7E+01	1.4E+03	2.4E+01	4.8E+02	8.5E-02	1.4E+01
Pesticides	Aldrin	4.0E+01	8.7E+01	6.9E+00	6.9E+01	3.0E+00	3.0E+01	NC	NC
Pesticides	alpha-BHC	7.2E+00	2.9E+01	8.7E-01	6.5E+01	1.5E+00	1.1E+02	NC	NC
Pesticides	beta-BHC	7.2E+00	2.9E+01	6.8E+00	3.4E+01	1.2E+01	6.0E+01	NC	NC
Pesticides	delta-BHC	7.2E+00	2.9E+01	1.0E+00	7.7E+01	1.5E+00	1.1E+02	NC	NC
Pesticides	Dieldrin	9.2E-01	1.0E+01	8.7E-01	7.6E+01	4.5E-01	3.9E+01	NC	NC
Pesticides	Endosulfan I	1.3E+02	--	2.6E+00	5.1E+01	4.5E+00	8.7E+01	NC	NC
Pesticides	Endosulfan II	1.3E+02	--	2.6E+00	5.1E+01	4.5E+00	8.7E+01	NC	NC
Pesticides	Endosulfan sulfate	1.3E+02	--	2.4E+00	4.7E+01	4.5E+00	8.7E+01	NC	NC
Pesticides	Endrin	1.3E-01	1.3E+00	3.3E+00	3.3E+01	2.8E+00	2.8E+01	NC	NC
Pesticides	Endrin aldehyde	1.3E-01	1.3E+00	2.7E+00	2.7E+01	2.8E+00	2.8E+01	NC	NC
Pesticides	Endrin ketone	1.3E-01	1.3E+00	2.9E+00	2.9E+01	2.8E+00	2.8E+01	NC	NC
Pesticides	gamma-BHC	2.6E+01	2.6E+02	8.3E-01	6.2E+01	1.5E+00	1.1E+02	NC	NC
Pesticides	Heptachlor	1.7E+01	8.5E+01	7.3E+00	3.8E+02	3.9E+00	2.1E+02	NC	NC
Pesticides	Heptachlor epoxide	1.7E+01	8.5E+01	4.0E-02	2.0E-01	3.8E-02	1.9E-01	NC	NC
Pesticides	Methoxychlor	1.9E+03	--	8.4E+01	1.7E+03	7.5E+01	1.5E+03	NC	NC
Pesticides	Mirex	8.5E+02	--	5.8E+00	5.8E+01	2.1E+00	2.1E+01	NC	NC
Pesticides	Toxaphene	--	--	4.1E+02	--	2.4E+02	--	--	--
SVOC	bis(2-Ethylhexyl) phthalate	1.4E+01	--	2.2E+03	2.2E+04	5.5E+02	5.5E+03	1.7E+01	--
SVOC	Butyl benzyl phthalate	--	--	2.2E+03	6.6E+03	2.4E+03	7.1E+03	--	--
SVOC	Di-n-butyl phthalate	1.4E+00	1.4E+01	1.4E+04	4.6E+04	1.7E+04	5.5E+04	3.3E-03	3.3E-02
SVOC	Di-n-octyl phthalate	3.8E+01	3.8E+02	5.0E+02	4.9E+03	6.2E+02	6.1E+03	4.5E+01	4.5E+02
SVOC	m-Terphenyl	1.2E+01	1.2E+02	2.4E+03	3.9E+03	1.8E+03	2.8E+03	NC	NC
SVOC	Pentachlorophenol	8.7E+01	6.7E+02	3.5E+01	9.7E+01	2.5E+02	6.9E+02	NC	NC
SVOC	Tetrachlorophenol	8.7E+01	6.7E+02	3.0E+02	1.2E+03	3.8E+02	1.5E+03	NC	NC
VOC	1,2,4-Trichlorobenzene	--	--	1.4E+02	5.2E+02	2.2E+02	8.1E+02	--	--
VOC	1,2-Dichlorobenzene	--	--	1.2E+03	1.2E+03	2.6E+03	2.6E+03	--	--
VOC	1,3-Dichlorobenzene	--	--	2.2E+02	1.1E+03	4.4E+02	2.2E+03	--	--
VOC	1,4-Dichlorobenzene	--	--	5.1E+01	2.6E+02	1.1E+02	5.4E+02	--	--
VOC	Hexachlorobutadiene	4.1E+01	--	5.7E-01	2.9E+00	6.0E-01	3.0E+00	5.7E-02	--
VOC	n-Butylbenzene	--	--	1.1E+03	3.4E+03	1.5E+03	4.4E+03	--	--
VOC	sec-Butylbenzene	1.3E+01	1.3E+02	1.4E+03	4.3E+03	1.7E+03	5.0E+03	2.6E-02	2.6E-01

Table 3-5. Ecological Risk-based Screening Levels for CPECs in Soil and Lakebed Sediment

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

EcoRAClass	Analyte	Soil EcoRBSLs						Lakebed Sediment EcoRBSLs	
		Red-tailed Hawk		Mule Deer		Bobcat		Great Blue Heron	
		Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL

Notes:
-- = not applicable, not available
ARCL = aroclor
CPEC = chemical of potential ecological concern
EcoRA = ecological risk assessment
EcoRBSL = ecological risk-based screening level
ERA = ecological risk assessment
HQ = hazard quotient
MW = molecular weight
NC = not calculated
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RME = reasonable maximum exposure
SVOC = semivolatile organic compound
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxicity equivalent
VOC = volatile organic compound

Table 3-6. Ecological Risk-based Screening Levels for CPECs in Surface Water

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Matrix	EcoRAClass	Analyte	Surface Water RBSLs (µg/L)					
			Mule Deer		Bobcat		Great Blue Heron	
			Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL
Surface water	Inorganics	Aluminum	2.8E+04	2.8E+05	2.5E+04	2.5E+05	2.4E+06	--
Surface water	Inorganics	Antimony	8.6E+02	4.1E+04	7.5E+02	3.6E+04	--	--
Surface water	Inorganics	Arsenic	4.7E+03	6.8E+04	4.1E+03	6.0E+04	1.2E+05	4.8E+05
Surface water	Inorganics	Arsenic, Dissolved	4.7E+03	6.8E+04	4.1E+03	6.0E+04	1.2E+05	4.8E+05
Surface water	Inorganics	Barium	7.5E+05	1.2E+06	6.6E+05	1.1E+06	4.6E+05	9.2E+05
Surface water	Inorganics	Boron	4.1E+05	1.4E+06	3.6E+05	1.2E+06	6.3E+05	2.2E+06
Surface water	Inorganics	Cadmium	8.7E+02	3.8E+04	7.6E+02	3.4E+04	1.5E+04	2.3E+05
Surface water	Inorganics	Chloramines	1.4E+05	--	1.2E+05	--	--	--
Surface water	Inorganics	Chromium	3.5E+04	8.5E+05	3.1E+04	7.4E+05	5.9E+04	3.5E+05
Surface water	Inorganics	Cobalt	1.7E+04	2.9E+05	1.5E+04	2.5E+05	1.7E+05	4.0E+05
Surface water	Inorganics	Copper	3.9E+04	9.2E+06	3.4E+04	8.0E+06	5.1E+04	1.2E+06
Surface water	Inorganics	Fluoride	4.6E+05	7.7E+05	4.0E+05	6.7E+05	1.7E+05	7.0E+05
Surface water	Inorganics	Lead	1.5E+04	3.5E+06	1.3E+04	3.1E+06	3.1E+02	1.9E+05
Surface water	Inorganics	Manganese	2.0E+05	2.3E+06	1.7E+05	2.0E+06	1.7E+06	1.7E+07
Surface water	Inorganics	Molybdenum	3.8E+03	3.8E+04	3.3E+03	3.3E+04	7.7E+04	7.8E+05
Surface water	Inorganics	Nickel	1.9E+03	4.6E+05	1.7E+03	4.0E+05	3.0E+04	1.2E+06
Surface water	Inorganics	Silver	8.8E+04	1.7E+06	7.7E+04	1.5E+06	4.4E+04	1.3E+06
Surface water	Inorganics	Strontium	3.8E+06	5.5E+06	3.3E+06	4.8E+06	--	--
Surface water	Inorganics	Titanium	--	--	--	--	2.2E+04	2.2E+05
Surface water	Inorganics	Vanadium	6.1E+04	1.4E+05	5.3E+04	1.2E+05	7.6E+03	3.7E+04
Surface water	Inorganics	Zinc	1.4E+05	6.0E+06	1.2E+05	5.2E+06	3.8E+05	3.8E+06
Surface water	General Chemistry	Chloride	--	--	--	--	--	--
Surface water	General Chemistry	Nitrate/Nitrite as N	7.4E+06	1.7E+07	6.5E+06	1.4E+07	--	--
Surface water	General Chemistry	Nitrate-N	7.4E+06	1.7E+07	6.5E+06	1.4E+07	--	--
Surface water	General Chemistry	Sulfate	--	--	--	--	--	--
Surface water	Dioxin_Furans	2,3,7,8-TCDD_TEQ_Bird	--	--	--	--	3.1E-01	3.1E+00
Surface water	Dioxin_Furans	2,3,7,8-TCDD_TEQ_Mammal	1.5E-02	1.5E-01	1.3E-02	1.3E-01	--	--
Surface water	Energetics	Perchlorate	9.3E+04	4.7E+05	8.1E+04	4.1E+05	2.9E+05	5.7E+05
Surface water	Herbicides	2,4,5-T	4.4E+04	1.5E+05	3.8E+04	1.3E+05	--	--
Surface water	PAH-HighMW	Benzo(a)anthracene	9.0E+03	5.5E+05	7.8E+03	4.8E+05	4.3E+05	--
Surface water	PAH-HighMW	Benzo(ghi)perylene	9.0E+03	5.5E+05	7.8E+03	4.8E+05	4.3E+05	--
Surface water	PAH-HighMW	Chrysene	9.0E+03	5.5E+05	7.8E+03	4.8E+05	4.3E+05	--
Surface water	PAH-HighMW	Dibenzo(a,h)anthracene	9.0E+03	5.5E+05	7.8E+03	4.8E+05	4.3E+05	--
Surface water	PAH-HighMW	Indeno(1,2,3-cd)pyrene	9.0E+03	5.5E+05	7.8E+03	4.8E+05	--	--
Surface water	PAH-HighMW	Pyrene	9.0E+03	5.5E+05	7.8E+03	4.8E+05	4.3E+05	--
Surface water	PAH-LowMW	Fluoranthene	9.6E+05	5.2E+06	8.3E+05	4.5E+06	4.3E+05	--
Surface water	PAH-LowMW	Phenanthrene	9.6E+05	5.2E+06	8.3E+05	4.5E+06	2.5E+04	2.5E+05
Surface water	PCBs	PCB_TEQ_Bird	--	--	--	--	3.1E-01	3.1E+00
Surface water	PCBs	PCB_TEQ_Mammal	1.5E-02	1.5E-01	1.3E-02	1.3E-01	--	--
Surface water	SVOC	bis(2-Ethylhexyl) phthalate	2.7E+05	2.7E+06	2.3E+05	2.3E+06	2.4E+04	--
Surface water	SVOC	Diethyl phthalate	6.7E+07	--	5.8E+07	--	2.2E+04	2.2E+05
Surface water	VOC	Acetone	1.5E+05	7.3E+05	1.3E+05	6.4E+05	6.0E+07	--
Surface water	VOC	Chloroform	2.2E+05	6.0E+05	1.9E+05	5.2E+05	--	--
Surface water	VOC	Formaldehyde	1.4E+05	1.2E+06	1.2E+05	1.0E+06	--	--
Surface water	VOC	Methylene chloride	8.5E+04	7.3E+05	7.4E+04	6.4E+05	--	--
Surface water	VOC	m-Xylene	3.0E+04	3.8E+04	2.6E+04	3.3E+04	1.6E+07	--
Surface water	VOC	m-Xylene & p-Xylene	3.0E+04	3.8E+04	2.6E+04	3.3E+04	1.6E+07	--
Surface water	VOC	Trichloroethene	1.0E+04	1.0E+05	8.9E+03	8.9E+04	--	--
Surface water	VOC	Xylenes, Total	3.0E+04	3.8E+04	2.6E+04	3.3E+04	1.6E+07	--

Notes:

-- = not applicable, not available
µg/L = microgram(s) per liter
CPEC = chemical of potential ecological concern
EcoRA = ecological risk assessment
EcoRBSL = ecological risk-based screening level
ERA = ecological risk assessment
MW = molecular weight
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SVOC = semivolatile organic compound
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxicity equivalent
VOC = volatile organic compound

Table 4-1. Summary of Chemical Exceedances for Soil and Lakebed Sediment Exposure Scenarios

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

			Baseline				Subarea-level				Facility-wide			
			Site Risk		Incremental Risk		Site Risk Subarea-level		Incremental Risk Subarea-level		Site Risk Facility-wide		Incremental Risk Facility-wide	
Receptor	EcoRAClass	CPEC	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL
Red-tailed Hawk	Inorganics	Arsenic												
Red-tailed Hawk	Inorganics	Cadmium	X	X	X	X	X	X	X	X	X	X	X	X
Red-tailed Hawk	Inorganics	Chromium	X	X	X	X	X	X	X	X	X		X	
Red-tailed Hawk	Inorganics	Copper	X	X	X	X	X		X		X	X	X	X
Red-tailed Hawk	Inorganics	Hexavalent Chromium												
Red-tailed Hawk	Inorganics	Lead	X	X	X	X	X	X	X	X	X	X	X	X
Red-tailed Hawk	Inorganics	Mercury	X	X	X	X	X		X		X		X	
Red-tailed Hawk	Inorganics	Nickel	X	X	X	X	X		X		X		X	
Red-tailed Hawk	Inorganics	Selenium	X		X		X		X		X		X	
Red-tailed Hawk	Inorganics	Silver												
Red-tailed Hawk	Inorganics	Zinc	X	X	X	X	X	X	X	X	X	X	X	X
Red-tailed Hawk	ARCL	Aroclor-1242												
Red-tailed Hawk	ARCL	Aroclor-1248	X		n/a									
Red-tailed Hawk	ARCL	Aroclor-1254	X		n/a		X		n/a		X		n/a	
Red-tailed Hawk	ARCL	Aroclor-1260	X		n/a		X		n/a		X		n/a	
Red-tailed Hawk	ARCL	Aroclor-5460												
Red-tailed Hawk	Dioxin_Furans	2,3,7,8-TCDD_TEQ_Bird	X	X	X	X	X	X	X	X	X	X	X	X
Red-tailed Hawk	Dioxin_Furans	2,3,7,8-TCDD_TEQ_Mammal												
Red-tailed Hawk	Energetics	2,4,6-Trinitrotoluene												
Red-tailed Hawk	Energetics	Perchlorate												
Red-tailed Hawk	Energetics	RDX												
Red-tailed Hawk	PAH-HighMW	Benzo(a)anthracene												
Red-tailed Hawk	PAH-HighMW	Benzo(a)pyrene												
Red-tailed Hawk	PAH-HighMW	Benzo(b)fluoranthene												
Red-tailed Hawk	PAH-HighMW	Benzo(e)pyrene												
Red-tailed Hawk	PAH-HighMW	Benzo(ghi)perylene												
Red-tailed Hawk	PAH-HighMW	Benzo(k)fluoranthene												
Red-tailed Hawk	PAH-HighMW	Chrysene												
Red-tailed Hawk	PAH-HighMW	Dibenzo(a,h)anthracene												
Red-tailed Hawk	PAH-HighMW	Indeno(1,2,3-cd)pyrene												
Red-tailed Hawk	PAH-HighMW	Pyrene												
Red-tailed Hawk	PAH-LowMW	Acenaphthene												
Red-tailed Hawk	PAH-LowMW	Acenaphthylene												
Red-tailed Hawk	PAH-LowMW	Anthracene	X		X									
Red-tailed Hawk	PAH-LowMW	Fluoranthene												
Red-tailed Hawk	PAH-LowMW	Fluorene												
Red-tailed Hawk	PAH-LowMW	Naphthalene												
Red-tailed Hawk	PAH-LowMW	Phenanthrene	X		X		X		X		X		X	
Red-tailed Hawk	PCBs (coplanar)	PCB_TEQ_Bird	X	X	n/a	n/a	X	X	n/a	n/a	X	X	n/a	n/a
Red-tailed Hawk	PCBs (coplanar)	PCB_TEQ_Mammal												
Red-tailed Hawk	Pesticides	4,4'-DDD												
Red-tailed Hawk	Pesticides	4,4'-DDE												
Red-tailed Hawk	Pesticides	4,4'-DDT	X		X						X		X	
Red-tailed Hawk	Pesticides	beta-BHC												

Table 4-1. Summary of Chemical Exceedances for Soil and Lakebed Sediment Exposure Scenarios

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

			Baseline				Subarea-level				Facility-wide			
			Site Risk		Incremental Risk		Site Risk Subarea-level		Incremental Risk Subarea-level		Site Risk Facility-wide		Incremental Risk Facility-wide	
Receptor	EcoRAClass	CPEC	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL
Red-tailed Hawk	Pesticides	delta-BHC												
Red-tailed Hawk	Pesticides	Dieldrin												
Red-tailed Hawk	Pesticides	Endosulfan I												
Red-tailed Hawk	Pesticides	Endosulfan II												
Red-tailed Hawk	Pesticides	Endosulfan sulfate												
Red-tailed Hawk	Pesticides	Endrin												
Red-tailed Hawk	Pesticides	Endrin aldehyde												
Red-tailed Hawk	Pesticides	Endrin ketone												
Red-tailed Hawk	Pesticides	gamma-BHC												
Red-tailed Hawk	Pesticides	Heptachlor												
Red-tailed Hawk	Pesticides	Heptachlor epoxide												
Red-tailed Hawk	Pesticides	Methoxychlor												
Red-tailed Hawk	Pesticides	Mirex												
Red-tailed Hawk	SVOC	bis(2-Ethylhexyl) phthalate	X		X		X		X		X		X	
Red-tailed Hawk	SVOC	Butyl benzyl phthalate												
Red-tailed Hawk	SVOC	Di-n-butyl phthalate	X		X		X		X		X		X	
Red-tailed Hawk	SVOC	Di-n-octyl phthalate												
Red-tailed Hawk	SVOC	Pentachlorophenol	X	X	n/a	n/a	X	X	n/a	n/a	X	X	n/a	n/a
Red-tailed Hawk	SVOC	Tetrachlorophenol												
Red-tailed Hawk	Terphenyls	m-Terphenyl												
Red-tailed Hawk	VOC	1,2,4-Trichlorobenzene												
Red-tailed Hawk	VOC	1,2-Dichlorobenzene												
Red-tailed Hawk	VOC	1,3-Dichlorobenzene												
Red-tailed Hawk	VOC	1,4-Dichlorobenzene												
Red-tailed Hawk	VOC	Hexachlorobutadiene												
Red-tailed Hawk	VOC	n-Butylbenzene												
Red-tailed Hawk	VOC	sec-Butylbenzene												
Mule Deer	Inorganics	Arsenic												
Mule Deer	Inorganics	Cadmium	X	X	X	X	X	X	X	X	X	X	X	X
Mule Deer	Inorganics	Chromium												
Mule Deer	Inorganics	Copper	X		X		X		X		X		X	
Mule Deer	Inorganics	Hexavalent Chromium	X		X									
Mule Deer	Inorganics	Lead	X		X		X		X		X		X	
Mule Deer	Inorganics	Mercury	X		X		X		X		X		X	
Mule Deer	Inorganics	Nickel	X	X	X	X	X	X	X	X	X	X	X	X
Mule Deer	Inorganics	Selenium	X		X		X		X		X		X	
Mule Deer	Inorganics	Silver												
Mule Deer	Inorganics	Zinc	X	X	X	X	X	X	X	X	X	X	X	X
Mule Deer	ARCL	Aroclor-1242												
Mule Deer	ARCL	Aroclor-1248	X		n/a		X		n/a		X		n/a	
Mule Deer	ARCL	Aroclor-1254	X		n/a		X		n/a		X		n/a	
Mule Deer	ARCL	Aroclor-1260												
Mule Deer	ARCL	Aroclor-5460												
Mule Deer	Dioxin_Furans	2,3,7,8-TCDD_TEQ_Bird												

Table 4-1. Summary of Chemical Exceedances for Soil and Lakebed Sediment Exposure Scenarios

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

			Baseline				Subarea-level				Facility-wide			
			Site Risk		Incremental Risk		Site Risk Subarea-level		Incremental Risk Subarea-level		Site Risk Facility-wide		Incremental Risk Facility-wide	
Receptor	EcoRAClass	CPEC	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL
Mule Deer	Dioxin_Furans	2,3,7,8-TCDD_TEQ_Mammal	X	X	X	X	X	X	X	X	X	X	X	X
Mule Deer	Energetics	2,4,6-Trinitrotoluene	X		n/a		X		n/a		X		n/a	
Mule Deer	Energetics	Perchlorate												
Mule Deer	Energetics	RDX												
Mule Deer	PAH-HighMW	Benzo(a)anthracene												
Mule Deer	PAH-HighMW	Benzo(a)pyrene												
Mule Deer	PAH-HighMW	Benzo(b)fluoranthene												
Mule Deer	PAH-HighMW	Benzo(e)pyrene												
Mule Deer	PAH-HighMW	Benzo(ghi)perylene												
Mule Deer	PAH-HighMW	Benzo(k)fluoranthene												
Mule Deer	PAH-HighMW	Chrysene												
Mule Deer	PAH-HighMW	Dibenzo(a,h)anthracene												
Mule Deer	PAH-HighMW	Indeno(1,2,3-cd)pyrene												
Mule Deer	PAH-HighMW	Pyrene	X		X		X		X		X		X	
Mule Deer	PAH-LowMW	Acenaphthene												
Mule Deer	PAH-LowMW	Acenaphthylene												
Mule Deer	PAH-LowMW	Anthracene												
Mule Deer	PAH-LowMW	Fluoranthene												
Mule Deer	PAH-LowMW	Fluorene												
Mule Deer	PAH-LowMW	Naphthalene												
Mule Deer	PAH-LowMW	Phenanthrene												
Mule Deer	PCBs (coplanar)	PCB_TEQ_Bird												
Mule Deer	PCBs (coplanar)	PCB_TEQ_Mammal	X		n/a		X		n/a		X		n/a	
Mule Deer	Pesticides	4,4'-DDD												
Mule Deer	Pesticides	4,4'-DDE												
Mule Deer	Pesticides	4,4'-DDT												
Mule Deer	Pesticides	beta-BHC												
Mule Deer	Pesticides	delta-BHC												
Mule Deer	Pesticides	Dieldrin												
Mule Deer	Pesticides	Endosulfan I												
Mule Deer	Pesticides	Endosulfan II												
Mule Deer	Pesticides	Endosulfan sulfate												
Mule Deer	Pesticides	Endrin												
Mule Deer	Pesticides	Endrin aldehyde												
Mule Deer	Pesticides	Endrin ketone												
Mule Deer	Pesticides	gamma-BHC												
Mule Deer	Pesticides	Heptachlor												
Mule Deer	Pesticides	Heptachlor epoxide												
Mule Deer	Pesticides	Methoxychlor												
Mule Deer	Pesticides	Mirex												
Mule Deer	SVOC	bis(2-Ethylhexyl) phthalate												
Mule Deer	SVOC	Butyl benzyl phthalate												
Mule Deer	SVOC	Di-n-butyl phthalate												
Mule Deer	SVOC	Di-n-octyl phthalate												

Table 4-1. Summary of Chemical Exceedances for Soil and Lakebed Sediment Exposure Scenarios

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

			Baseline				Subarea-level				Facility-wide			
			Site Risk		Incremental Risk		Site Risk Subarea-level		Incremental Risk Subarea-level		Site Risk Facility-wide		Incremental Risk Facility-wide	
Receptor	EcoRAClass	CPEC	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL
Mule Deer	SVOC	Pentachlorophenol	X	X	n/a	n/a	X	X	n/a	n/a	X	X	n/a	n/a
Mule Deer	SVOC	Tetrachlorophenol												
Mule Deer	Terphenyls	m-Terphenyl												
Mule Deer	VOC	1,2,4-Trichlorobenzene												
Mule Deer	VOC	1,2-Dichlorobenzene												
Mule Deer	VOC	1,3-Dichlorobenzene												
Mule Deer	VOC	1,4-Dichlorobenzene												
Mule Deer	VOC	Hexachlorobutadiene												
Mule Deer	VOC	n-Butylbenzene												
Mule Deer	VOC	sec-Butylbenzene												
Bobcat	Inorganics	Arsenic												
Bobcat	Inorganics	Cadmium	X	X	X	X	X	X	X	X	X	X	X	X
Bobcat	Inorganics	Chromium	X		X		X		X		X		X	
Bobcat	Inorganics	Copper	X		X		X		X		X		X	
Bobcat	Inorganics	Hexavalent Chromium												
Bobcat	Inorganics	Lead	X		X		X		X		X		X	
Bobcat	Inorganics	Mercury												
Bobcat	Inorganics	Nickel	X	X	X		X		X		X		X	
Bobcat	Inorganics	Selenium	X		X		X		X		X		X	
Bobcat	Inorganics	Silver												
Bobcat	Inorganics	Zinc	X	X	X	X	X		X		X	X	X	X
Bobcat	ARCL	Aroclor-1242												
Bobcat	ARCL	Aroclor-1248	X	X	n/a	n/a	X		n/a		X	X	n/a	n/a
Bobcat	ARCL	Aroclor-1254	X		n/a						X		n/a	
Bobcat	ARCL	Aroclor-1260	X		n/a						X		n/a	
Bobcat	ARCL	Aroclor-5460												
Bobcat	Dioxin_Furans	2,3,7,8-TCDD_TEQ_Bird												
Bobcat	Dioxin_Furans	2,3,7,8-TCDD_TEQ_Mammal	X	X	X	X	X	X	X	X	X	X	X	X
Bobcat	Energetics	2,4,6-Trinitrotoluene												
Bobcat	Energetics	Perchlorate												
Bobcat	Energetics	RDX												
Bobcat	PAH-HighMW	Benzo(a)anthracene	X		X						X		X	
Bobcat	PAH-HighMW	Benzo(a)pyrene	X		X						X		X	
Bobcat	PAH-HighMW	Benzo(b)fluoranthene	X		X						X		X	
Bobcat	PAH-HighMW	Benzo(e)pyrene												
Bobcat	PAH-HighMW	Benzo(ghi)perylene												
Bobcat	PAH-HighMW	Benzo(k)fluoranthene												
Bobcat	PAH-HighMW	Chrysene	X		X						X		X	
Bobcat	PAH-HighMW	Dibenzo(a,h)anthracene												
Bobcat	PAH-HighMW	Indeno(1,2,3-cd)pyrene												
Bobcat	PAH-HighMW	Pyrene	X		X						X		X	
Bobcat	PAH-LowMW	Acenaphthene												
Bobcat	PAH-LowMW	Acenaphthylene												
Bobcat	PAH-LowMW	Anthracene												

Table 4-1. Summary of Chemical Exceedances for Soil and Lakebed Sediment Exposure Scenarios

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

			Baseline				Subarea-level				Facility-wide			
			Site Risk		Incremental Risk		Site Risk Subarea-level		Incremental Risk Subarea-level		Site Risk Facility-wide		Incremental Risk Facility-wide	
Receptor	EcoRAClass	CPEC	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL
Bobcat	PAH-LowMW	Fluoranthene												
Bobcat	PAH-LowMW	Fluorene												
Bobcat	PAH-LowMW	Naphthalene												
Bobcat	PAH-LowMW	Phenanthrene												
Bobcat	PCBs (coplanar)	PCB_TEQ_Bird												
Bobcat	PCBs (coplanar)	PCB_TEQ_Mammal	X	X	n/a	n/a	X		n/a		X	X	n/a	n/a
Bobcat	Pesticides	4,4'-DDD												
Bobcat	Pesticides	4,4'-DDE												
Bobcat	Pesticides	4,4'-DDT												
Bobcat	Pesticides	beta-BHC												
Bobcat	Pesticides	delta-BHC												
Bobcat	Pesticides	Dieldrin												
Bobcat	Pesticides	Endosulfan I												
Bobcat	Pesticides	Endosulfan II												
Bobcat	Pesticides	Endosulfan sulfate												
Bobcat	Pesticides	Endrin												
Bobcat	Pesticides	Endrin aldehyde												
Bobcat	Pesticides	Endrin ketone												
Bobcat	Pesticides	gamma-BHC												
Bobcat	Pesticides	Heptachlor												
Bobcat	Pesticides	Heptachlor epoxide												
Bobcat	Pesticides	Methoxychlor												
Bobcat	Pesticides	Mirex												
Bobcat	SVOC	bis(2-Ethylhexyl) phthalate												
Bobcat	SVOC	Butyl benzyl phthalate												
Bobcat	SVOC	Di-n-butyl phthalate												
Bobcat	SVOC	Di-n-octyl phthalate												
Bobcat	SVOC	Pentachlorophenol	X	X	n/a	n/a	X		n/a		X	X	n/a	n/a
Bobcat	SVOC	Tetrachlorophenol												
Bobcat	Terphenyls	m-Terphenyl												
Bobcat	VOC	1,2,4-Trichlorobenzene												
Bobcat	VOC	1,2-Dichlorobenzene												
Bobcat	VOC	1,3-Dichlorobenzene												
Bobcat	VOC	1,4-Dichlorobenzene												
Bobcat	VOC	Hexachlorobutadiene												
Bobcat	VOC	n-Butylbenzene												
Bobcat	VOC	sec-Butylbenzene												
Great blue heron	Inorganics	Arsenic												
Great blue heron	Inorganics	Cadmium	X		X									
Great blue heron	Inorganics	Chromium	X		X									
Great blue heron	Inorganics	Copper	X		X									
Great blue heron	Inorganics	Lead	X		X		X		X		X		X	
Great blue heron	Inorganics	Mercury												
Great blue heron	Inorganics	Nickel	X		X									

Table 4-1. Summary of Chemical Exceedances for Soil and Lakebed Sediment Exposure Scenarios

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

			Baseline				Subarea-level				Facility-wide			
			Site Risk		Incremental Risk		Site Risk Subarea-level		Incremental Risk Subarea-level		Site Risk Facility-wide		Incremental Risk Facility-wide	
Receptor	EcoRAClass	CPEC	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL
Great blue heron	Inorganics	Selenium	X	X	X	X								
Great blue heron	Inorganics	Silver	X		X									
Great blue heron	Inorganics	Zinc	X	X	X	X								
Great blue heron	ARCL	Aroclor-1254	X	X	n/a	n/a								
Great blue heron	Dioxin_Furans	2,3,7,8-TCDD_TEQ_Bird												
Great blue heron	Energetics	2,4,6-Trinitrotoluene												
Great blue heron	Energetics	Perchlorate												
Great blue heron	Energetics	RDX												
Great blue heron	PAH-HighMW	Benzo(a)anthracene												
Great blue heron	PAH-HighMW	Benzo(a)pyrene												
Great blue heron	PAH-HighMW	Benzo(b)fluoranthene												
Great blue heron	PAH-HighMW	Benzo(e)pyrene												
Great blue heron	PAH-HighMW	Benzo(ghi)perylene												
Great blue heron	PAH-HighMW	Benzo(k)fluoranthene												
Great blue heron	PAH-HighMW	Chrysene												
Great blue heron	PAH-HighMW	Dibenzo(a,h)anthracene												
Great blue heron	PAH-HighMW	Pyrene												
Great blue heron	PAH-LowMW	Acenaphthene												
Great blue heron	PAH-LowMW	Anthracene												
Great blue heron	PAH-LowMW	Fluoranthene												
Great blue heron	PAH-LowMW	Fluorene												
Great blue heron	PAH-LowMW	Phenanthrene	X		X									
Great blue heron	PCBs (coplanar)	PCB_TEQ_Bird												
Great blue heron	Pesticides	4,4'-DDD												
Great blue heron	Pesticides	4,4'-DDT	X		X									
Great blue heron	SVOC	bis(2-Ethylhexyl) phthalate												
Great blue heron	SVOC	Di-n-butyl phthalate	X	X	X	X	X		X		X	X	X	X
Great blue heron	SVOC	Di-n-octyl phthalate												
Great blue heron	VOC	sec-Butylbenzene	X											

Notes:

X = Indicates the exceedance of at least one sample location in the Boeing Evaluation Areas for the listed exposure scenario. Sample location may or may not be in habitats suitable for the indicated receptor.

Incremental risks are only estimated for analytes with background data. Aroclors, PCBs, and pentachlorophenol do not have background data.

ARCL = aroclor
Boeing = The Boeing Company
CPEC = chemical of potential ecological concern
EcoRBSL = ecological risk-based screening level
ERA = ecological risk assessment
MW = molecular weight
n/a = background value not available to calculate incremental risk
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
SVOC = semivolatile organic compound
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxicity equivalent
VOC = volatile organic compound

Table 4-2. Summary of Chemical Group Exceedances for Soil and Lakebed Sediment Exposure Scenarios

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

		Baseline				Subarea-level				Facility-wide			
		Site Risk Location Specific		Incremental Location Specific		Site Risk RFI Subarea		Incremental RFI Subarea		Site Risk SSFL Facility		Incremental SSFL Facility	
Receptor	Chemical Group	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL
Red-tailed Hawk	Aroclor HI	X		n/a		X		n/a		X		n/a	
Red-tailed Hawk	Low MW PAH HI	X		X		X		X		X		X	
Red-tailed Hawk	High MW PAH HI												
Red-tailed Hawk	Organochlorine Pesticide HI	X		X						X		X	
Mule Deer	Aroclor HI	X		n/a		X		n/a		X		n/a	
Mule Deer	Low MW PAH HI												
Mule Deer	High MW PAH HI	X		X		X		X		X		X	
Mule Deer	Organochlorine Pesticide HI												
Bobcat	Aroclor HI	X	X	n/a	n/a	X		n/a		X	X	n/a	n/a
Bobcat	Low MW PAH HI												
Bobcat	High MW PAH HI	X		X						X		X	
Bobcat	Organochlorine Pesticide HI												
Great Blue Heron	Aroclor HI	X	X	n/a	n/a								
Great Blue Heron	Low MW PAH HI	X		X									
Great Blue Heron	High MW PAH HI												
Great Blue Heron	Organochlorine Pesticide HI	X		X									

Notes:

X = Indicates the exceedance of a single sample location in the Boeing Evaluation Areas with a chemical group HI exceeding 1. Sample location may or may not be in habitats suitable for the indicated receptor.

Incremental risks are only estimated for analytes with background data. Aroclors do not have background data.

Boeing = The Boeing Company
EcoRBSL = ecological risk-based screening level
ERA = ecological risk assessment
HI = hazard index
MW = molecular weight
n/a = background value not available to calculate incremental risk
PAH = polycyclic aromatic hydrocarbon
RCRA = Resource Conservation and Recovery Act
RFI = RCRA facility investigation
SSFL = Santa Susana Field Laboratory

Table 4-3. Summary of Location-specific Exceedances

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Receptor	CPEC	Number of Sample Locations in Boeing Evaluation Areas[a]	Location-specific Exceedances for Site Risk[b]										Location-specific Exceedances for Incremental Risk[c]									
			Low EcoRBSL					High EcoRBSL					Low EcoRBSL					High EcoRBSL				
			HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000	HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000	HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000	HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000
Baseline Exposure Scenario																						
Red-tailed Hawk	Cadmium	3846	113	13	4	0	0	1	1	0	0	0	89	13	4	0	0	1	1	0	0	0
Red-tailed Hawk	Chromium	3504	19	4	0	0	0	3	0	0	0	0	7	3	0	0	0	3	0	0	0	0
Red-tailed Hawk	Copper	3703	10	3	2	0	0	1	0	0	0	0	8	3	1	0	0	1	0	0	0	0
Red-tailed Hawk	Lead	3878	33	821	2886	84	10	10	3	1	0	0	22	29	126	48	9	11	2	1	0	0
Red-tailed Hawk	Mercury	2915	3	0	0	0	0	1	0	0	0	0	3	0	0	0	0	1	0	0	0	0
Red-tailed Hawk	Nickel	3524	245	9	7	0	0	2	0	0	0	0	27	5	5	0	0	1	0	0	0	0
Red-tailed Hawk	Selenium	3834	7	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	Zinc	3597	661	15	22	1	0	22	0	1	0	0	58	12	13	1	0	13	0	1	0	0
Red-tailed Hawk	Aroclor-1248	1934	1	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Red-tailed Hawk	Aroclor-1254	1929	13	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Red-tailed Hawk	Aroclor-1260	1932	2	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Red-tailed Hawk	2,3,7,8-TCDD_TEQ_Bird	1833	48	5	6	1	0	6	1	1	0	0	45	5	6	1	0	6	1	1	0	0
Red-tailed Hawk	Anthracene	2894	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	Phenanthrene	2904	6	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	PCB_TEQ_Bird	5	1	0	2	0	0	1	1	0	0	0	--	--	--	--	--	--	--	--	--	--
Red-tailed Hawk	4,4'-DDT	441	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	bis(2-Ethylhexyl) phthalate	2887	3	1	1	0	0	0	0	0	0	0	3	1	1	0	0	0	0	0	0	0
Red-tailed Hawk	Di-n-butyl phthalate	2900	5	1	0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0
Red-tailed Hawk	Pentachlorophenol	645	0	0	1	0	0	0	1	0	0	0	--	--	--	--	--	--	--	--	--	--
Mule Deer	Cadmium	3846	619	62	62	1	0	5	1	0	0	0	260	48	57	1	0	5	1	0	0	0
Mule Deer	Copper	3703	22	2	4	0	0	0	0	0	0	0	10	2	4	0	0	0	0	0	0	0
Mule Deer	Hexavalent Chromium	399	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Mule Deer	Lead	3878	107	12	10	1	0	0	0	0	0	0	45	11	10	1	0	0	0	0	0	0
Mule Deer	Mercury	2915	6	2	1	0	0	0	0	0	0	0	6	2	1	0	0	0	0	0	0	0
Mule Deer	Nickel	3524	1410	1608	466	9	0	4	0	0	0	0	13	8	31	7	0	4	0	0	0	0
Mule Deer	Selenium	3834	10	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0
Mule Deer	Zinc	3597	223	14	12	0	0	1	0	0	0	0	33	14	10	0	0	1	0	0	0	0
Mule Deer	Aroclor-1248	1934	1	1	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Mule Deer	Aroclor-1254	1929	4	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Mule Deer	2,3,7,8-TCDD_TEQ_Mammal	1926	16	2	5	0	0	4	1	0	0	0	15	2	5	0	0	4	1	0	0	0
Mule Deer	2,4,6-Trinitrotoluene	669	1	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Mule Deer	Pyrene	2905	5	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
Mule Deer	PCB_TEQ_Mammal	8	1	1	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Mule Deer	Pentachlorophenol	645	0	0	0	1	0	0	0	1	0	0	--	--	--	--	--	--	--	--	--	--
Bobcat	Cadmium	3846	633	69	62	1	0	5	1	0	0	0	265	47	59	1	0	5	1	0	0	0
Bobcat	Chromium	3504	7	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
Bobcat	Copper	3703	7	0	1	0	0	0	0	0	0	0	5	0	1	0	0	0	0	0	0	0
Bobcat	Lead	3878	38	4	6	0	0	0	0	0	0	0	23	4	6	0	0	0	0	0	0	0
Bobcat	Nickel	3524	3155	132	55	3	0	1	0	0	0	0	18	13	18	3	0	0	0	0	0	0
Bobcat	Selenium	3834	75	1	0	0	0	0	0	0	0	0	15	1	0	0	0	0	0	0	0	0
Bobcat	Zinc	3597	324	15	12	0	0	1	0	0	0	0	39	13	12	0	0	1	0	0	0	0
Bobcat	Aroclor-1248	1934	2	0	1	0	0	1	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Bobcat	Aroclor-1254	1929	18	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Bobcat	Aroclor-1260	1932	2	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Bobcat	2,3,7,8-TCDD_TEQ_Mammal	1926	191	40	30	6	1	38	1	7	1	0	171	39	30	6	1	38	1	7	1	0
Bobcat	Benzo(a)anthracene	2899	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Bobcat	Benzo(a)pyrene	2897	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Bobcat	Benzo(b)fluoranthene	2900	3	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Bobcat	Chrysene	2905	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Bobcat	Pyrene	2905	5	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
Bobcat	PCB_TEQ_Mammal	8	2	0	2	0	0	1	0	1	0	0	--	--	--	--	--	--	--	--	--	--
Bobcat	Pentachlorophenol	645	0	0	1	0	0	0	1	0	0	0	--	--	--	--	--	--	--	--	--	--
Great Blue Heron	Cadmium	927	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Great Blue Heron	Chromium	867	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

Table 4-3. Summary of Location-specific Exceedances

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Receptor	CPEC	Number of Sample Locations in Boeing Evaluation Areas[a]	Location-specific Exceedances for Site Risk[b]										Location-specific Exceedances for Incremental Risk[c]									
			Low EcoRBSL					High EcoRBSL					Low EcoRBSL					High EcoRBSL				
			HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000	HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000	HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000	HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000
Great Blue Heron	Copper	884	4	1	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0
Great Blue Heron	Lead	930	157	380	374	7	0	0	0	0	0	0	21	11	25	5	0	0	0	0	0	0
Great Blue Heron	Nickel	868	63	2	3	0	0	0	0	0	0	0	6	2	2	0	0	0	0	0	0	0
Great Blue Heron	Selenium	970	59	0	1	0	0	1	0	0	0	0	12	0	1	0	0	1	0	0	0	0
Great Blue Heron	Silver	881	14	1	1	0	0	0	0	0	0	0	13	1	1	0	0	0	0	0	0	0
Great Blue Heron	Zinc	903	228	5	9	0	0	9	0	0	0	0	24	3	6	0	0	6	0	0	0	0
Great Blue Heron	Aroclor-1254	481	19	3	2	0	0	1	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Great Blue Heron	Phenanthrene	795	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Great Blue Heron	4,4'-DDT	145	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Great Blue Heron	Di-n-butyl phthalate	749	33	10	10	4	0	7	4	4	0	0	15	3	11	1	0	4	4	4	0	0
Great Blue Heron	sec-Butylbenzene	377	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subarea-level Exposure Scenario																						
Red-tailed Hawk	Cadmium	3846	47	4	1	0	0	1	0	0	0	0	39	4	1	0	0	1	0	0	0	0
Red-tailed Hawk	Chromium	3504	5	2	0	0	0	1	0	0	0	0	3	2	0	0	0	1	0	0	0	0
Red-tailed Hawk	Copper	3703	10	1	0	0	0	0	0	0	0	0	9	1	0	0	0	0	0	0	0	0
Red-tailed Hawk	Lead	3878	1335	976	1239	32	3	3	1	0	0	0	47	42	102	23	3	3	1	0	0	0
Red-tailed Hawk	Mercury	2915	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	Nickel	3524	43	4	3	0	0	0	0	0	0	0	10	3	3	0	0	0	0	0	0	0
Red-tailed Hawk	Selenium	3834	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	Zinc	3597	137	4	6	0	0	6	0	0	0	0	31	4	6	0	0	6	0	0	0	0
Red-tailed Hawk	Aroclor-1254	1929	3	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Red-tailed Hawk	Aroclor-1260	1932	1	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Red-tailed Hawk	2,3,7,8-TCDD_TEQ_Bird	1833	17	1	4	0	0	5	0	0	0	0	17	1	4	0	0	5	0	0	0	0
Red-tailed Hawk	Phenanthrene	2904	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	PCB_TEQ_Bird	5	1	0	1	0	0	1	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Red-tailed Hawk	bis(2-Ethylhexyl) phthalate	2887	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	Di-n-butyl phthalate	2900	3	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	Pentachlorophenol	645	0	0	1	0	0	1	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Mule Deer	Cadmium	3846	345	58	22	1	0	2	1	0	0	0	171	44	20	1	0	2	1	0	0	0
Mule Deer	Copper	3703	15	3	1	0	0	0	0	0	0	0	9	3	1	0	0	0	0	0	0	0
Mule Deer	Lead	3878	56	4	3	0	0	0	0	0	0	0	30	4	3	0	0	0	0	0	0	0
Mule Deer	Mercury	2915	4	2	0	0	0	0	0	0	0	0	4	2	0	0	0	0	0	0	0	0
Mule Deer	Nickel	3524	2066	749	214	5	0	1	0	0	0	0	14	13	25	4	0	1	0	0	0	0
Mule Deer	Selenium	3834	5	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Mule Deer	Zinc	3597	117	7	6	0	0	1	0	0	0	0	27	8	5	0	0	1	0	0	0	0
Mule Deer	Aroclor-1248	1934	2	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Mule Deer	Aroclor-1254	1929	1	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Mule Deer	2,3,7,8-TCDD_TEQ_Mammal	1926	7	3	1	0	0	1	0	0	0	0	6	3	1	0	0	1	0	0	0	0
Mule Deer	2,4,6-Trinitrotoluene	669	1	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Mule Deer	Pyrene	2905	3	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Mule Deer	PCB_TEQ_Mammal	8	1	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Mule Deer	Pentachlorophenol	645	0	0	1	0	0	0	0	1	0	0	--	--	--	--	--	--	--	--	--	--
Bobcat	Cadmium	3846	80	4	4	1	0	1	0	0	0	0	71	4	4	1	0	1	0	0	0	0
Bobcat	Chromium	3504	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Bobcat	Copper	3703	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Bobcat	Lead	3878	2	1	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0
Bobcat	Nickel	3524	210	5	5	0	0	0	0	0	0	0	16	3	4	0	0	0	0	0	0	0
Bobcat	Selenium	3834	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Bobcat	Zinc	3597	15	2	1	0	0	0	0	0	0	0	9	2	1	0	0	0	0	0	0	0
Bobcat	Aroclor-1248	1934	1	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Bobcat	2,3,7,8-TCDD_TEQ_Mammal	1926	31	3	5	0	0	4	1	0	0	0	29	3	5	0	0	4	1	0	0	0
Bobcat	PCB_TEQ_Mammal	8	1	1	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Bobcat	Pentachlorophenol	645	1	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Great blue heron	Lead	930	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Great blue heron	Di-n-butyl phthalate	749	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

Table 4-3. Summary of Location-specific Exceedances

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Receptor	CPEC	Number of Sample Locations in Boeing Evaluation Areas[a]	Location-specific Exceedances for Site Risk[b]										Location-specific Exceedances for Incremental Risk[c]									
			Low EcoRBSL					High EcoRBSL					Low EcoRBSL					High EcoRBSL				
			HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000	HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000	HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000	HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000
Facility-wide Exposure Scenario																						
Red-tailed Hawk	Cadmium	3846	49	2	1	0	0	1	0	0	0	0	46	2	1	0	0	1	0	0	0	0
Red-tailed Hawk	Chromium	3504	7	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	Copper	3703	7	0	1	0	0	1	0	0	0	0	7	0	1	0	0	1	0	0	0	0
Red-tailed Hawk	Lead	3878	1247	1504	1046	27	5	5	1	0	0	0	51	36	108	23	5	5	1	0	0	0
Red-tailed Hawk	Mercury	2915	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	Nickel	3524	47	2	3	0	0	0	0	0	0	0	14	2	3	0	0	0	0	0	0	0
Red-tailed Hawk	Selenium	3834	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	Zinc	3597	101	7	7	0	0	7	0	0	0	0	33	6	6	0	0	6	0	0	0	0
Red-tailed Hawk	Aroclor-1254	1929	4	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Red-tailed Hawk	Aroclor-1260	1932	1	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Red-tailed Hawk	2,3,7,8-TCDD_TEQ_Bird	1833	13	1	5	0	0	4	1	0	0	0	13	1	5	0	0	4	1	0	0	0
Red-tailed Hawk	Phenanthrene	2904	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	PCB_TEQ_Bird	5	0	0	2	0	0	2	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Red-tailed Hawk	4,4'-DDT	441	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	bis(2-Ethylhexyl) phthalate	2887	2	1	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0
Red-tailed Hawk	Di-n-butyl phthalate	2900	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	Pentachlorophenol	645	0	0	1	0	0	1	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Mule Deer	Cadmium	3846	418	34	46	1	0	1	1	0	0	0	203	30	43	1	0	1	1	0	0	0
Mule Deer	Copper	3703	11	2	3	0	0	0	0	0	0	0	8	3	2	0	0	0	0	0	0	0
Mule Deer	Lead	3878	58	10	7	1	0	0	0	0	0	0	34	6	8	0	0	0	0	0	0	0
Mule Deer	Mercury	2915	6	0	1	0	0	0	0	0	0	0	6	0	1	0	0	0	0	0	0	0
Mule Deer	Nickel	3524	2509	777	192	7	0	3	0	0	0	0	14	9	30	5	0	3	0	0	0	0
Mule Deer	Selenium	3834	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Mule Deer	Zinc	3597	124	7	7	0	0	1	0	0	0	0	34	5	7	0	0	1	0	0	0	0
Mule Deer	Aroclor-1248	1934	2	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Mule Deer	Aroclor-1254	1929	2	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Mule Deer	2,3,7,8-TCDD_TEQ_Mammal	1926	5	2	4	0	0	4	0	0	0	0	5	2	4	0	0	4	0	0	0	0
Mule Deer	2,4,6-Trinitrotoluene	669	1	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Mule Deer	Pyrene	2905	3	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Mule Deer	PCB_TEQ_Mammal	8	2	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Mule Deer	Pentachlorophenol	645	0	0	1	0	0	0	0	1	0	0	--	--	--	--	--	--	--	--	--	--
Bobcat	Cadmium	3846	624	67	62	1	0	5	1	0	0	0	265	47	59	1	0	5	1	0	0	0
Bobcat	Chromium	3504	7	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
Bobcat	Copper	3703	7	0	1	0	0	0	0	0	0	0	5	0	1	0	0	0	0	0	0	0
Bobcat	Lead	3878	37	4	6	0	0	0	0	0	0	0	22	4	6	0	0	0	0	0	0	0
Bobcat	Nickel	3524	3144	132	54	3	0	0	0	0	0	0	18	13	18	3	0	0	0	0	0	0
Bobcat	Selenium	3834	55	1	0	0	0	0	0	0	0	0	15	1	0	0	0	0	0	0	0	0
Bobcat	Zinc	3597	308	14	12	0	0	1	0	0	0	0	39	13	12	0	0	1	0	0	0	0
Bobcat	Aroclor-1248	1929	2	0	1	0	0	1	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Bobcat	Aroclor-1254	1929	17	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Bobcat	Aroclor-1260	1932	2	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Bobcat	2,3,7,8-TCDD_TEQ_Mammal	1926	189	40	30	6	1	38	1	7	1	0	172	38	30	6	1	38	1	7	1	0
Bobcat	Benzo(a)anthracene	2899	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Bobcat	Benzo(a)pyrene	2897	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Bobcat	Benzo(b)fluoranthene	2900	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Bobcat	Chrysene	2905	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Bobcat	Pyrene	2905	5	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
Bobcat	PCB_TEQ_Mammal	8	2	0	2	0	0	1	0	1	0	0	--	--	--	--	--	--	--	--	--	--
Bobcat	Pentachlorophenol	645	0	0	1	0	0	0	1	0	0	0	--	--	--	--	--	--	--	--	--	--
Great Blue Heron	Lead	930	23	4	0	0	0	0	0	0	0	0	13	3	0	0	0	0	0	0	0	0
Great Blue Heron	Di-n-butyl phthalate	749	6	0	3	0	0	3	0	0	0	0	6	0	3	0	0	3	0	0	0	0

Table 4-3. Summary of Location-specific Exceedances

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Receptor	CPEC	Number of Sample Locations in Boeing Evaluation Areas[a]	Location-specific Exceedances for Site Risk[b]										Location-specific Exceedances for Incremental Risk[c]									
			Low EcoRBSL					High EcoRBSL					Low EcoRBSL					High EcoRBSL				
			HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000	HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000	HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000	HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000

Notes:

[a] Number of sample locations across all of the Boeing evaluation areas. The counts are not restricted to habitats suitable for each receptor (i.e., sample locations included in the count may or may not fall within suitable habitat).

[b] Site risk shows the numbers of sample locations across the Boeing Evaluation Areas with hazard quotients falling within the ranges of 1 to 5, 5 to 10, 10 to 100, 100 to 1,000, or over 1,000. The counts are not restricted to habitats suitable for each receptor (i.e., sample locations included in the count may or may not fall within habitats suitable for the listed receptor).

[c] Incremental risk shows the numbers of sample locations across the Boeing Evaluation Areas with incremental risks within the risk ranges. Note incremental risks are only calculated for analytes with background values. The counts are not restricted to habitats suitable for each receptor (i.e., sample locations included in the count may or may not fall within habitats suitable for the listed receptor).

-- = background threshold value not available to estimate incremental risk.
Boeing = The Boeing Company
CPEC = chemical of potential ecological concern
EcoRBSL = ecological risk-based screening level
HQ = hazard quotient
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxicity equivalent
PCB = polychlorinated biphenyl

Table 4-4. Summary of Location-specific Hazard Index Exceedances

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

		Location-specific Exceedances for Site Risk[a]										Location-specific Exceedances for Incremental Risk[b]									
		Low EcoRBSL					High EcoRBSL					Low EcoRBSL					High EcoRBSL				
Receptor	Chemical Group	HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000	HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000	HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000	HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000
Baseline Exposure Scenario																					
Red-tailed Hawk	Aroclor HI	18	1	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Red-tailed Hawk	Low MW PAH HI	7	1	0	0	0	0	0	0	0	0	7	1	0	0	0	0	0	0	0	0
Red-tailed Hawk	Organochlorine Pesticide HI	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Mule Deer	Aroclor HI	6	1	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Mule Deer	High MW PAH HI	8	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0
Bobcat	Aroclor HI	20	1	1	0	0	1	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Bobcat	High MW PAH HI	7	4	0	0	0	0	0	0	0	0	7	4	0	0	0	0	0	0	0	0
Great blue heron	Aroclor HI	19	3	1	0	0	1	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Great blue heron	Low MW PAH HI	4	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
Great blue heron	Organochlorine Pesticide HI	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Subarea-level Exposure Scenario																					
Red-tailed Hawk	Aroclor HI	4	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Red-tailed Hawk	Low MW PAH HI	3	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
Mule Deer	Aroclor HI	3	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Mule Deer	High MW PAH HI	4	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
Bobcat	Aroclor HI	2	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Facility-wide Exposure Scenario																					
Red-tailed Hawk	Aroclor HI	5	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Red-tailed Hawk	Low MW PAH HI	5	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
Red-tailed Hawk	Organochlorine Pesticide HI	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Mule Deer	Aroclor HI	5	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Mule Deer	High MW PAH HI	5	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
Bobcat	Aroclor HI	20	1	1	0	0	1	0	0	0	0	--	--	--	--	--	--	--	--	--	--
Bobcat	High MW PAH HI	6	4	0	0	0	0	0	0	0	0	6	4	0	0	0	0	0	0	0	0

Notes:

[a] Site risk presents the numbers of sample locations across the Boeing Evaluation Areas with chemical group hazard indices falling within the ranges of 1 to 5, 5 to 10, 10 to 100, 100 to 1,000, or over 1,000. The counts are not restricted to habitats suitable for each receptor (i.e., sample locations included in the count may or may not fall within habitats suitable for the listed receptor).

[b] Incremental risk presents the number of sample locations across the Boeing Evaluation Areas with incremental hazard indices within the risk ranges. Note incremental risks are only calculated for analytes with background values. The counts are not restricted to habitats suitable for each receptor (i.e., sample locations included in the count may or may not fall within habitats suitable for the listed receptor).

-- = background threshold value not available to estimate incremental risk.
Boeing = The Boeing Company
EcoRBSL = ecological risk-based screening level
HI = hazard index
HQ = hazard quotient
MW = molecular weight
PAH = polycyclic aromatic hydrocarbon

Table 4-5. Risk Estimation for Birds - Ingestion of Surface Water

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Site Data							Risk Estimates - Great Blue Heron				
Boeing Evaluation Are	RFI Site	Matrix	ERAClass	CPEC	Units	RME EPC	Low EcoRBSL	High EcoRBSL	HQ - Low	HQ - High	Exceed Low or High EcoRBSL?
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Arsenic, Dissolved	µg/L	2.0E+00	1.2E+05	4.8E+05	2E-05	4E-06	No
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Barium	µg/L	2.4E+01	4.6E+05	9.2E+05	5E-05	3E-05	No
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Boron	µg/L	1.5E+02	6.3E+05	2.2E+06	2E-04	7E-05	No
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Chromium	µg/L	1.8E+00	5.9E+04	3.5E+05	3E-05	5E-06	No
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Copper	µg/L	1.0E+01	5.1E+04	1.2E+06	2E-04	9E-06	No
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Lead	µg/L	5.4E+00	3.1E+02	1.9E+05	2E-02	3E-05	No
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Manganese	µg/L	5.4E+01	1.7E+06	1.7E+07	3E-05	3E-06	No
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Nickel	µg/L	3.9E+00	3.0E+04	1.2E+06	1E-04	3E-06	No
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Zinc	µg/L	1.6E+02	3.8E+05	3.8E+06	4E-04	4E-05	No
Subarea 1B North	R-1 Pond	Surface Water	General Chemistry	Chloride	µg/L	2.6E+03	--	--	--	--	Uncertainty
Subarea 1B North	R-1 Pond	Surface Water	General Chemistry	Nitrate/Nitrite as N	µg/L	1.6E+03	--	--	--	--	Uncertainty
Subarea 1B North	R-1 Pond	Surface Water	General Chemistry	Sulfate	µg/L	1.8E+04	--	--	--	--	Uncertainty
Subarea 1B North	R-1 Pond	Surface Water	Energetics	Perchlorate	µg/L	3.5E+00	2.9E+05	5.7E+05	1E-05	6E-06	No
Subarea 1B North	R-1 Pond	Surface Water	VOC	Acetone	µg/L	5.5E+00	6.0E+07	--	9E-08	--	No
Subarea 1B North	R-1 Pond	Surface Water	VOC	Chloroform	µg/L	2.8E-01	--	--	--	--	Uncertainty
Subarea 1B North	R-1 Pond	Surface Water	VOC	Methylene chloride	µg/L	2.2E+00	--	--	--	--	Uncertainty
Subarea 1B North	R-1 Pond	Surface Water	VOC	m-Xylene	µg/L	9.7E-02	1.6E+07	--	6E-09	--	No
Subarea 1B North	R-1 Pond	Surface Water	VOC	Xylenes, Total	µg/L	1.0E-01	1.6E+07	--	6E-09	--	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Antimony	µg/L	2.0E+00	--	--	--	--	Uncertainty
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Arsenic	µg/L	1.6E+00	1.2E+05	4.8E+05	1E-05	3E-06	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Barium	µg/L	2.8E+01	4.6E+05	9.2E+05	6E-05	3E-05	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Boron	µg/L	9.8E+01	6.3E+05	2.2E+06	2E-04	4E-05	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Chromium	µg/L	1.9E+00	5.9E+04	3.5E+05	3E-05	5E-06	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Copper	µg/L	6.2E+00	5.1E+04	1.2E+06	1E-04	5E-06	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Lead	µg/L	1.6E+00	3.1E+02	1.9E+05	5E-03	8E-06	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Manganese	µg/L	2.1E+01	1.7E+06	1.7E+07	1E-05	1E-06	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Nickel	µg/L	8.3E+00	3.0E+04	1.2E+06	3E-04	7E-06	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Vanadium	µg/L	4.8E+00	7.6E+03	3.7E+04	6E-04	1E-04	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Zinc	µg/L	3.6E+01	3.8E+05	3.8E+06	1E-04	1E-05	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	General Chemistry	Chloride	µg/L	4.2E+03	--	--	--	--	Uncertainty
Subarea 1B Southeast	Perimeter Pond	Surface Water	General Chemistry	Nitrate-N	µg/L	2.6E+03	--	--	--	--	Uncertainty
Subarea 1B Southeast	Perimeter Pond	Surface Water	General Chemistry	Sulfate	µg/L	8.9E+03	--	--	--	--	Uncertainty
Subarea 1B Southeast	Perimeter Pond	Surface Water	VOC	Acetone	µg/L	3.8E+00	6.0E+07	--	6E-08	--	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	VOC	Methylene chloride	µg/L	1.9E+00	--	--	--	--	Uncertainty
Subarea 1B Southeast	Perimeter Pond	Surface Water	VOC	Trichloroethene	µg/L	7.7E-02	--	--	--	--	Uncertainty
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Aluminum	µg/L	8.1E+02	2.4E+06	--	3E-04	--	No

Table 4-5. Risk Estimation for Birds - Ingestion of Surface Water

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Site Data							Risk Estimates - Great Blue Heron				
Boeing Evaluation Are	RFI Site	Matrix	ERAClass	CPEC	Units	RME EPC	Low EcoRBSL	High EcoRBSL	HQ - Low	HQ - High	Exceed Low or High EcoRBSL?
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Arsenic	µg/L	2.0E+00	1.2E+05	4.8E+05	2E-05	4E-06	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Barium	µg/L	5.3E+01	4.6E+05	9.2E+05	1E-04	6E-05	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Boron	µg/L	1.3E+02	6.3E+05	2.2E+06	2E-04	6E-05	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Cadmium	µg/L	3.7E-01	1.5E+04	2.3E+05	2E-05	2E-06	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Chloramines	µg/L	4.0E+01	--	--	--	--	Uncertainty
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Chromium	µg/L	1.6E+00	5.9E+04	3.5E+05	3E-05	5E-06	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Cobalt	µg/L	2.9E+00	1.7E+05	4.0E+05	2E-05	7E-06	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Copper	µg/L	3.9E+00	5.1E+04	1.2E+06	8E-05	3E-06	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Fluoride	µg/L	3.4E+02	1.7E+05	7.0E+05	2E-03	5E-04	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Lead	µg/L	1.4E+00	3.1E+02	1.9E+05	5E-03	8E-06	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Manganese	µg/L	6.1E+02	1.7E+06	1.7E+07	4E-04	4E-05	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Molybdenum	µg/L	6.0E+00	7.7E+04	7.8E+05	8E-05	8E-06	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Nickel	µg/L	7.5E+00	3.0E+04	1.2E+06	3E-04	6E-06	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Silver	µg/L	2.3E-01	4.4E+04	1.3E+06	5E-06	2E-07	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Strontium	µg/L	9.2E+02	--	--	--	--	Uncertainty
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Titanium	µg/L	5.5E+01	2.2E+04	2.2E+05	3E-03	3E-04	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Vanadium	µg/L	3.7E+00	7.6E+03	3.7E+04	5E-04	1E-04	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Zinc	µg/L	3.7E+01	3.8E+05	3.8E+06	1E-04	1E-05	No
Subarea 5/9 North	Silvernale	Surface Water	General Chemistry	Chloride	µg/L	3.6E+04	--	--	--	--	Uncertainty
Subarea 5/9 North	Silvernale	Surface Water	General Chemistry	Nitrate-N	µg/L	1.4E+03	--	--	--	--	Uncertainty
Subarea 5/9 North	Silvernale	Surface Water	General Chemistry	Sulfate	µg/L	4.4E+05	--	--	--	--	Uncertainty
Subarea 5/9 North	Silvernale	Surface Water	Dioxin_Furans	2,3,7,8-TCDD_TEQ_Bird	µg/L	1.3E-07	3.1E-01	3.1E+00	4E-07	4E-08	No
Subarea 5/9 North	Silvernale	Surface Water	Herbicides	2,4,5-T	µg/L	3.0E-02	--	--	--	--	Uncertainty
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Benzo(a)anthracene	µg/L	4.9E-03	4.3E+05	--	1E-08	--	No
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Benzo(ghi)perylene	µg/L	4.2E-03	4.3E+05	--	1E-08	--	No
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Chrysene	µg/L	1.2E-02	4.3E+05	--	3E-08	--	No
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Dibenzo(a,h)anthracene	µg/L	6.0E-02	4.3E+05	--	1E-07	--	No
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Indeno(1,2,3-cd)pyrene	µg/L	6.0E-02	--	--	--	--	Uncertainty
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Pyrene	µg/L	2.0E-02	4.3E+05	--	5E-08	--	No
Subarea 5/9 North	Silvernale	Surface Water	PAH-LowMW	Fluoranthene	µg/L	2.1E-02	4.3E+05	--	5E-08	--	No
Subarea 5/9 North	Silvernale	Surface Water	PAH-LowMW	Phenanthrene	µg/L	1.2E-02	2.5E+04	2.5E+05	5E-07	5E-08	No
Subarea 5/9 North	Silvernale	Surface Water	PCBs	PCB_TEQ_Bird	µg/L	2.1E-07	3.1E-01	3.1E+00	7E-07	7E-08	No
Subarea 5/9 North	Silvernale	Surface Water	SVOC	bis(2-Ethylhexyl) phthalate	µg/L	1.0E-01	2.4E+04	--	4E-06	--	No
Subarea 5/9 North	Silvernale	Surface Water	SVOC	Diethyl phthalate	µg/L	7.6E-02	2.2E+04	2.2E+05	3E-06	3E-07	No
Subarea 5/9 North	Silvernale	Surface Water	VOC	Acetone	µg/L	4.6E+00	6.0E+07	--	8E-08	--	No
Subarea 5/9 North	Silvernale	Surface Water	VOC	Formaldehyde	µg/L	1.0E+01	--	--	--	--	Uncertainty

Table 4-5. Risk Estimation for Birds - Ingestion of Surface Water

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Site Data							Risk Estimates - Great Blue Heron				
Boeing Evaluation Are	RFI Site	Matrix	ERAClass	CPEC	Units	RME EPC	Low EcoRBSL	High EcoRBSL	HQ - Low	HQ - High	Exceed Low or High EcoRBSL?
Subarea 5/9 North	Silvernale	Surface Water	VOC	Methylene chloride	µg/L	1.8E+00	--	--	--	--	Uncertainty

Notes:
-- = not applicable, not available
µg/L = microgram(s) per liter
Boeing = The Boeing Company
CPEC = chemical of potential ecological concern
EcoRBSL = ecological risk-based screening level
EPC = exposure point concentration
ERA = ecological risk assessment
HQ = hazard quotient
MW = molecular weight
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RCRA = Resource Conservation and Recovery Act
RFI = RCRA facility investigation
RME = reasonable maximum exposure
SVOC = semivolatile organic compound
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxicity equivalent
VOC = volatile organic compound

Table 4-6. Risk Estimation for Mammals - Ingestion of Surface Water

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Site Data							Risk Estimates - Mule Deer					Risk Estimates - Bobcat				
Boeing Evaluation Area	RFI Site	Matrix	ERAClass	CPEC	Units	RME EPC	Low EcoRBSL	High EcoRBSL	HQ - Low	HQ - High	Exceed EcoRBSL?	Low EcoRBSL	High EcoRBSL	HQ - Low	HQ - High	Exceed EcoRBSL?
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Arsenic, Dissolved	µg/L	2.0E+00	4.7E+03	6.8E+04	4E-04	3E-05	No	4.1E+03	6.0E+04	5E-04	3E-05	No
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Barium	µg/L	2.4E+01	7.5E+05	1.2E+06	3E-05	2E-05	No	6.6E+05	1.1E+06	4E-05	2E-05	No
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Boron	µg/L	1.5E+02	4.1E+05	1.4E+06	4E-04	1E-04	No	3.6E+05	1.2E+06	4E-04	1E-04	No
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Chromium	µg/L	1.8E+00	3.5E+04	8.5E+05	5E-05	2E-06	No	3.1E+04	7.4E+05	6E-05	2E-06	No
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Copper	µg/L	1.0E+01	3.9E+04	9.2E+06	3E-04	1E-06	No	3.4E+04	8.0E+06	3E-04	1E-06	No
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Lead	µg/L	5.4E+00	1.5E+04	3.5E+06	4E-04	2E-06	No	1.3E+04	3.1E+06	4E-04	2E-06	No
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Manganese	µg/L	5.4E+01	2.0E+05	2.3E+06	3E-04	2E-05	No	1.7E+05	2.0E+06	3E-04	3E-05	No
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Nickel	µg/L	3.9E+00	1.9E+03	4.6E+05	2E-03	8E-06	No	1.7E+03	4.0E+05	2E-03	1E-05	No
Subarea 1B North	R-1 Pond	Surface Water	Inorganics	Zinc	µg/L	1.6E+02	1.4E+05	6.0E+06	1E-03	3E-05	No	1.2E+05	5.2E+06	1E-03	3E-05	No
Subarea 1B North	R-1 Pond	Surface Water	General Chemistry	Chloride	µg/L	2.6E+03	--	--	--	--	Uncertainty	--	--	--	--	Uncertainty
Subarea 1B North	R-1 Pond	Surface Water	General Chemistry	Nitrate/Nitrite as N	µg/L	1.6E+03	7.4E+06	1.7E+07	2E-04	1E-04	No	6.5E+06	1.4E+07	2E-04	1E-04	No
Subarea 1B North	R-1 Pond	Surface Water	General Chemistry	Sulfate	µg/L	1.8E+04	--	--	--	--	Uncertainty	--	--	--	--	Uncertainty
Subarea 1B North	R-1 Pond	Surface Water	Energetics	Perchlorate	µg/L	3.5E+00	9.3E+04	4.7E+05	4E-05	7E-06	No	8.1E+04	4.1E+05	4E-05	9E-06	No
Subarea 1B North	R-1 Pond	Surface Water	VOC	Acetone	µg/L	5.5E+00	1.5E+05	7.3E+05	4E-05	7E-06	No	1.3E+05	6.4E+05	4E-05	9E-06	No
Subarea 1B North	R-1 Pond	Surface Water	VOC	Chloroform	µg/L	2.8E-01	2.2E+05	6.0E+05	1E-06	5E-07	No	1.9E+05	5.2E+05	1E-06	5E-07	No
Subarea 1B North	R-1 Pond	Surface Water	VOC	Methylene chloride	µg/L	2.2E+00	8.5E+04	7.3E+05	3E-05	3E-06	No	7.4E+04	6.4E+05	3E-05	3E-06	No
Subarea 1B North	R-1 Pond	Surface Water	VOC	m-Xylene	µg/L	9.7E-02	3.0E+04	3.8E+04	3E-06	3E-06	No	2.6E+04	3.3E+04	4E-06	3E-06	No
Subarea 1B North	R-1 Pond	Surface Water	VOC	Xylenes, Total	µg/L	1.0E-01	3.0E+04	3.8E+04	3E-06	3E-06	No	2.6E+04	3.3E+04	4E-06	3E-06	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Antimony	µg/L	2.0E+00	8.6E+02	4.1E+04	2E-03	5E-05	No	7.5E+02	3.6E+04	3E-03	6E-05	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Arsenic	µg/L	1.6E+00	4.7E+03	6.8E+04	3E-04	2E-05	No	4.1E+03	6.0E+04	4E-04	3E-05	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Barium	µg/L	2.8E+01	7.5E+05	1.2E+06	4E-05	2E-05	No	6.6E+05	1.1E+06	4E-05	3E-05	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Boron	µg/L	9.8E+01	4.1E+05	1.4E+06	2E-04	7E-05	No	3.6E+05	1.2E+06	3E-04	8E-05	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Chromium	µg/L	1.9E+00	3.5E+04	8.5E+05	5E-05	2E-06	No	3.1E+04	7.4E+05	6E-05	3E-06	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Copper	µg/L	6.2E+00	3.9E+04	9.2E+06	2E-04	7E-07	No	3.4E+04	8.0E+06	2E-04	8E-07	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Lead	µg/L	1.6E+00	1.5E+04	3.5E+06	1E-04	5E-07	No	1.3E+04	3.1E+06	1E-04	5E-07	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Manganese	µg/L	2.1E+01	2.0E+05	2.3E+06	1E-04	9E-06	No	1.7E+05	2.0E+06	1E-04	1E-05	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Nickel	µg/L	8.3E+00	1.9E+03	4.6E+05	4E-03	2E-05	No	1.7E+03	4.0E+05	5E-03	2E-05	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Vanadium	µg/L	4.8E+00	6.1E+04	1.4E+05	8E-05	3E-05	No	5.3E+04	1.2E+05	9E-05	4E-05	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	Inorganics	Zinc	µg/L	3.6E+01	1.4E+05	6.0E+06	3E-04	6E-06	No	1.2E+05	5.2E+06	3E-04	7E-06	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	General Chemistry	Chloride	µg/L	4.2E+03	--	--	--	--	Uncertainty	--	--	--	--	Uncertainty
Subarea 1B Southeast	Perimeter Pond	Surface Water	General Chemistry	Nitrate-N	µg/L	2.6E+03	7.4E+06	1.7E+07	4E-04	2E-04	No	6.5E+06	1.4E+07	4E-04	2E-04	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	General Chemistry	Sulfate	µg/L	8.9E+03	--	--	--	--	Uncertainty	--	--	--	--	Uncertainty
Subarea 1B Southeast	Perimeter Pond	Surface Water	VOC	Acetone	µg/L	3.8E+00	1.5E+05	7.3E+05	3E-05	5E-06	No	1.3E+05	6.4E+05	3E-05	6E-06	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	VOC	Methylene chloride	µg/L	1.9E+00	8.5E+04	7.3E+05	2E-05	3E-06	No	7.4E+04	6.4E+05	3E-05	3E-06	No
Subarea 1B Southeast	Perimeter Pond	Surface Water	VOC	Trichloroethene	µg/L	7.7E-02	1.0E+04	1.0E+05	8E-06	8E-07	No	8.9E+03	8.9E+04	9E-06	9E-07	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Aluminum	µg/L	8.1E+02	2.8E+04	2.8E+05	3E-02	3E-03	No	2.5E+04	2.5E+05	3E-02	3E-03	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Arsenic	µg/L	2.0E+00	4.7E+03	6.8E+04	4E-04	3E-05	No	4.1E+03	6.0E+04	5E-04	3E-05	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Barium	µg/L	5.3E+01	7.5E+05	1.2E+06	7E-05	4E-05	No	6.6E+05	1.1E+06	8E-05	5E-05	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Boron	µg/L	1.3E+02	4.1E+05	1.4E+06	3E-04	9E-05	No	3.6E+05	1.2E+06	4E-04	1E-04	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Cadmium	µg/L	3.7E-01	8.7E+02	3.8E+04	4E-04	1E-05	No	7.6E+02	3.4E+04	5E-04	1E-05	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Chloramines	µg/L	4.0E+01	1.4E+05	--	3E-04	--	No	1.2E+05	--	3E-04	--	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Chromium	µg/L	1.6E+00	3.5E+04	8.5E+05	5E-05	2E-06	No	3.1E+04	7.4E+05	5E-05	2E-06	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Cobalt	µg/L	2.9E+00	1.7E+04	2.9E+05	2E-04	1E-05	No	1.5E+04	2.5E+05	2E-04	1E-05	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Copper	µg/L	3.9E+00	3.9E+04	9.2E+06	1E-04	4E-07	No	3.4E+04	8.0E+06	1E-04	5E-07	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Fluoride	µg/L	3.4E+02	4.6E+05	7.7E+05	7E-04	4E-04	No	4.0E+05	6.7E+05	8E-04	5E-04	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Lead	µg/L	1.4E+00	1.5E+04	3.5E+06	1E-04	4E-07	No	1.3E+04	3.1E+06	1E-04	5E-07	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Manganese	µg/L	6.1E+02	2.0E+05	2.3E+06	3E-03	3E-04	No	1.7E+05	2.0E+06	4E-03	3E-04	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Molybdenum	µg/L	6.0E+00	3.8E+03	3.8E+04	2E-03	2E-04	No	3.3E+03	3.3E+04	2E-03	2E-04	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Nickel	µg/L	7.5E+00	1.9E+03	4.6E+05	4E-03	2E-05	No	1.7E+03	4.0E+05	4E-03	2E-05	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Silver	µg/L	2.3E-01	8.8E+04	1.7E+06	3E-06	1E-07	No	7.7E+04	1.5E+06	3E-06	2E-07	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Strontium	µg/L	9.2E+02	3.8E+06	5.5E+06	2E-04	2E-04	No	3.3E+06	4.8E+06	3E-04	2E-04	No
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Titanium	µg/L	5.5E+01	--	--	--	--	Uncertainty	--	--	--	--	Uncertainty
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Vanadium	µg/L	3.7E+00	6.1E+04	1.4E+05	6E-05	3E-05	No	5.3E+04	1.2E+05	7E-05	3E-05	No

Table 4-6. Risk Estimation for Mammals - Ingestion of Surface Water

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Site Data							Risk Estimates - Mule Deer					Risk Estimates - Bobcat				
Boeing Evaluation Area	RFI Site	Matrix	ERAClass	CPEC	Units	RME EPC	Low EcoRBSL	High EcoRBSL	HQ - Low	HQ - High	Exceed EcoRBSL?	Low EcoRBSL	High EcoRBSL	HQ - Low	HQ - High	Exceed EcoRBSL?
Subarea 5/9 North	Silvernale	Surface Water	Inorganics	Zinc	µg/L	3.7E+01	1.4E+05	6.0E+06	3E-04	6E-06	No	1.2E+05	5.2E+06	3E-04	7E-06	No
Subarea 5/9 North	Silvernale	Surface Water	General Chemistry	Chloride	µg/L	3.6E+04	--	--	--	--	Uncertainty	--	--	--	--	Uncertainty
Subarea 5/9 North	Silvernale	Surface Water	General Chemistry	Nitrate-N	µg/L	1.4E+03	7.4E+06	1.7E+07	2E-04	8E-05	No	6.5E+06	1.4E+07	2E-04	1E-04	No
Subarea 5/9 North	Silvernale	Surface Water	General Chemistry	Sulfate	µg/L	4.4E+05	--	--	--	--	Uncertainty	--	--	--	--	Uncertainty
Subarea 5/9 North	Silvernale	Surface Water	Dioxin_Furans	2,3,7,8-TCDD_TEQ_Mammal	µg/L	6.6E-07	1.5E-02	1.5E-01	4E-05	4E-06	No	1.3E-02	1.3E-01	5E-05	5E-06	No
Subarea 5/9 North	Silvernale	Surface Water	Herbicides	2,4,5-T	µg/L	3.0E-02	4.4E+04	1.5E+05	7E-07	2E-07	No	3.8E+04	1.3E+05	8E-07	2E-07	No
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Benzo(a)anthracene	µg/L	4.9E-03	9.0E+03	5.5E+05	5E-07	9E-09	No	7.8E+03	4.8E+05	6E-07	1E-08	No
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Benzo(ghi)perylene	µg/L	4.2E-03	9.0E+03	5.5E+05	5E-07	8E-09	No	7.8E+03	4.8E+05	5E-07	9E-09	No
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Chrysene	µg/L	1.2E-02	9.0E+03	5.5E+05	1E-06	2E-08	No	7.8E+03	4.8E+05	2E-06	3E-08	No
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Dibenzo(a,h)anthracene	µg/L	6.0E-02	9.0E+03	5.5E+05	7E-06	1E-07	No	7.8E+03	4.8E+05	8E-06	1E-07	No
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Indeno(1,2,3-cd)pyrene	µg/L	6.0E-02	9.0E+03	5.5E+05	7E-06	1E-07	No	7.8E+03	4.8E+05	8E-06	1E-07	No
Subarea 5/9 North	Silvernale	Surface Water	PAH-HighMW	Pyrene	µg/L	2.0E-02	9.0E+03	5.5E+05	2E-06	4E-08	No	7.8E+03	4.8E+05	3E-06	4E-08	No
Subarea 5/9 North	Silvernale	Surface Water	PAH-LowMW	Fluoranthene	µg/L	2.1E-02	9.6E+05	5.2E+06	2E-08	4E-09	No	8.3E+05	4.5E+06	3E-08	5E-09	No
Subarea 5/9 North	Silvernale	Surface Water	PAH-LowMW	Phenanthrene	µg/L	1.2E-02	9.6E+05	5.2E+06	1E-08	2E-09	No	8.3E+05	4.5E+06	1E-08	3E-09	No
Subarea 5/9 North	Silvernale	Surface Water	PCBs	PCB_TEQ_Mammal	µg/L	5.1E-06	1.5E-02	1.5E-01	3E-04	3E-05	No	1.3E-02	1.3E-01	4E-04	4E-05	No
Subarea 5/9 North	Silvernale	Surface Water	SVOC	bis(2-Ethylhexyl) phthalate	µg/L	1.0E-01	2.7E+05	2.7E+06	4E-07	4E-08	No	2.3E+05	2.3E+06	5E-07	4E-08	No
Subarea 5/9 North	Silvernale	Surface Water	SVOC	Diethyl phthalate	µg/L	7.6E-02	6.7E+07	--	1E-09	--	No	5.8E+07	--	1E-09	--	No
Subarea 5/9 North	Silvernale	Surface Water	VOC	Acetone	µg/L	4.6E+00	1.5E+05	7.3E+05	3E-05	6E-06	No	1.3E+05	6.4E+05	4E-05	7E-06	No
Subarea 5/9 North	Silvernale	Surface Water	VOC	Formaldehyde	µg/L	1.0E+01	1.4E+05	1.2E+06	7E-05	8E-06	No	1.2E+05	1.0E+06	8E-05	1E-05	No
Subarea 5/9 North	Silvernale	Surface Water	VOC	Methylene chloride	µg/L	1.8E+00	8.5E+04	7.3E+05	2E-05	2E-06	No	7.4E+04	6.4E+05	2E-05	3E-06	No

Notes:
-- - not applicable, not available
µg/L = microgram(s) per liter
CPEC = chemical of potential ecological concern
EcoRBSL = ecological risk-based screening level
EPC = exposure point concentration
ERA = ecological risk assessment
HQ = hazard quotient
MW = molecular weight
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
RME = reasonable maximum exposure
SVOC = semivolatile organic compound
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxicity equivalent
VOC = volatile organic compound

Table 4-7. Summary of Risk Interpolation

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

CPEC[a]	Summary of Interpolation of Potential Risks																							
	Red-tailed Hawk						Mule Deer						Bobcat						Great blue heron					
	Contour Figure Number	Site Low	Site High	INCR Low	INCR High	Risk vs. Habitat	Contour Figure Number	Site Low	Site High	INCR Low	INCR High	Risk vs. Habitat	Contour Figure Number	Site Low	Site High	INCR Low	INCR High	Risk vs. Habitat	Contour Figure Number	Site Low	Site High	INCR Low	INCR High	Risk vs. Habitat
Baseline Exposure Scenario - Hazard Quotients																								
Cadmium	C-1	+++	+	+++	+	0	C-11	++++	+	++++	+	1	C-16	++++	+	++++	+	1	nc	nc	nc	nc	nc	nc
Chromium	C-2	++	+	++	+	1	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Copper	C-3	+++	+	+++	+	0	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Lead	C-4	++++	++	++++	++	2	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Mercury	C-5	--	--	--	--	0	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Nickel	C-6	+++	--	+++	--	0	C-12	++++	+	++++	--	0	C-17	+++	--	+++	--	0	nc	nc	nc	nc	nc	nc
Selenium	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	C-23	++	+	++	+	0
Zinc	C-7	+++	+	+++	+	1	C-13	+++	--	+++	--	0	C-18	+++	--	+++	--	0	C-24	+++	+	+++	+	0
Aroclor 1248	nc	nc	nc	n/a	n/a	nc	nc	nc	nc	n/a	n/a	nc	C-19	+	--	n/a	n/a	0	nc	nc	nc	n/a	n/a	nc
Aroclor 1254	nc	nc	nc	n/a	n/a	nc	nc	nc	nc	n/a	n/a	nc	nc	nc	nc	n/a	n/a	nc	C-25	+++	--	n/a	n/a	0
2,3,7,8-TCDD_TEQ_Bird	C-8	++	+	++	+	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	nc	nc	nc	nc	nc	nc
2,3,7,8-TCDD_TEQ_Mammal	n/a	n/a	n/a	n/a	n/a	n/a	C-14	++	--	++	--	0	C-20	++++	+++	++++	+++	2	n/a	n/a	n/a	n/a	n/a	n/a
PCB_TEQ_Bird	C-9	+++	++	n/a	n/a	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	nc	nc	nc	nc	nc	nc
PCB_TEQ_Mammal	n/a	n/a	n/a	n/a	n/a	n/a	nc	nc	nc	n/a	n/a	nc	C-21	+++	+++	n/a	n/a	2	n/a	n/a	n/a	n/a	n/a	n/a
Di-n-butyl phthalate	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	C-26	++++	+++	++++	+++	1
Pentachlorophenol	C-10	+	--	n/a	n/a	0	C-15	++	+	n/a	n/a	1	C-22	+	--	n/a	n/a	0	nc	nc	nc	n/a	n/a	nc
Baseline Exposure Scenario - Hazard Indices																								
Aroclor HI	nc	nc	nc	n/a	n/a	nc	nc	nc	nc	n/a	n/a	nc	C-27	+	--	n/a	n/a	0	C-28	+++	--	n/a	n/a	0
Subarea Level Exposure Scenario - Hazard Quotients																								
Cadmium	D-1	+++	+	+++	+	0	D-8	++++	+	++++	+	1	D-13	+++	+	+++	+	1	nc	nc	nc	nc	nc	nc
Chromium	D-2	++	--	++	--	0	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Lead	D-3	++++	+	++++	+	0	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Nickel	nc	nc	nc	nc	nc	nc	D-9	++++	--	++++	--	0	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Zinc	D-4	+++	+	+++	+	0	D-10	+++	--	+++	--	0	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
2,3,7,8-TCDD_TEQ_Bird	D-5	+	--	+	--	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	nc	nc	nc	nc	nc	nc
2,3,7,8-TCDD_TEQ_Mammal	n/a	n/a	n/a	n/a	n/a	n/a	D-11	+	--	+	--	0	D-14	++	+	++	+	1	n/a	n/a	n/a	n/a	n/a	n/a
PCB_TEQ_Bird	D-6	+++	+	n/a	n/a	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	nc	nc	nc	n/a	n/a	nc
PCB_TEQ_Mammal	n/a	n/a	n/a	n/a	n/a	n/a	nc	nc	nc	n/a	n/a	nc	nc	nc	nc	n/a	n/a	nc	n/a	n/a	n/a	n/a	n/a	n/a
Pentachlorophenol	D-7	--	--	n/a	n/a	0	D-12	+	--	n/a	n/a	0	nc	nc	nc	n/a	n/a	nc	nc	nc	nc	n/a	n/a	nc
Facility-wide Exposure Scenario - Hazard Quotients																								
Cadmium	E-1	+++	+	+++	+	0	E-8	++++	+	++++	+	1	E-13	++++	+	++++	+	1	nc	nc	nc	nc	nc	nc
Copper	E-2	+++	--	+++	--	0	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Lead	E-3	++++	+	++++	+	1	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Nickel	nc	nc	nc	nc	nc	nc	E-9	++++	--	++++	--	0	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Zinc	E-4	+++	+	++	--	0	E-10	+++	--	+++	--	0	E-14	+++	--	+++	--	0	nc	nc	nc	nc	nc	nc
Aroclor 1248	nc	nc	nc	n/a	n/a	nc	nc	nc	nc	n/a	n/a	nc	E-15	+	--	n/a	n/a	0	nc	nc	nc	n/a	n/a	nc
2,3,7,8-TCDD_TEQ_Bird	E-5	+	--	+	--	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	nc	nc	nc	n/a	n/a	nc
2,3,7,8-TCDD_TEQ_Mammal	n/a	n/a	n/a	n/a	n/a	n/a	E-11	++	--	++	--	0	E-16	++++	+++	++++	+++	2	n/a	n/a	n/a	n/a	n/a	n/a
PCB_TEQ_Bird	E-6	+++	+	n/a	n/a	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	nc	nc	nc	n/a	n/a	nc
PCB_TEQ_Mammal	n/a	n/a	n/a	n/a	n/a	n/a	nc	nc	nc	n/a	n/a	nc	E-17	+++	+++	n/a	n/a	2	n/a	n/a	n/a	n/a	n/a	n/a
Di-n-butyl phthalate	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	E-19	+++	+	+++	+	0
Pentachlorophenol	E-7	+	--	n/a	n/a	0	E-12	++	+	n/a	n/a	1	E-18	+	--	n/a	n/a	0	nc	nc	nc	n/a	n/a	nc
Facility-wide Exposure Scenario - Hazard Indices																								
Aroclor HI	nc	nc	nc	n/a	n/a	nc	nc	nc	nc	n/a	n/a	nc	E-20	+	--	n/a	n/a	0	nc	nc	nc	n/a	n/a	nc

Notes:

[a] Chemical of potential ecological concern (CPEC) for at least one LHR receptor.

HQ = hazard quotient

INCR = incremental

LHR = large home range

n/a = not applicable

nc = not retained for risk interpolation contour

PCB = polychlorinated biphenyl

TCDD = tetrachlorodibenzo-p-dioxin

TEQ = toxicity equivalent

Interpolated Risk	
--	Interpolated HQs<1
+	Interpolated HQs from 1 to 5
++	Interpolated HQs up to 10
+++	Interpolated HQs up to 100
++++	Interpolated HQs >100

Risk vs. Habitat	
0	Potential INCR High risks do not occur in habitat types considered suitable for this receptor
1	Potential INCR High risks occur within suitable habitat but interpolated HQs are generally less than 5, no hot spots
2	Potential INCR High risks occur within suitable habitat, interpolated HQs are generally less than 5, but may be localized higher risks in small area(s) of the SSFL.

Table 4-8. Weight of Evidence Evaluation for Soil and Lakebed Sediment

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

CPEC	Baseline Exposure Scenario												Subarea-Level Exposure Scenario											
	Red-tailed Hawk			Mule Deer			Bobcat			Great Blue Heron			Red-tailed Hawk			Mule Deer			Bobcat			Great blue heron		
	Site High	INCR High	Risk vs. Habitat	Site High	INCR High	Risk vs. Habitat	Site High	INCR High	Risk vs. Habitat	Site High	INCR High	Risk vs. Habitat	Site High	INCR High	Risk vs. Habitat	Site High	INCR High	Risk vs. Habitat	Site High	INCR High	Risk vs. Habitat	Site High	INCR High	Risk vs. Habitat
Cadmium	+	+	0	+	+	1	+	+	1	nc	nc	nc	+	+	0	+	+	1	+	+	1	nc	nc	nc
Chromium	+	+	1	nc	nc	nc	nc	nc	nc	nc	nc	nc	--	--	0	nc	nc	nc	nc	nc	nc	nc	nc	nc
Copper	+	+	0	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Hexavalent chromium	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Lead	++	++	2	nc	nc	nc	nc	nc	nc	nc	nc	nc	+	+	0	nc	nc	nc	nc	nc	nc	nc	nc	nc
Mercury	--	--	0	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Nickel	--	--	0	+	--	0	--	--	0	nc	nc	nc	nc	nc	nc	--	--	0	nc	nc	nc	nc	nc	nc
Selenium	nc	nc	nc	nc	nc	nc	nc	nc	nc	+	+	0	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Silver	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Zinc	+	+	1	--	--	0	--	--	0	+	+	0	+	+	0	--	--	0	nc	nc	nc	nc	nc	nc
Aroclor 1248	nc	n/a	nc	nc	n/a	nc	--	n/a	0	nc	n/a	nc	nc	n/a	nc	nc	n/a	nc	nc	n/a	nc	nc	n/a	nc
Aroclor 1254	nc	n/a	nc	nc	n/a	nc	nc	n/a	nc	--	n/a	0	nc	n/a	nc	nc	n/a	nc	nc	n/a	nc	nc	n/a	nc
Aroclor 1260	nc	n/a	nc	nc	n/a	nc	nc	n/a	nc	nc	n/a	nc	nc	n/a	nc	nc	n/a	nc	nc	n/a	nc	nc	n/a	nc
2,3,7,8-TCDD_TEQ_Bird	+	+	1	n/a	n/a	n/a	n/a	n/a	n/a	nc	nc	nc	--	--	0	n/a	n/a	n/a	n/a	n/a	n/a	nc	nc	nc
2,3,7,8-TCDD_TEQ_Mammal	n/a	n/a	n/a	--	--	0	+++	+++	2	n/a	n/a	n/a	n/a	n/a	n/a	--	--	0	+	+	1	n/a	n/a	n/a
2,4,6-Trinitrotoluene	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Benzo(a)anthracene	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Benzo(a)pyrene	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Benzo(b)fluoranthene	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Chrysene	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Pyrene	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Anthracene	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Phenanthrene	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
PCB_TEQ_Bird	++	n/a	0	n/a	n/a	n/a	n/a	n/a	n/a	nc	nc	nc	+	n/a	0	n/a	n/a	n/a	n/a	n/a	n/a	nc	nc	nc
PCB_TEQ_Mammal	n/a	n/a	n/a	nc	nc	nc	+++	n/a	2	n/a	n/a	n/a	n/a	n/a	n/a	nc	n/a	nc	nc	n/a	nc	n/a	n/a	n/a
4,4'-DDT	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
bis(2-Ethylhexyl) phthalate	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Di-n-butyl phthalate	nc	nc	nc	nc	nc	nc	nc	nc	nc	+++	+++	1	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Pentachlorophenol	--	n/a	0	+	n/a	1	--	n/a	0	nc	n/a	nc	--	n/a	0	--	n/a	0	nc	n/a	nc	nc	n/a	nc
sec-Butylbenzene	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Aroclor HI	nc	n/a	nc	nc	n/a	nc	--	n/a	0	--	n/a	0	nc	n/a	nc	nc	n/a	nc	nc	n/a	nc	nc	n/a	nc
Low MW PAH HI	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
High MW PAH HI	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc
Organochlorine Pesticide HI	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc

Table 4-8. Weight of Evidence Evaluation for Soil and Lakebed Sediment

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

CPEC	Facility-wide Exposure Scenario												Retain as a COEC	
	Red-tailed Hawk			Mule Deer			Bobcat			Great Blue Heron				
	Site High	INCR High	Risk vs. Habitat	Site High	INCR High	Risk vs. Habitat	Site High	INCR High	Risk vs. Habitat	Site High	INCR High	Risk vs. Habitat	COEC?	Rationale Code
Cadmium	+	+	0	+	+	1	+	+	1	nc	nc	nc	No	C
Chromium	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	B
Copper	--	--	0	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	B
Hexavalent chromium	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	A
Lead	+	+	1	nc	nc	nc	nc	nc	nc	nc	nc	nc	**Yes**	**D**
Mercury	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	B
Nickel	nc	nc	nc	--	--	0	nc	nc	nc	nc	nc	nc	No	B
Selenium	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	B
Silver	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	A
Zinc	+	--	0	--	--	0	--	--	0	nc	nc	nc	No	E
Aroclor 1248	nc	n/a	nc	nc	n/a	nc	--	n/a	0	nc	n/a	nc	No	B
Aroclor 1254	nc	n/a	nc	nc	n/a	nc	nc	n/a	nc	nc	n/a	nc	No	B
Aroclor 1260	nc	n/a	nc	nc	n/a	nc	nc	n/a	nc	nc	n/a	nc	No	B
2,3,7,8-TCDD_TEQ_Bird	--	--	0	n/a	n/a	n/a	n/a	n/a	n/a	nc	nc	nc	No	B
2,3,7,8-TCDD_TEQ_Mammal	n/a	n/a	n/a	--	--	0	+++	+++	2	n/a	n/a	n/a	**Yes**	**F**
2,4,6-Trinitrotoluene	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	A
Benzo(a)anthracene	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	A
Benzo(a)pyrene	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	A
Benzo(b)fluoranthene	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	A
Chrysene	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	A
Pyrene	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	A
Anthracene	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	A
Phenanthrene	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	A
PCB_TEQ_Bird	+	n/a	0	n/a	n/a	n/a	n/a	n/a	n/a	nc	n/a	nc	No	H
PCB_TEQ_Mammal	n/a	n/a	n/a	nc	n/a	nc	+++	n/a	2	n/a	n/a	n/a	**Yes**	**G**
4,4'-DDT	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	A
bis(2-Ethylhexyl) phthalate	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	A
Di-n-butyl phthalate	nc	nc	nc	nc	nc	nc	nc	nc	nc	+	+	0	No	H
Pentachlorophenol	--	n/a	0	+	n/a	1	--	n/a	0	nc	n/a	nc	No	I
sec-Butylbenzene	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	A
Aroclor HI	nc	n/a	nc	nc	n/a	nc	--	n/a	0	nc	n/a	nc	No	B
Low MW PAH HI	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	A
High MW PAH HI	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	A
Organochlorine Pesticide HI	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	nc	No	A

Table 4-8. Weight of Evidence Evaluation for Soil and Lakebed Sediment
Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Notes:
Boeing = The Boeing Company
COEC = chemical of ecological concern
CPEC = chemical of potential ecological concern
EcoRBSL = ecological risk-based screening level
HI = hazard index
HQ = hazard quotient
INCR = incremental
LHR = large home range
n/a = not applicable
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzo-p-dioxin
TEQ = toxicity equivalent

Interpolated Risk

nc	No retained for risk interpolation as there were no location-specific Site HQs >1 at the High EcoRBSL
--	Interpolated HQs<1
+	Interpolated HQs from 1 to 5
++	Interpolated HQs from 5 to 10
+++	Interpolated HQs up to 100

Risk vs. Habitat

0	Potential INCR High risks do not occur in habitat types considered suitable for this receptor
1	Potential INCR High risks occur within habitat types considered suitable for the receptor, but interpolated HQs are generally less than 5, no hot spots
2	Potential INCR High risks occur within habitat types considered suitable for this receptor. Interpolated HQs are generally less than 5, but may be localized higher risks in small area(a) of the SSFL.

Weight of Evidence Rationale

A	Analyte is not retained as a COEC. Analyte had at least 1 location-specific Site HQ>1 at the Low EcoRBSL, but did not have any location-specific Site HQs>1 or chemical group Site HIs>1 (where applicable) at the High EcoRBSL for any receptor and was not retained for risk interpolation for any receptor or exposure scenario.
B	Analyte is not retained as a COEC. Interpolated Site risks or chemical group Site HIs do not exceed 1 at the High EcoRBSL for any LHR receptor under the Subarea-level or Facility-wide exposure scenarios.
C	Cadmium is not retained as a COEC. Interpolated Site risks exceed 1 at the High EcoRBSL, but are less than 5 for a small number of sample locations (less than 5) across the Boeing Evaluation Areas. Interpolated exceedances are not within habitat suitable (or occur along margin with suitable habitat) for the red-tailed hawk, but may be suitable for the mule deer and bobcat. Overall potential for risks for birds and mammals is considered low.
D	Lead is retained as a COEC for birds in the Shooting Range Area. Interpolated Site and Incremental risks at the High EcoRBSL do not exceed 1 for mammals under the Subarea-level or Facility-wide exposure scenarios. Potential risk to birds from lead is primarily at the Low EcoRBSL with risks up to 5 at the High EcoRBSL under the Subarea-level and Facility-wide exposure scenarios. Since special status species raptors may use the Boeing Evaluation Area, lead is retained as a COEC.
E	Zinc is not retained as a COEC. Interpolated Site and Incremental risks do not exceed 1 at the High EcoRBSL for mammals or great blue heron. Interpolated Site and Incremental risks for red-tailed hawk exceed 1 at the High EcoRBSL for the Subarea-level exposure scenario, and interpolated Site risks exceed 1 for the Facility-wide exposure scenario. Incremental risks do not exceed 1 at the High EcoRBSL for the Facility-wide exposure scenario.. Potential risks are not in habitat considered suitable for the red-tailed hawk. Overall potential risks for the Boeing Evaluation Areas are considered low.
F	2,3,7,8-TCDD_TEQ_Mammal is retained as a COEC for bobcat under the Facility-wide exposure scenario. Interpolated Site and Incremental risks exceed the High EcoRBSL with risks ranging from <1 to 100 in portions of Subareas 5/9 North and 1B Southwest.
G	PCB_TEQ_Mammal is retained as a COEC. Interpolated risks exceed 1 at the High EcoRBSL in Subareas 5/9 North and 1B Southwest under the Facility-wide exposure scenarios. Potential risks are within habitats considered suitable for LHR receptors.
H	Analyte is not retained as a COEC. Interpolated Site and Incremental risks exceeding 1 at the High EcoRBSL do not occur in suitable habitat for the receptor. Overall potential for risk is considered low.
I	Analyte is not retained as a COEC. Interpolated Site a risks exceeding 1 at the High EcoRBSL are based on a single sample location. Majority of samples were non-detect. Overall potential for risk to LHRs is considered low.

Table 4-9. Screening of Qualitative Data for Shooting Range Area

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Boeing Evaluation Area	EcoRAClass	Analyte	Unit	Maximum Detect	BTV	EcoRBSLs						Background Screen		Risk Screen					
						Red-tailed Hawk		Mule Deer		Bobcat				Red-tailed Hawk		Mule Deer		Bobcat	
						Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	>BTV?	>2x BTV?	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL	Low EcoRBSL	High EcoRBSL
Shooting Range Area	Inorganics	Arsenic	mg/kg	273	24.2	4.8E+03	1.9E+04	1.4E+02	2.0E+03	6.5E+02	9.5E+03	Yes	Yes	6E-02	1E-02	**2E+00**	1E-01	4E-01	3E-02
Shooting Range Area	Inorganics	Lead	mg/kg	39800	33.9	6.3E-01	4.0E+02	5.1E+01	1.2E+04	1.1E+02	2.5E+04	Yes	Yes	**6E+04**	**1E+02**	**8E+02**	**3E+00**	**4E+02**	**2E+00**
Shooting Range Area	PAH-HighMW	Benzo(a)anthracene	mg/kg	2	0.001222	2.5E+02	--	4.5E+01	2.8E+03	1.9E+01	1.2E+03	Yes	Yes	8E-03	--	4E-02	7E-04	1E-01	2E-03
Shooting Range Area	PAH-HighMW	Benzo(a)pyrene	mg/kg	4.3	0.00164	2.5E+02	--	1.3E+02	7.9E+03	1.9E+01	1.2E+03	Yes	Yes	2E-02	--	3E-02	5E-04	2E-01	4E-03
Shooting Range Area	PAH-HighMW	Benzo(b)fluoranthene	mg/kg	4.3	0.003264	2.5E+02	--	4.7E+01	2.9E+03	1.9E+01	1.2E+03	Yes	Yes	2E-02	--	9E-02	1E-03	2E-01	4E-03
Shooting Range Area	PAH-HighMW	Benzo(ghi)perylene	mg/kg	3.6	0.001177	2.5E+02	--	6.7E+01	4.1E+03	1.9E+01	1.2E+03	Yes	Yes	1E-02	--	5E-02	9E-04	2E-01	3E-03
Shooting Range Area	PAH-HighMW	Benzo(k)fluoranthene	mg/kg	1.4	0.00353	2.5E+02	--	6.0E+01	3.7E+03	1.9E+01	1.2E+03	Yes	Yes	6E-03	--	2E-02	4E-04	7E-02	1E-03
Shooting Range Area	PAH-HighMW	Chrysene	mg/kg	2.3	0.002457	2.5E+02	--	4.5E+01	2.8E+03	1.9E+01	1.2E+03	Yes	Yes	9E-03	--	5E-02	8E-04	1E-01	2E-03
Shooting Range Area	PAH-HighMW	Dibenzo(a,h)anthracene	mg/kg	0.68	0.00102	2.5E+02	--	1.0E+02	6.3E+03	1.9E+01	1.2E+03	Yes	Yes	3E-03	--	7E-03	1E-04	4E-02	6E-04
Shooting Range Area	PAH-HighMW	Indeno(1,2,3-cd)pyrene	mg/kg	2.9	0.000792	--	--	1.2E+02	7.3E+03	1.9E+01	1.2E+03	Yes	Yes	--	--	2E-02	4E-04	2E-01	3E-03
Shooting Range Area	PAH-HighMW	Pyrene	mg/kg	2.2	0.002586	2.5E+02	--	2.1E+01	1.3E+03	1.9E+01	1.2E+03	Yes	Yes	9E-03	--	1E-01	2E-03	1E-01	2E-03
Shooting Range Area	PAH-LowMW	Acenaphthene	mg/kg	0.23	0.0018	1.3E+01	1.3E+02	2.2E+02	1.2E+03	2.0E+03	1.1E+04	Yes	Yes	2E-02	2E-03	1E-03	2E-04	1E-04	2E-05
Shooting Range Area	PAH-LowMW	Acenaphthylene	mg/kg	0.00587	0.000815	1.3E+01	1.3E+02	3.2E+03	1.7E+04	2.0E+03	1.1E+04	Yes	Yes	5E-04	5E-05	2E-06	3E-07	3E-06	5E-07
Shooting Range Area	PAH-LowMW	Anthracene	mg/kg	0.12	0.000645	1.4E+01	1.4E+02	1.1E+03	5.9E+03	2.0E+03	1.1E+04	Yes	Yes	9E-03	9E-04	1E-04	2E-05	6E-05	1E-05
Shooting Range Area	PAH-LowMW	Fluoranthene	mg/kg	1.7	0.002466	2.5E+02	--	3.2E+03	1.7E+04	2.0E+03	1.1E+04	Yes	Yes	7E-03	--	5E-04	1E-04	9E-04	2E-04
Shooting Range Area	PAH-LowMW	Fluorene	mg/kg	0.034	0.001805	1.3E+01	1.3E+02	2.2E+02	1.2E+03	2.0E+03	1.1E+04	Yes	Yes	3E-03	3E-04	2E-04	3E-05	2E-05	3E-06
Shooting Range Area	PAH-LowMW	Naphthalene	mg/kg	0.052	0.0017	5.4E+02	2.7E+03	1.3E+02	7.3E+02	2.0E+03	1.1E+04	Yes	Yes	1E-04	2E-05	4E-04	7E-05	3E-05	5E-06
Shooting Range Area	PAH-LowMW	Phenanthrene	mg/kg	0.39	0.001864	1.5E+01	1.5E+02	7.7E+02	4.2E+03	2.0E+03	1.1E+04	Yes	Yes	3E-02	3E-03	5E-04	9E-05	2E-04	4E-05

Notes:

-- = not available, not applicable
Boeing = The Boeing Company
BTV = background threshold value
EcoRA = ecological risk assessment
EcoRBSL = ecological risk-based screening level
ERA = ecological risk assessment
mg/kg = milligram(s) per kilogram
MW = molecular weight
PAH = polycyclic aromatic hydrocarbon
Exceeds the EcoRBSL

Table 4-10. Summary of Lead Exceedances for Qualitative Data

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Receptor	CPEC	Number of Sample Locations in the Shooting Range Area	Total Number of Samples Exceeding		Location-specific Exceedances for Site Risk[a]									
					Low EcoRBSL					High EcoRBSL				
			Low EcoRBSL	High EcoRBSL	HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000	HQs from 1-5	HQs from 5-10	HQs from 10-100	HQs from 100-1,000	HQs >1,000
Baseline Exposure Scenario														
Red-tailed Hawk	Lead	324	324	39	2	33	158	102	29	25	5	9	0	0
Mule Deer	Lead	324	145	3	89	21	27	8	0	3	0	0	0	0
Bobcat	Lead	324	101	1	69	12	17	3	0	1	0	0	0	0
Subarea-level Exposure Scenario														
Red-tailed Hawk	Lead	324	317	12	126	39	114	29	9	9	2	1	0	0
Mule Deer	Lead	324	25	0	16	4	5	0	0	0	0	0	0	0
Bobcat	Lead	324	11	0	9	1	1	0	0	0	0	0	0	0
Facility-wide Exposure Scenario														
Red-tailed Hawk	Lead	324	324	23	48	66	133	62	15	14	5	4	0	0
Mule Deer	Lead	324	124	2	81	15	22	6	0	2	0	0	0	0
Bobcat	Lead	324	98	1	66	12	17	3	0	1	0	0	0	0

Notes:

[a] Site risk- numbers of sample locations within the Shooting Range Area with hazard quotients falling within the ranges of 1 to 5, 5 to 10, 10 to 100, 100 to 1,000, or over 1,000. Sample locations may or may not occur within habitat suitable for the listed receptor.

CPEC = chemical of potential ecological concern

EcoRBSL = ecological risk-based screening level

HQ = hazard quotient

Table 5-1. Uncertainty Analysis

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

Assessment Element	Uncertainty	Magnitude of Impact	Direction of Impact
Problem Formulation			
Fate and Transport	It is assumed that chemical concentrations will not change over time, and that concentrations are constant during the exposure duration. Natural attenuation and/or other degradation processes may be significant in some areas resulting in an over-estimation of exposure.	Moderate	Over-estimation of exposure/risk
Data Collection/ Analysis	Variability in analyses, laboratories, representativeness of samples, sampling errors, and homogeneity of the sample matrix can influence quality and quantity of data used in the risk assessment. Data were validated, but historical sampling programs may not have had the same standards as more recent ones.	Unknown	Over- or under-estimation of exposure/risk
Data Collection/ Analysis	Detection Limits. Historical data were noted to have overly high detection limits, especially in regard to metals. Recent sampling was designed to have detection limits meeting EcoRBSLs. However, as data are combined into the EPCs, high detection limits may influence the resulting mean and 95UCLs.	Moderate	Over-estimation of exposure/risk
Data Collection/ Analysis	The ISM data collected from the Shooting Range Area represent an area rather than a point. Interpolation of an area average between other area averages may result in an underestimation of potential risks.	Low	Under-estimation of exposure/risk
Data Collection/ Analysis	Data evaluated for the Shooting Range Area did not include ISM coarse fraction data, discrete samples from the loop trail, discrete samples from migration area (sieved), pre-RFI data, or RFI data. These data were evaluated qualitatively and support the recommendations made for the Shooting Range Area based on the data retained for the quantitative risk assessment.	Low	Under-estimation of exposure/risk
Representative Species	Representative species were selected to reduce uncertainty; however, differences among species including physiology, reproductive biology, and/or foraging habits can result in different exposures and sensitivities for different receptors.	Low	Over- or under-estimation of exposure/risk
Exposure Pathway Analysis	Dermal and inhalation (for surface-dwelling animals) exposure pathways were not quantified.	Low	Under-estimation of
Analysis			
Bioavailability	Bioavailability of CPECs was assumed to be 100 percent. This likely overestimates risk to receptors at the site.	Low	Over-estimation of exposure/risk
Exposure Point Concentrations	The maximum detected concentration from 0-2 feet at each sample location was used as the EPC. Area averaging was not done as interpolation of risks required a point-by-point evaluation. The use of the maximum detect is considered to be a likely overestimation of the representative EPC because samples were collected in areas likely to have the highest concentrations at the site.	Moderate	Over-estimation of exposure/risk
EcoRBSLs	Toxicity data were not available for all CPECs or media considered in the ERA. CPECs for which toxicity data were unavailable were not evaluated, or surrogate toxicity data were used. Risks may be overestimated or underestimated.	Moderate	Over- or under-estimation of exposure/risk
Risk Characterization			
Risk Estimation	Potential ecological risks were quantified using the HQ approach and then interpolated across the SSFL. The magnitude of the location-specific HQs indicates potential for ecological risk, but is not an exact estimation of risk. For example, the actual risk from a chemical with an HQ of 70 could be less than that for a chemical with an HQ of 20 because of uncertainties involved in estimating exposure, selection of effects criteria (TRVs), or field conditions affecting exposure.	Moderate	Over- or under-estimation of risks
Incremental Risk Estimation	Incremental HQs and group HIs were only calculated when background data were available. For Chemical group HI, analytes missing background data were not included in the Incremental HI. This potentially results in an underestimation of incremental risks for groups, however the Site HIs are used to determine if (a) the group as a whole (HI) poses a potential risk even if all individual chemical HQs are less than 1, and (b) if so, identify the primary risk contributors to the chemical group HI. Incremental HIs are given a lower weight of evidence in the WOE than Site HIs.	Low	Under-estimation of exposure/risk

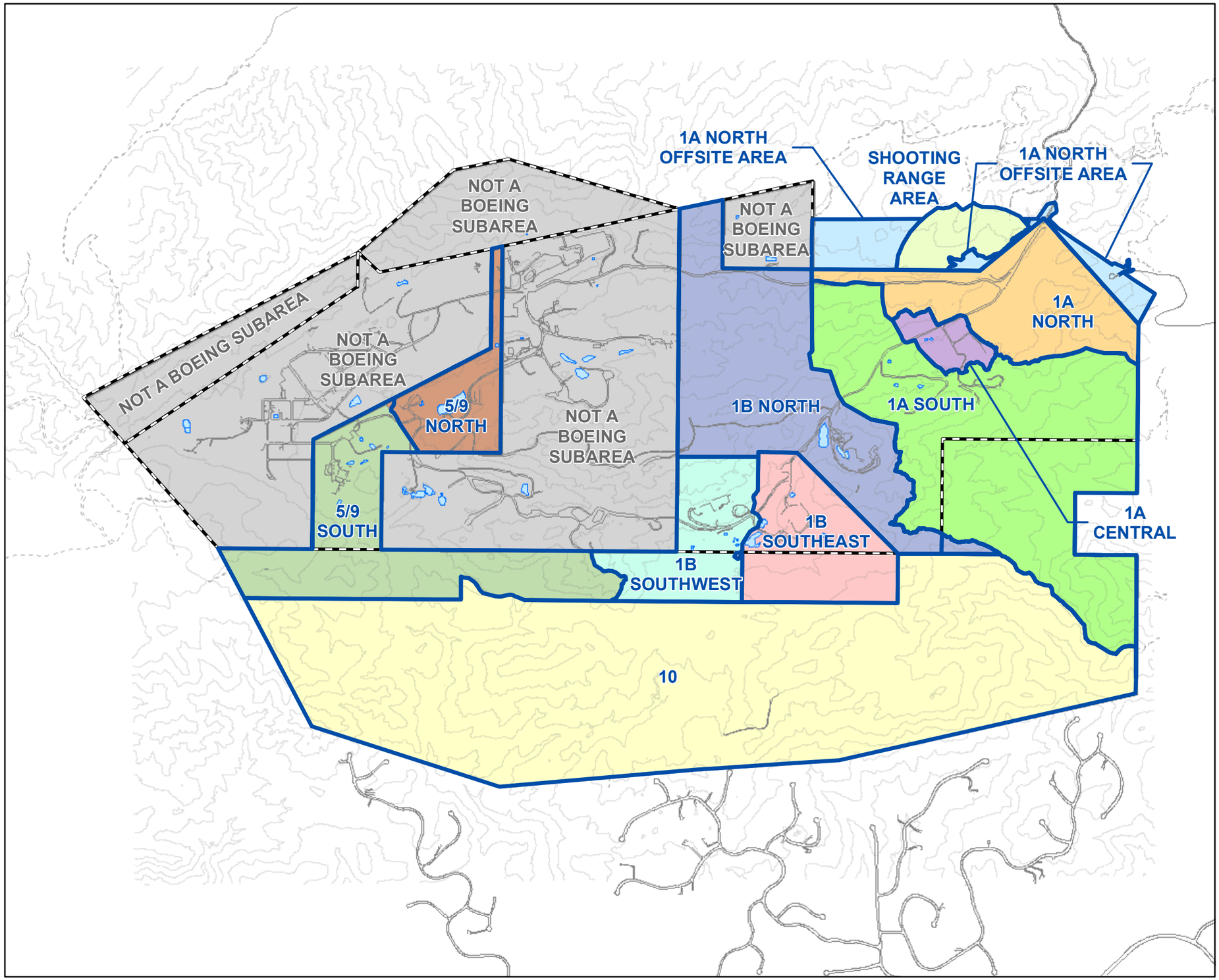
Table 5-1. Uncertainty Analysis

Large Home Range Receptor Ecological Risk Assessment, Santa Susana Field Laboratory, Ventura County, California

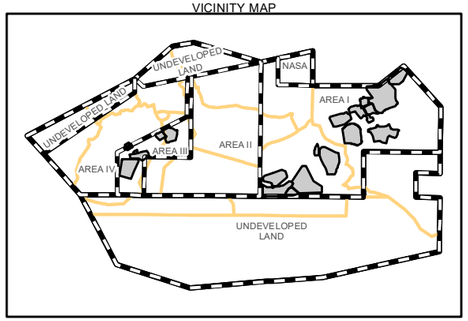
Assessment Element	Uncertainty	Magnitude of Impact	Direction of Impact
Risk Interpolation	Interpolation of potential risks was completed using IDW method. The IDW interpolation method determines values for areas without measured data using a linear-weighted combination of the nearest measured sample points. The weight assigned is a function of the distance between an input point (sample location) and the output location. The greater the distance, the less influence the input point has on the output and the greater the uncertainty in the risk estimate between the two points. Specific instances where the interpolation was impacted or could not be completed are as follows: -If most of the samples were nondetect, potential risks may not show on interpolation (primarily noted for pentachlorophenol). -If the distance between samples with exceedances was large, the interpolated risks may be estimated high and extend beyond reasonable limits based on a few samples. This is noted for the interpolations for di-n-butyl phthalate. Uncertainty exists in the actual extent of potential risks in this instance. -If there are very few samples and the distance between them is large, the interpolation model attempts to interpolate between those points and results in extreme overestimation of risks. In these cases, the location-specific HQs were shown on the figures instead of the interpolation (specifically, PCB_TEQs). -If there are no sample locations beyond the facility boundary, the interpolation between the closest sample location and the site boundary is uncertain. This is noted for a small area at the eastern edge of the Subarea 1A North Offsite Areas and along the southernmost boundary of Subarea 10 (primarily noted for lead and nickel).	Moderate	Over- or under-estimation of risks

Notes:
95UCL = 95 percent upper confidence level
CPEC = chemical of potential ecological concern
EPC = exposure point concentration
ERA = ecological risk assessment
HI = hazard index
HQ = hazard quotient
IDW = inverse distance weight
ISM = incremental sampling methodology
PCB = polychlorinated biphenyl
RBSL = risk-based screening level
RCRA = Resource Conservation and Recovery Act
RFI = RCRA facility investigation
SSFL = Santa Susana Field Laboratory
TEQ =toxicity equivalent
TRV = toxicity reference value
WOE = weight of evidence

Figures



VICINITY MAP



LEGEND

- Elevation Contour Line (100-foot interval)
- Paved Road
- Evaluation Areas
- Non-Boeing
- Administrative Boundary

N

0 750 1,500

Feet

1 in = 1,607 ft

FIGURE 1-1
Boeing Evaluation Areas
Large Home Range Receptor Ecological Risk Assessment
Santa Susana Field Laboratory, Ventura County, California

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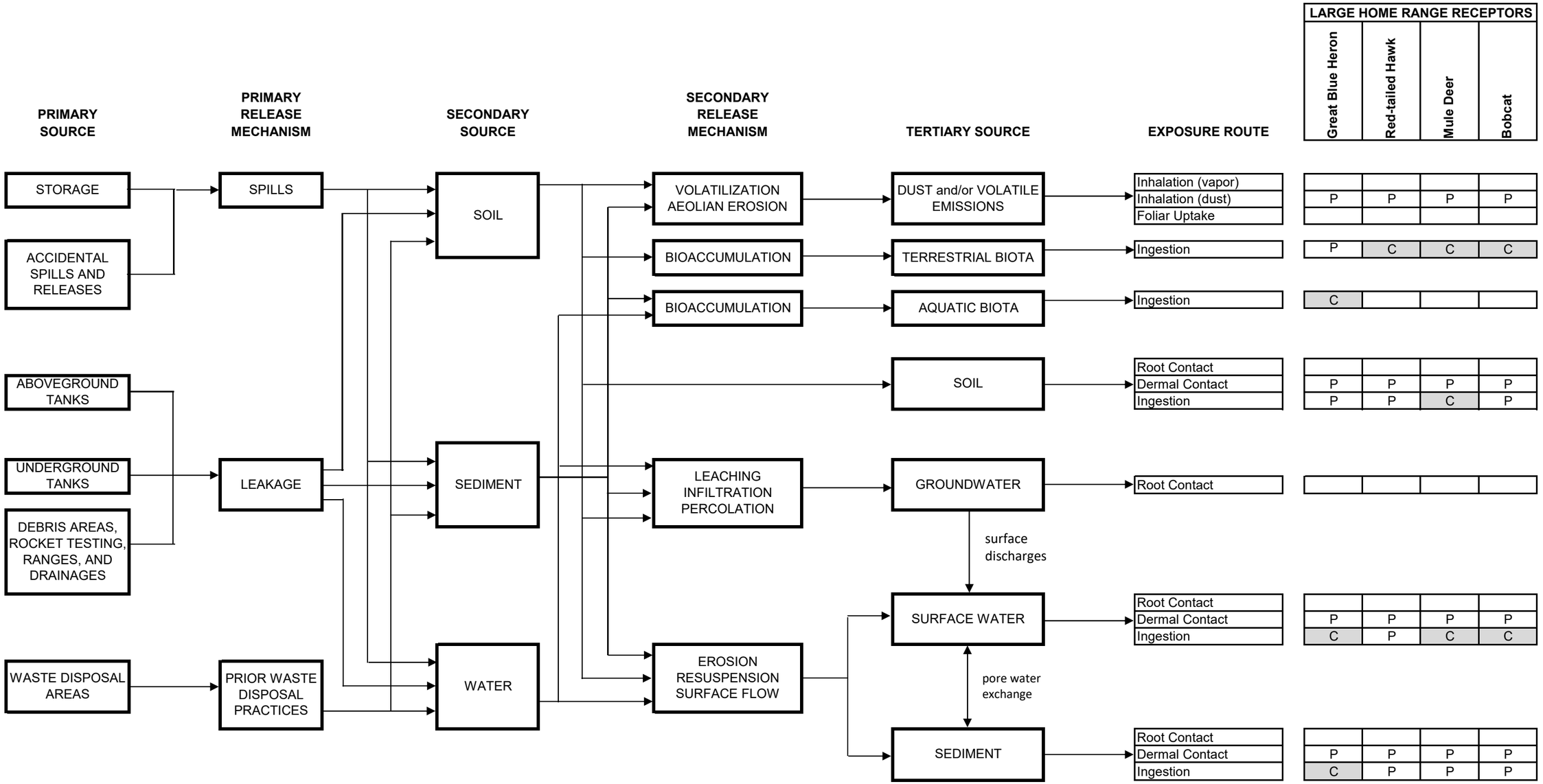

Notes:
C - Pathway considered complete for purposes of this ecological risk assessment.
P - Pathway considered potentially complete.
Blank - Pathway considered incomplete and not evaluated in this ecological risk assessment.
Pathway evaluated quantitatively or qualitatively.

FIGURE 2-1
Ecological Conceptual Site Model for Large Home Range Receptors
Large Home Range Receptor Ecological Risk Assessment
Santa Susana Field Laboratory, Ventura County California

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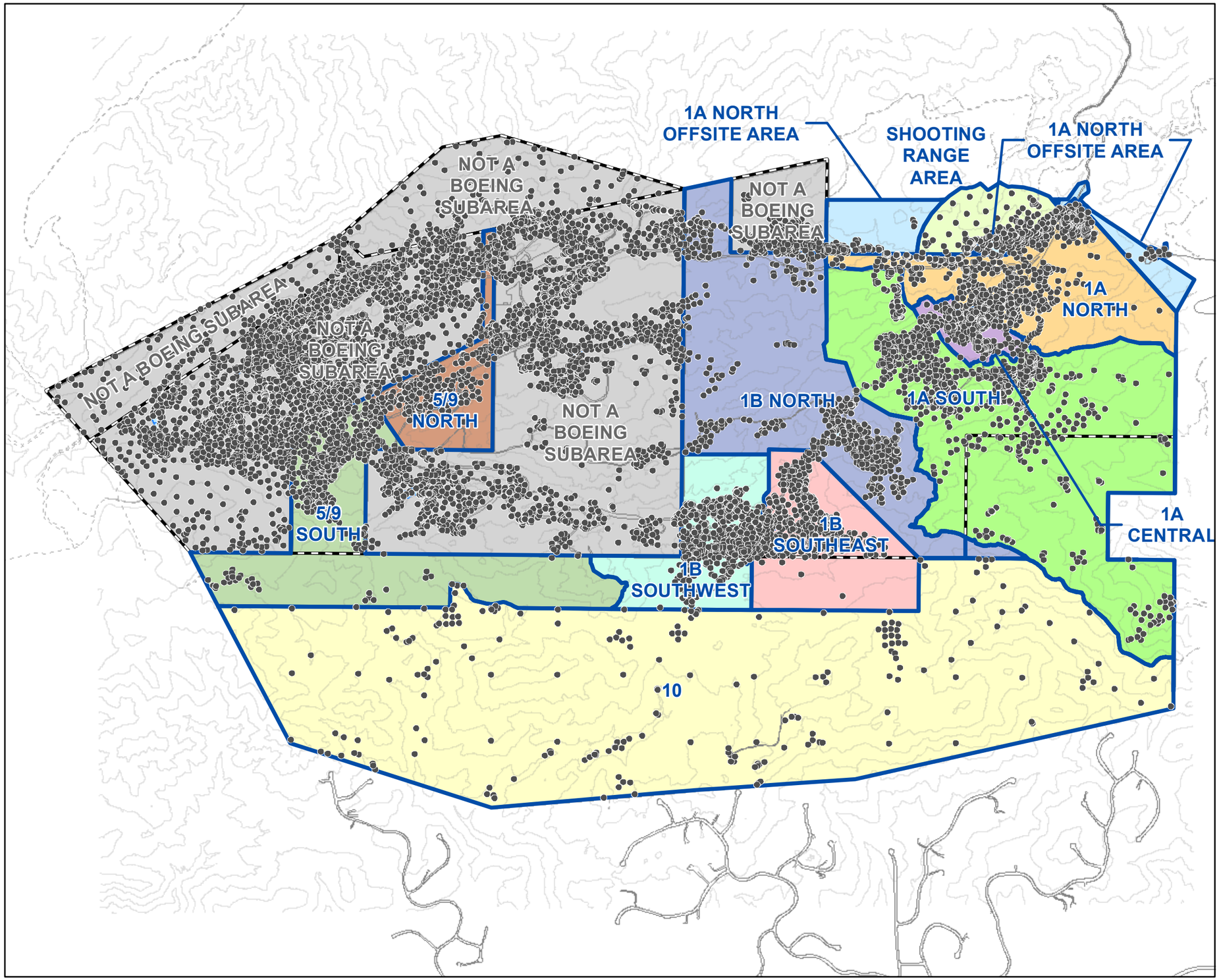

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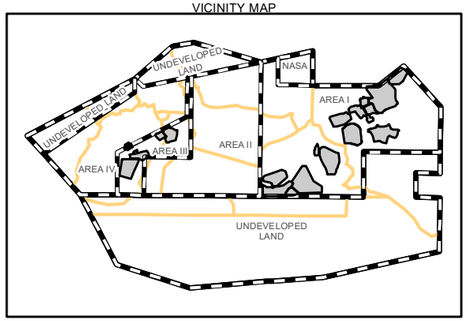


LEGEND

- Sample Locations Evaluated in the LHRERA
- Elevation Contour Line (100-foot interval)
- Paved Road
- Evaluation Areas
- Non-Boeing
- Administrative Boundary

N

0 750 1,500

Feet

1 in = 1,500 ft

FIGURE 2-2
Sample Locations
Large Home Range Receptor Ecological Risk Assessment
Santa Susana Field Laboratory, Ventura County, California

JACOBS

SCO \\DC1VS01\GISPROJ\B\BOEING\SSFL\MAPS\REPORT\LHRERA\LHRERA_FIGURE2-2_SAMPLE_LOCATIONS.MXD NY032148 9/9/2020 5:08:03 PM

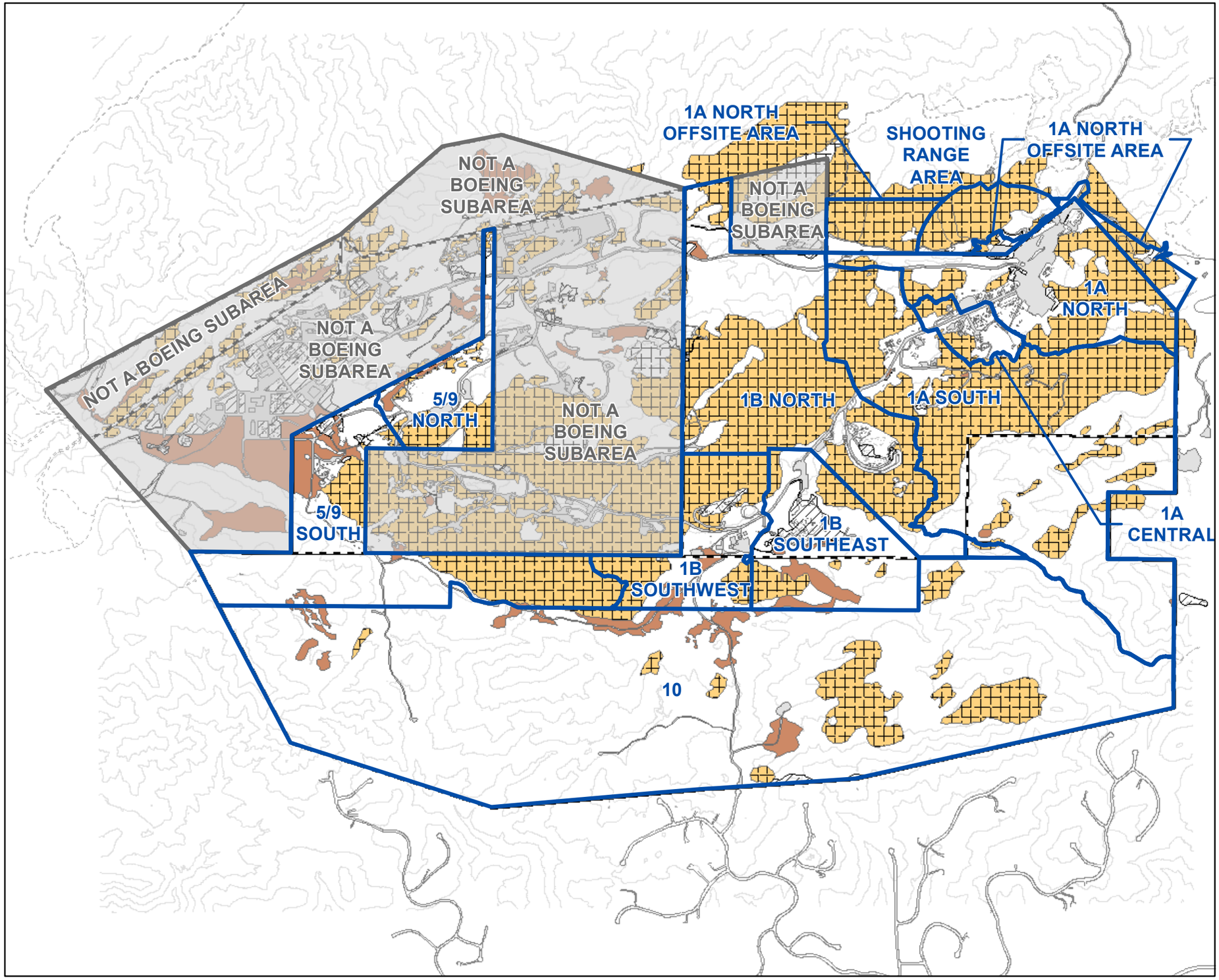


FIGURE 3-1
Suitable Habitat for Red-tailed Hawk
Large Home Range Receptor Ecological Risk Assessment
Santa Susana Field Laboratory, Ventura County, California

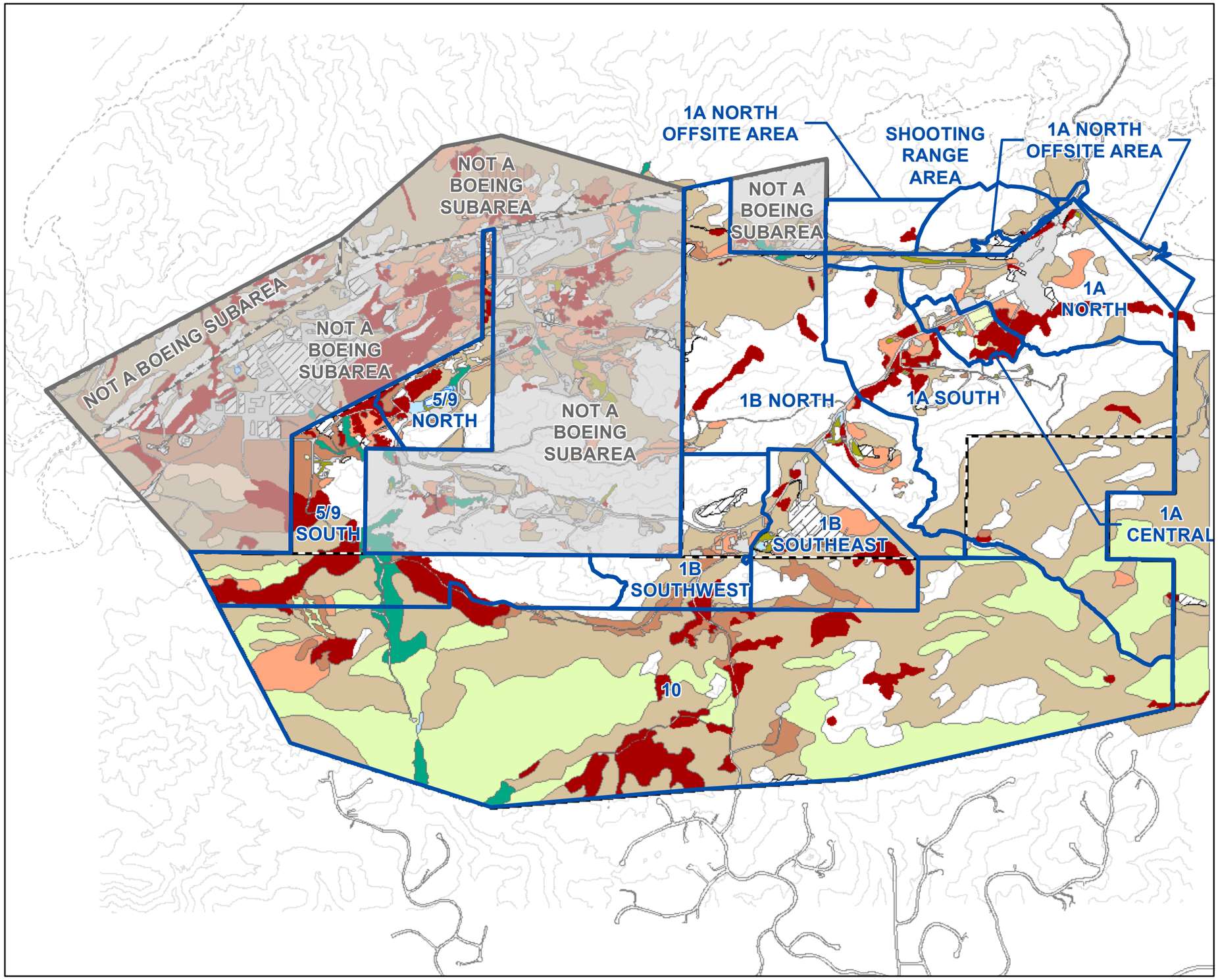


FIGURE 3-2
Suitable Habitat for Mule Deer
Large Home Range Receptor Ecological Risk Assessment
Santa Susana Field Laboratory, Ventura County, California

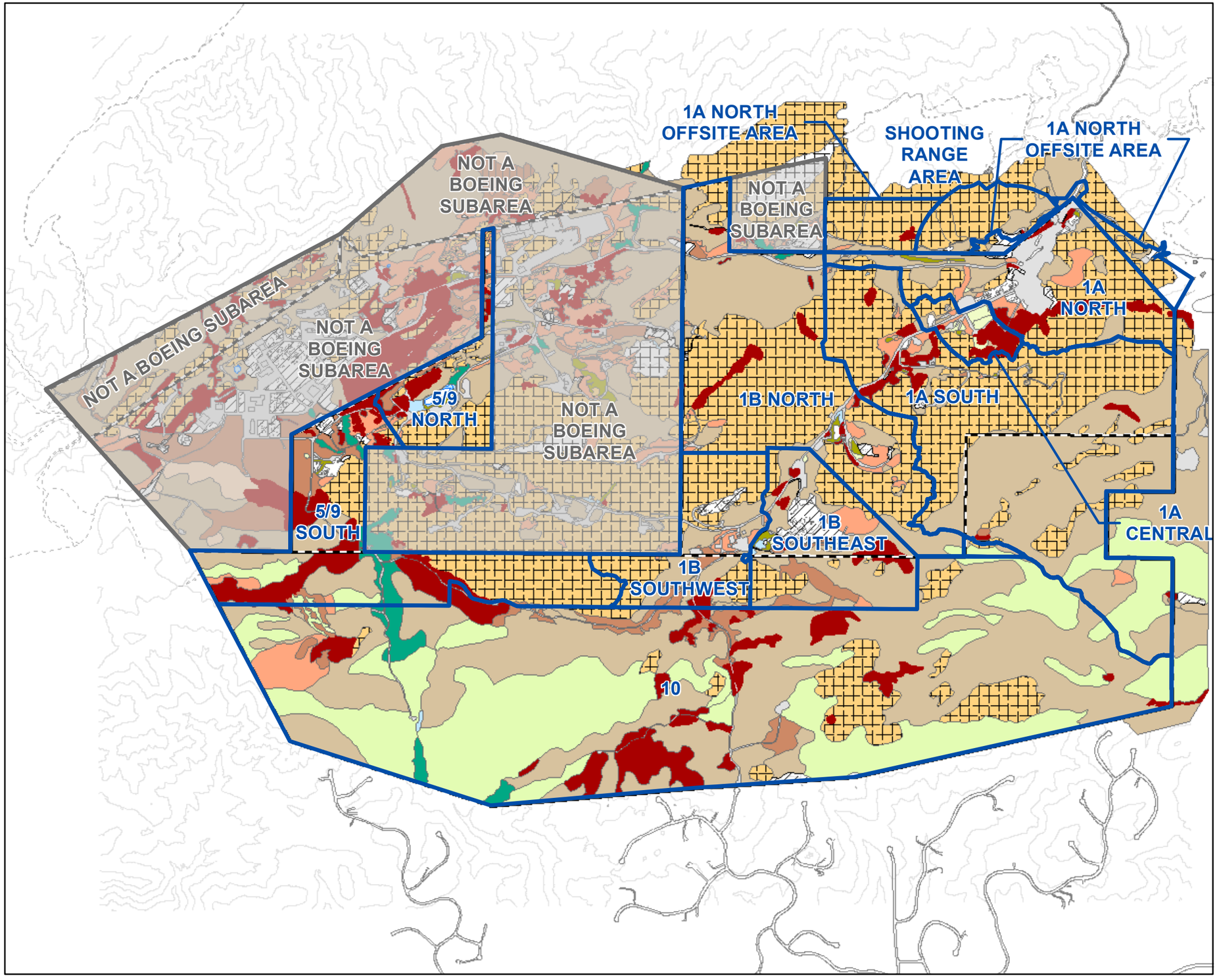
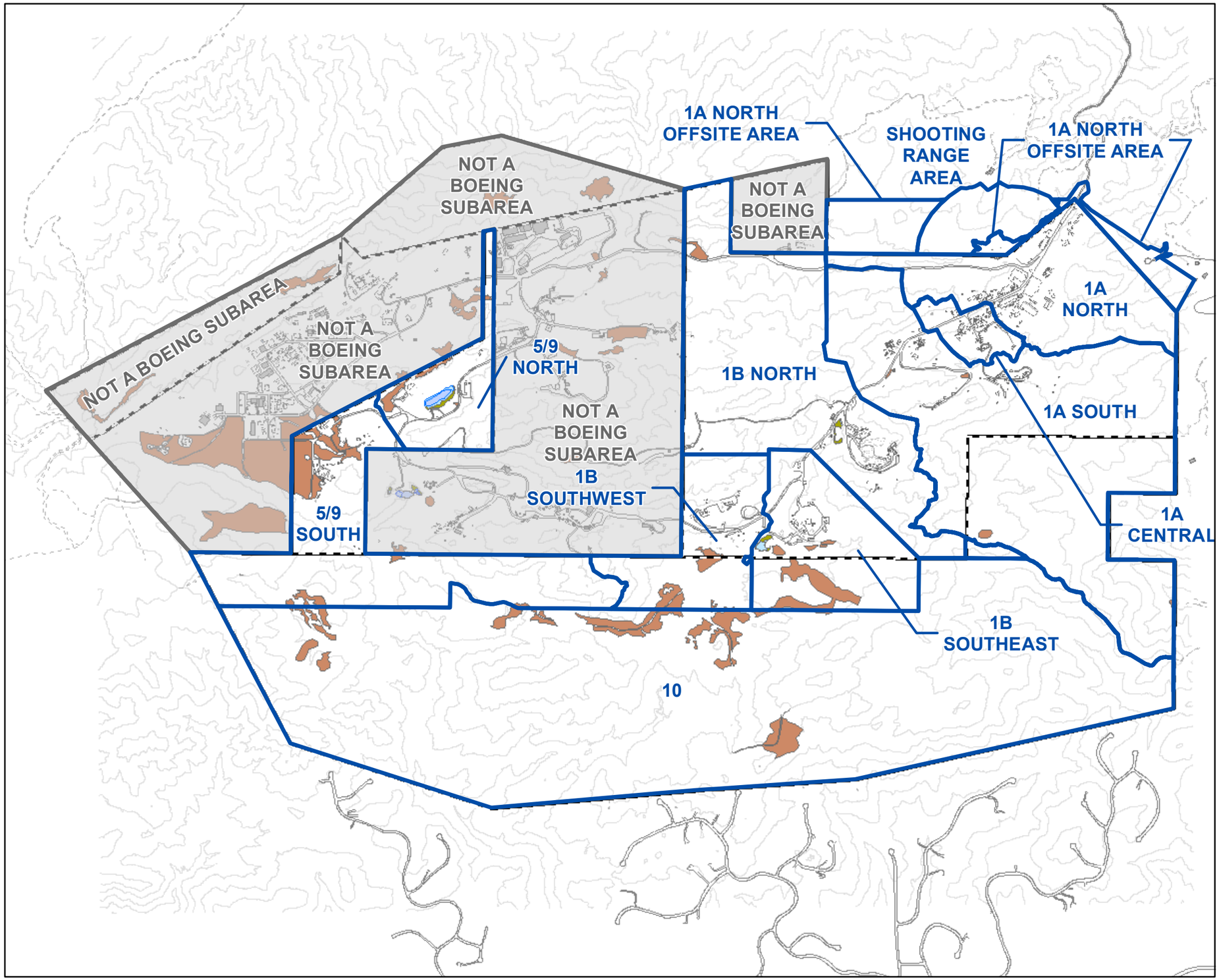


FIGURE 3-3
Suitable Habitat for Bobcat
Large Home Range Receptor Ecological Risk Assessment
Santa Susana Field Laboratory, Ventura County, California



LEGEND

- Elevation Contour Line (100-foot interval)
- Paved Road
- Evaluation Areas
- Non-Boeing
- Administrative Boundary

Suitable Great Blue Heron Habitat

- Grassland
- Mulefat Scrub
- Open Water
- Pond/ Potential wetland
- Southern Willow Scrub
- Venturan Coastal Sage Scrub
- Wetland

N

0 750 1,500
Feet
1 in = 1,500 ft

FIGURE 3-4
Suitable Habitat for Great Blue Heron
Large Home Range Receptor Ecological Risk Assessment
Santa Susana Field Laboratory, Ventura County, California

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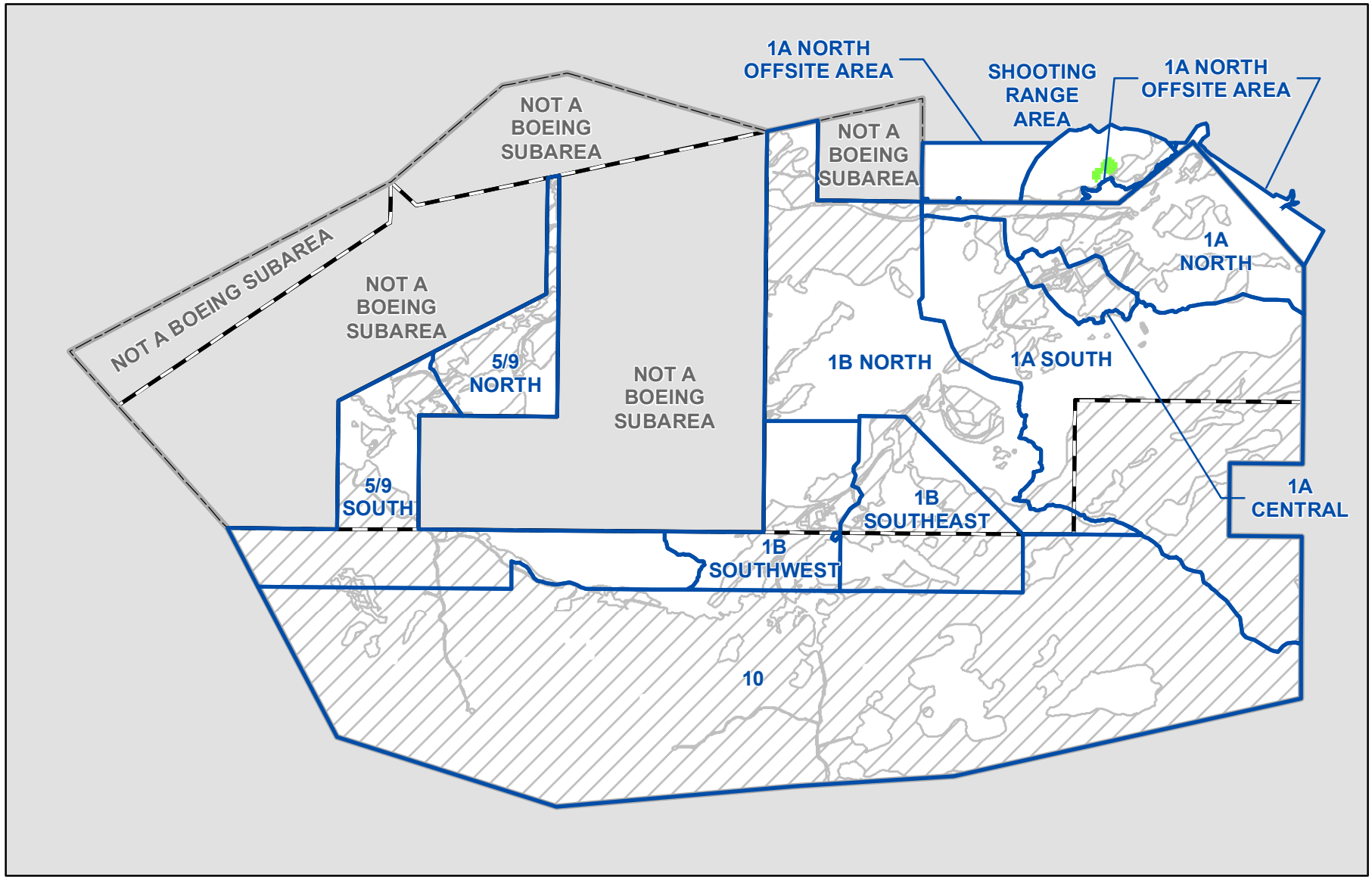

LEGEND

- Evaluation Areas
- Site Property
- Unsuitable Habitat
- Not a Boeing Subarea

Hazard Quotient

- HQ <1
- HQ 1 - 5
- HQ 5 - 10
- HQ 10 - 100
- HQ 100 - 1,000
- HQ > 1,000

Incremental High EcoRBSL

N

0 1,000 2,000

Feet

Note: Based on risks for red-tailed hawk under the facility-wide exposure scenario

FIGURE 6-1
Recommended CMS Areas for Lead
Large Home Range Receptor Ecological Risk Assessment
Santa Susana Field Laboratory, Ventura County, California

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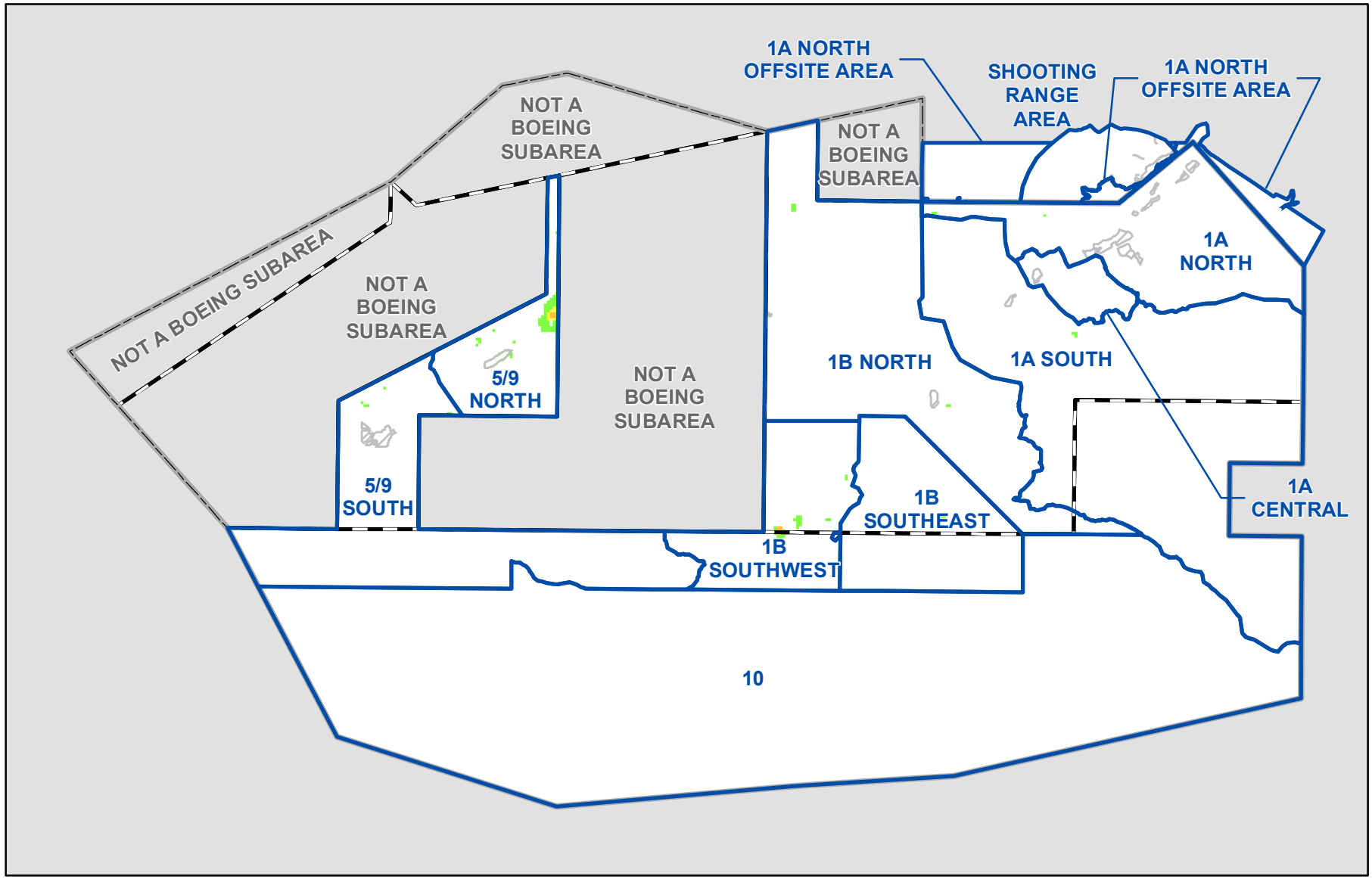

LEGEND

- Evaluation Areas
- Site Property
- Unsuitable Habitat
- Not a Boeing Subarea

Hazard Quotient

- HQ <1
- HQ 1 - 5
- HQ 5 - 10
- HQ 10 - 100
- HQ 100 - 1,000
- HQ > 1,000

Incremental High EcoRBSL

N

0 1,000 2,000

Feet

Note: Based on risks for bobcat under the facility-wide exposure scenario

FIGURE 6-2
Recommended CMS Areas for 2,3,7,8-TCDD_TEQ_Mammal
Large Home Range Receptor Ecological Risk Assessment
Santa Susana Field Laboratory, Ventura County, California

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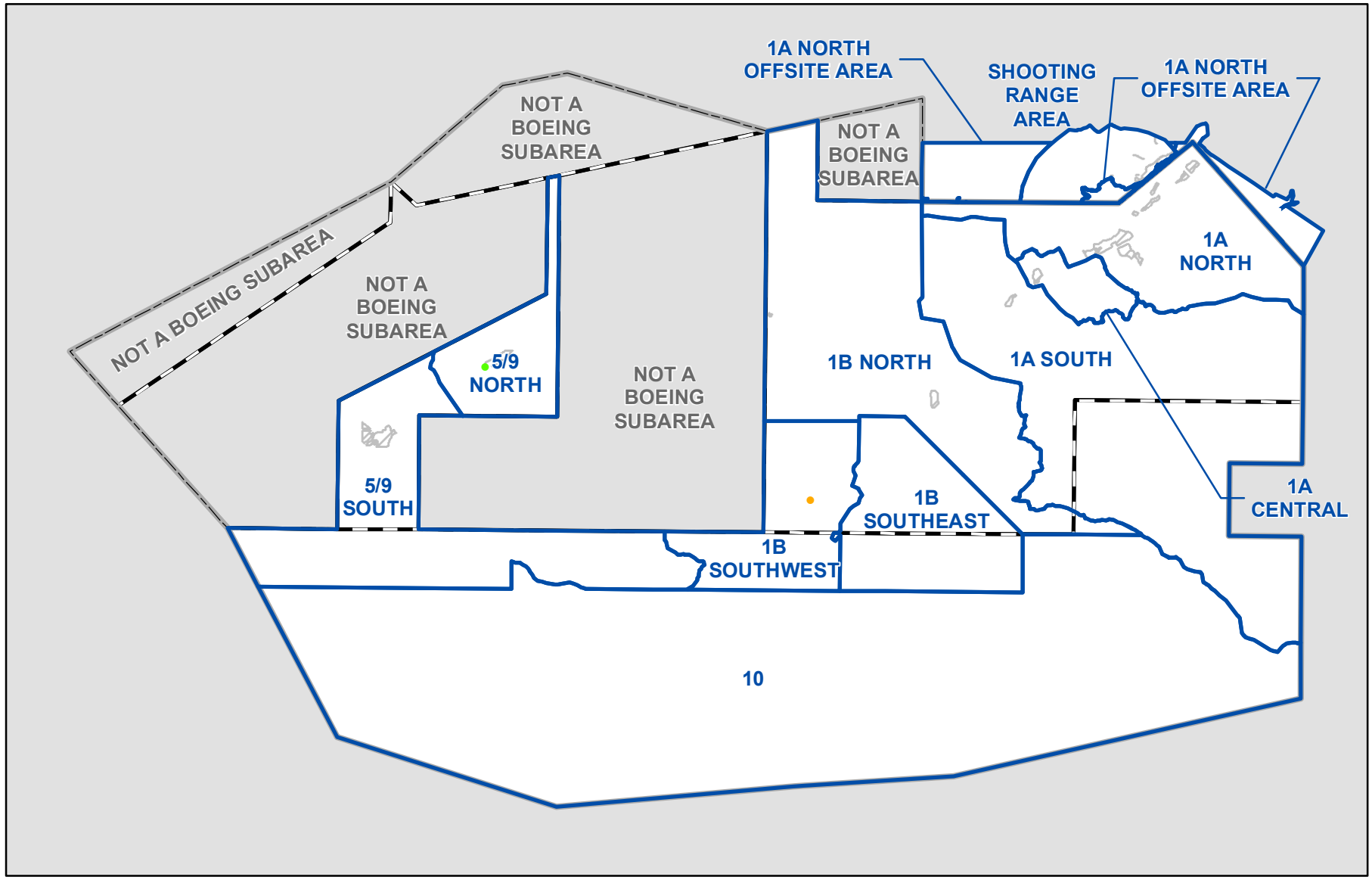

LEGEND

- Evaluation Areas
- Site Property
- Unsuitable Habitat
- Not a Boeing Subarea

Hazard Quotient

- HQ <1
- HQ 1 - 5
- HQ 5 - 10
- HQ 10 - 100
- HQ 100 - 1,000
- HQ > 1,000

Site High EcoRBSL

N

0 1,000 2,000

Feet

Note: Based on risks for bobcat under the facility-wide exposure scenario

FIGURE 6-3
Recommended CMS Areas for PCB_TEQ_Mammal
Large Home Range Receptor Ecological Risk Assessment
Santa Susana Field Laboratory, Ventura County, California

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Appendix A
Large Home Range Ecological Risk Assessment Database

Files are provided electronically only.

Appendix B
Location-specific Risk Calculations

Files are provided electronically only.

Appendix C
Risk Interpolations for the Baseline Exposure Scenario

Files are provided electronically only.

Appendix D
Risk Interpolations for the Subarea-level Exposure Scenario

Files are provided electronically only.

Appendix E
Risk Interpolations for the Facility-wide Exposure Scenario

Files are provided electronically only.